



U.S. DEPARTMENT OF AGRICULTURE

Natural Resource Conservation Service EAXX-005-53-048-1130642336 August 2026

# Appendix F: Environmental Assessment for the Supplemental Watershed Plan No. 1 Rehabilitation of Upper San Marcos Watershed Dam No. 4 & 5



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## PROPOSAL INFORMATION

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### General Information

**Proposal Name:** Supplemental Watershed Plan No. 1 – for the Rehabilitation of Upper San Marcos Watershed Dam No. 4 & 5

**Proposal Tracking #:** EAXX-005-53-048-1130642336

**Proposal Initiation Date:** 6/25/2025

**Proponent Name:** City of San Marcos, Hays County Soil and Water Conservation District, and Upper San Marcos Watershed Reclamation and Flood Control District

**Signing Authority:** TX State Resource Conservationist

**Responsible Official:** Kristy Oates

**Unit:** Texas State Office (Engineering)

**General Location of Proposal:** The project area is the portion of the Purgatory Creek subbasin that encompasses the upstream and catchment areas and downstream benefitted areas for USM Sites 4 and 5, which are located approximately 4.5 and 1.8 miles west of San Marcos.

### Purpose and Need: Why do we need to act?

Purpose: To reduce the risk of loss of life due to catastrophic dam failure, provide flood protection for life and property upstream and downstream of the dams, and to find a solution to meet compliance with current NRCS and State of Texas safety performance standards

Need: Upper San Marcos Floodwater Retarding Structures No. 4 and No. 5 (USM 4 and 5) were originally constructed as Class C high hazard dams. The proposed action is needed to address public health and safety concerns that USM 4 and 5 NRCS TR 60 design criteria and performance standards regarding passing the 24-hour principal spillway hydrograph without engaging the auxiliary spillway and passing the 24-hour freeboard hydrograph without overtopping the dam. The Texas Commission of Environmental Quality (TCEQ) determined the dams were out of compliance with Dam safety regulations.

### Proposed Action: What are we proposing to do?

Alternative 6 is the preferred alternative and includes the structural rehabilitation of Upper San Marcos Watershed Sites 4 and 5 to meet current NRCS and TCEQ safety criteria and performance standards for high-hazard dams. This alternative involves converting the existing earthen auxiliary spillways at both dams into roller-compacted concrete structural combined spillways.

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

**Alternative No. 1: No-Action** – This plan is also considered the future without Federal investment (FWOFI), in which no Federal funds are expended on the project. This is a true no-action alternative, in which no rehabilitation measures take place. The dams would remain in their current configuration with regular maintenance continuing. The dams would not be in compliance with the NRCS or State of Texas criteria for high-hazard dams, and the embankments would remain in place with elevated breach risk. There would be no mitigation measures implemented.

**Alternative No. 2: Decommissioning** – This alternative would remove a portion of the existing embankments of the dam to eliminate all storage capacity and reconnect and stabilize the historic stream channel and floodplain alignment. Mitigation measures would focus on restoration and stabilization of the stream channel and floodplain functions. Mitigation of induced damages includes buyout of the impacted structures, raising the impacted roadways, and bridge and culvert improvements.

**Alternative No. 3: Rehabilitation:** Site 4: No primary spillway modifications (no extension required with anticipated dam raise). Convert earthen auxiliary spillway to roller compacted concrete (RCC) combined spillway. Auxiliary spillway remains 365 feet wide. Raise combined spillway crest 11.6 feet (to elevation 885.0 feet). Raise top of dam 6.4 feet (to elevation 896.2 feet). Affected properties – one residence would be in new flood pool of dam (not within the induced pool created by the 100-year 24-hour storm event)

Site 5: No primary spillway modifications (no extension required with anticipated dam raise). Convert earthen auxiliary spillway to RCC combined spillway. Widen auxiliary spillway to 385 feet (85 foot increase). No modification to combined spillway crest elevation. No modification to top of dam elevation. No affected properties.

**Alternative No. 4: Rehabilitation:** Site 4: No primary spillway modifications (no extension required with anticipated dam raise). Convert earthen auxiliary spillway to RCC combined spillway. Auxiliary spillway remains 365 feet wide. Raise combined spillway crest 11.6 feet (to elevation 885.0 feet). Raise top of dam 6.4 feet (to elevation 896.2 feet). Affected properties – one residence would be in new flood pool of dam (not within the induced pool created by the 100-year 24-hour storm event).

Site 5: No primary spillway modifications (no extension required with anticipated dam raise). Convert earthen auxiliary spillway to RCC combined spillway. Auxiliary spillway remains 300 feet wide. No modification to combined spillway crest elevation. Raise top of dam 2.4 feet (to elevation 669.6 feet). Affected properties - 2 homes below new top of dam elevation (not within the induced pool created by the 100-year 24-hour storm even.

**Alternative No. 5: Rehabilitation:** Site 4: No primary spillway modifications (no extension required with anticipated dam raise). Convert earthen auxiliary spillway to RCC combined spillway. Auxiliary spillway remains 365 feet wide. Raise combined

spillway crest 6.6 feet (to elevation 880.0 feet). Raise top of dam 1.7 feet (to elevation 891.45 feet). No affected properties.

Site 5: No primary spillway modifications (no extension required with anticipated dam raise). Convert earthen auxiliary spillway to RCC combined spillway. Widen auxiliary spillway to 405 feet (105 foot increase). No modification to combined spillway crest elevation. No modification to top of dam elevation. No affected properties.

## **Alternatives Considered but Not Analyzed in Detail**

### **ALTERNATIVE NO. 7 – SPILLWAY AND DAM EMBANKMENT MODIFICATIONS**

Modifications to the principal spillway (48-inch diameter reinforced concrete pipe) were evaluated to bring USM Site 4 into compliance with NRCS' principal spillway hydrograph requirement, but it was found that increasing the principal spillway capacity led to increased intensity of flooding downstream. This increased intensity of flooding downstream adversely impacts the USM Site 5 dam, and therefore, the alternatives that included modifications to the principal spillway were removed from further study.

Modifying the principal spillway was determined to not be a viable alternative to meet the purpose and need of the project, therefore modifications to the auxiliary spillway were explored. Raising the crest of the auxiliary spillway to an elevation to prevent activation during the principal spillway hydrograph was one option that was explored. To meet the NRCS requirement, the auxiliary spillway crest would need to be raised to elevation 892.71 feet, which is an 18-foot or more raise and nearly 3 feet above the existing top of dam (889.80). This change would put an upstream residence into the 100-year flood pool, as its low elevation would be below the auxiliary spillway crest. The top of dam would need to be raised above elevation 905 feet. This modification would still not meet the NRCS' stability design hydrograph requirements, so the auxiliary spillway would need to be armored. The design shear and velocity would necessitate the use of roller compacted concrete, as they are over the allowable limits for articulated concrete block armoring.

It was also determined that raising the auxiliary crest over elevation 885 feet did not provide any additional reduction in maximum pool elevation or additional reduction in peak flowrates downstream of USM Site 5. This outcome results because the peak flowrate from the drainage basin to USM Site 5 cannot be reduced by any changes at USM Site 4, and once the auxiliary spillway crest is increased to 885.0 feet, the peak outflow at USM Site 5 from its own drainage area is larger than the peak outflow caused by the routed outflow from USM Site 4. This condition is illustrated in Figure 12, which shows the inflow hydrographs and outflow hydrographs at USM Site 5 in the existing condition and with a raised spillway crest at USM Site 4.

Alternatives that included widening the new structural combined spillway were also considered. Due to the structural combined spillway being activated during frequent storm events, any widening of the spillway results in increased flow to USM Site 5, thus increasing the peak flood pool elevation and flood elevations downstream, which would not meet the purpose and need of the project.

## **ALTERNATIVE NO. 8 – SPILLWAY AND DAM EMBANKMENT MODIFICATIONS**

The large number of homes in proximity both upstream and downstream of USM Site 5 pose challenges for the alternative configurations that can be pursued.

Modifications to the principal spillway (5-foot x 5.5-foot reinforced concrete box) were evaluated to bring USM Site 5 into compliance with NRCS' principal spillway hydrograph requirement, but it was found that increasing the principal spillway capacity led to increased intensity of flooding downstream. Therefore, the alternatives that included modifications to the principal spillway were removed from further study because they did not meet the project's purpose and need.

Because modifying the principal spillway was determined to not be a viable alternative to meet the purpose and need of the project, modifications to the auxiliary spillway were then explored. Raising the crest of the auxiliary spillway to an elevation to prevent activation during the NRCS principal spillway hydrograph was one option that was explored. To meet the NRCS principal spillway hydrograph requirement, the auxiliary spillway crest would need to be raised to elevation

674.98 feet, which is a raise of more than 24 feet and nearly 8 feet above the existing top of dam (667.20). Raising the auxiliary spillway crest would also put over 20 homes, 5 student housing complex buildings, and State Highway 12 into the 100-year floodplain.

As with USM Site 4, raising the auxiliary spillway was not a viable alternative to meet the NRCS principal spillway hydrograph requirement, as the auxiliary spillway would be activated more frequently than the NRCS principal spillway hydrograph storm. Because of this condition, the auxiliary spillway would have to be converted to a structural combined spillway, which is a control structure that acts as both the primary and auxiliary spillway, and it must be armored to protect against erosive forces. This could be accomplished by using roller compacted concrete, which would also meet the NRCS' spillway integrity and stability requirements.

## INTERDISCIPLINARY PROPOSAL SCREENING

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

- ☒ Endangered Species Act (ESA)
- ☒ National Historic Preservation Act (NHPA)
- ☒ Tribal Consultation (EO 13175)
- ☒ Clean Air Act (CAA)
- ☐ Clean Water Act (CWA)
- ☒ Pertinent Executive Orders

### **Special Management Areas:**

- ☐ Coastal Zone Management Areas
- ☐ Conservation Easements
- ☐ Coral Reefs
- ☐ Inventoried Roadless
- ☐ Marine Sanctuaries
- ☐ National Recreation Areas
- ☐ National Scenic & Historic Trails
- ☐ Research or Experimental Areas
- ☐ Wild & Scenic River Corridors
- ☐ Wilderness
- ☐ Other: Soils (including Prime Farmland), Water, Sole Source Aquifer, Floodplain Management, Air Quality, Vegetation (Riparian Areas, Special Status Plant Species, Invasive Plant Species), Wildlife (Terrestrial Wildlife Communities), State Protected Threatened and Endangered Species



## **Scope of Analysis**

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

USM Sites 4 and 5 are located in the central portion of the Purgatory Creek subbasin, which is one of four basins that make up the Upper San Marcos River Watershed, 8-digit hydrologic code 12100203. The watershed encompasses 94.6 square miles (60,605 acres) and is divided into four main drainage basins or subbasins: Purgatory Creek (36.96 mi<sup>2</sup>/23,698 acres), Sessom Creek (0.63 mi<sup>2</sup>/402 acres), Sink Creek (48.26 mi<sup>2</sup>/30,906 acres), and Willow Creek (5.90 mi<sup>2</sup>/3,778 acres). The project area is the portion of the Purgatory Creek subbasin that encompasses the upstream and catchment areas and downstream benefitted areas for USM Sites 4 and 5, which are located approximately 4.5 and 1.8 miles west of San Marcos.

## **Agencies and Persons Consulted**

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

### **Agencies/ Organizations/Businesses**

Federal:

- U.S. Army Corps of Engineers
- U.S. Department of the Interior

State:

- Texas Commission on Environmental Quality
- Texas Parks and Wildlife Department
- Texas Historical Commission

### **Native American Tribes**

- Apache Tribe of Oklahoma
- Comanche Nation of Oklahoma
- Tonkawa Tribe of Indians of Oklahoma
- Wichita and Affiliated Tribes of Oklahoma

### **Individuals**

- Landowners potentially impacted by construction or breach

Table 1: Applicable proposal record documentation to support agencies/persons consulted

| Documentation Type                                   | File Name (if applicable/needed) |
|------------------------------------------------------|----------------------------------|
| Copies of project correspondence and public comments | Appendix A                       |

## Substantive Issues Considered for Analysis

| Resource Concerns     | Relevant to Proposed Action |    | Rationale for relevance vs non-relevance                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------|-----------------------------|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       | Yes                         | No |                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Soils                 |                             |    |                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Soils                 | X                           |    | Potential for soil disturbance is present for all alternatives. Best management practices (BMPs) should be used to minimize soil. loss, erosion, and sedimentation during construction when effects are most likely to occur. Therefore, soil resources are relevant.                                                                                                                                                                      |
| Water Resources       |                             |    |                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Floodplain Management | X                           |    | USM Sites 4 and 5 are within and affect the regulatory floodplain of Purgatory Creek.                                                                                                                                                                                                                                                                                                                                                      |
| Water Quality         | X                           |    | Segment 1814 of Purgatory Creek located downstream of USM Site 5 dam is on the 2024 Texas 303(d) list of impaired waters but is not currently subject to total maximum daily load (TMDL) requirements. It Is subject to the Upper San Marcos River Watershed Protection Plan. Regional water quality measures and BMPs are in place to provide higher levels of water quality and enhance protection of threatened and endangered species. |
| Ground Water          | X                           |    | A significant portion of groundwater in the project area is attributed to spring flows, which comprise the majority of flows in the Upper San Marcos River. This water acts as a major regional water source that supports municipal supply, agriculture, endangered species and downstream ecosystems.                                                                                                                                    |
| Air Resources         |                             |    |                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Climate               | X                           |    | The contribution of greenhouse gas emissions from any of the alternatives to aggregate state and national global greenhouse gas emissions would be negligible. Anthropogenic climate change could potentially impact local resources like hydrology.                                                                                                                                                                                       |

| Resource Concerns                 | Relevant to Proposed Action |    | Rationale for relevance vs non-relevance                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------|-----------------------------|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                   | Yes                         | No |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Plant and Aimal Resources         |                             |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Fish and Wildlife Habitat         | X                           |    | While there are many common wildlife species present within the study area, the absence of relatively permanent water prohibits the presence of fish or commercial fisheries within proximity of either dam site.                                                                                                                                                                                                                                                                                                 |
| Threatened and Endangered Species | X                           |    | There are 32 Federal and State listed threatened and endangered species that may be present within Hays County. Threatened and endangered species are relevant.                                                                                                                                                                                                                                                                                                                                                   |
| Migratory Birds                   | X                           |    | Some migratory bird species were observed in the project area during pedestrian surveys. While no migratory bird nests were observed, migratory birds are likely to nest in the area.                                                                                                                                                                                                                                                                                                                             |
| Invasive Species                  | X                           |    | One invasive plant and one wildlife species were observed at both sites during the pedestrian survey. No evidence of invasive animals, fungi, or microbial organisms were observed. Site and soil disturbance during construction could facilitate spread of the invasive plant species. Implementing BMPs, including contractor requirements to clean equipment prior to arriving on site and before leaving the site, will minimize potential spread and introduction of invasive species to and from the site. |
| Riparian Areas                    | X                           |    | Riparian corridors are present along streams within the watershed, even the more urbanized portion in the south. Each of the alternatives has the potential to affect these areas. Riparian zones provide important functions for stream stability and wildlife habitat.                                                                                                                                                                                                                                          |
| Natural Areas                     | X                           |    | Purgatory Creek Natural Area, present in the study area in and around USM Site 5, is a designated natural area owned by Hays County and permanently protected by a conservation easement.                                                                                                                                                                                                                                                                                                                         |

| Resource Concerns                                                | Relevant to Proposed Action |    | Rationale for relevance vs non-relevance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------|-----------------------------|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                  | Yes                         | No |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Humans                                                           |                             |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Land Use                                                         | X                           |    | Land use within the watershed is predominantly rangeland with urban development in the southwestern portion of the watershed. Dam breaches and flood hazards could impact land use in the Purgatory Creek subbasin watershed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Public Health and Safety                                         | X                           |    | The primary function of the USM Sites 4 and 5 dams is to attenuate or reduce downstream flooding, thereby reducing flood risk to the downstream community located within the breach inundation zone.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Cultural Resources, Historic Properties, and Tribal Consultation | X                           |    | A review of the Restricted Texas Archaeological Sites Atlas (Atlas) maintained by the Texas Historical Commission and the Texas Archaeological Research Laboratory indicated seven (7) recorded archaeological sites located within the cultural resources direct effects APE. Five (5) of the archaeological sites were Historic age, one site was Contact Period/Historic Age, and one site was Prehistoric/Archaic through Middle Woodland period. Four (4) of the sites were previously deemed as not eligible for inclusion in the National Register of Historic Places (NRHP), one site had an undetermined eligibility, and two sites were previously determined as eligible for inclusion in the NRHP. The two NRHP eligible sites were 41HY163, the "Zatopek Site," a multi-component prehistoric campsite with Archaic through Middle Woodland occupations, located adjacent to the project footprint of Dam Site #5, and 41HY446, a Historic age/Contact Period campsite with at least one rare metal arrowhead recovered, located within the study buffer of Dam #5. No recorded historic structures were located within the direct or indirect APE. A cultural resources survey of the project APE was also conducted, and no additional archaeological sites or historic structures were recorded. A copy of the report of investigations is attached in Appendix E of this document. |

| Resource Concerns                     | Relevant to Proposed Action |    | Rationale for relevance vs non-relevance                                                                                                                                                                                                            |
|---------------------------------------|-----------------------------|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                       | Yes                         | No |                                                                                                                                                                                                                                                     |
| Local, Regional, and National Economy | X                           |    | Alternatives could result in the potential influx of capital expenditures in the study area associated with works of improvement. This influx could potentially result in direct, indirect, and induced effects to the local and regional economy.  |
| Recreation                            | X                           |    | The Purgatory Creek Natural Area provides public recreation in the form of nature trails for walking, wildlife viewing, and enjoying nature.                                                                                                        |
| Scenic Beauty                         | X                           |    | The rural character and protected natural area provide scenic beauty that the community noted as being very important during scoping. The natural area draws in residents and visitors to walk, enjoy nature, and watch wildlife in the study area. |

### Issues Considered but Dismissed from Detailed Analysis

| Resource Concerns                                    | Relevant to Proposed Action |    | Rationale for relevance vs non-relevance                                                                                                                                                                                                                                                                         |
|------------------------------------------------------|-----------------------------|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                      | Yes                         | No |                                                                                                                                                                                                                                                                                                                  |
| Soils                                                |                             |    |                                                                                                                                                                                                                                                                                                                  |
| Prime and Unique Farmland and Statewide Importance   |                             | X  | A very small portion of the study area is made up of soils rated as prime farmland, at 3.7 percent (815.4 acres). The primary agricultural use of the area is for rangeland cattle. The proposed action to address compliance standards is not likely to affect these soils. See maps C-1 and C-2 in Appendix C. |
| Water Resources                                      |                             |    |                                                                                                                                                                                                                                                                                                                  |
| Waters of the US, Wetlands and Special Aquatic Sites |                             | X  | Purgatory Creek and the unnamed tributaries within this portion of the watershed and study area are all relatively non-permanent, of the watershed and study area are all relatively non-permanent, There are no wetlands within the study area.                                                                 |

| Resource Concerns             | Relevant to Proposed Action |    | Rationale for relevance vs non-relevance                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------|-----------------------------|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               | Yes                         | No |                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Sole Source Aquifer           |                             | X  | The Edwards Aquifer is a state designated sole source aquifer present within the Upper San Marcos River Watershed and the study area. It is a confined aquifer that is composed of mostly porous of karst limestone. Much of this water is not easily available for use and springs can stop flowing even when the aquifer is relatively full. No Edwards Aquifer sensitive features were identified in the project area. |
| Coastal Zone Management Areas |                             | X  | The project area is outside of the state of Texas' Coastal Zone Management Program and is not subject to coastal policies under the Coastal Zone Management Act.                                                                                                                                                                                                                                                          |
| Coral Reefs                   |                             | X  | According to the U.S. Geological Survey (USGS) national map, Hays County is land locked with no waterways draining into marine environments.                                                                                                                                                                                                                                                                              |
| Regional Water Resource Plan  |                             | X  | The Upper San Marcos River Watershed Protection Plan (Meadows Center 2018) and the Edwards Aquifer Implementation Plan Habitat Conservation Plan (Recon 2021) have been developed to address improving water quality within the watershed. Neither plan specifically addresses requirements for the two dams within the study area.                                                                                       |
| Wild and Scenic Rivers        |                             | X  | There are no rivers or streams within or near the study area that have a national wild and scenic designation.                                                                                                                                                                                                                                                                                                            |
| Air Resources                 |                             |    |                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Air Quality                   |                             | X  | The project area is in an attainment area for all criteria pollutants. Construction activities related to any of the alternatives are expected to result in no more than a de minimis impact on air quality.                                                                                                                                                                                                              |
| Plant and Amlinal Resources   |                             |    |                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Bald and Golden Eagles        |                             | X  | No eagles or their nests were observed during the pedestrian survey. Due to the absence of permanent water features, bald and golden eagles are unlikely to use the study area.                                                                                                                                                                                                                                           |

| Resource Concerns                                           | Relevant to Proposed Action |    | Rationale for relevance vs non-relevance                                                                                                                                                                                                                        |
|-------------------------------------------------------------|-----------------------------|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                             | Yes                         | No |                                                                                                                                                                                                                                                                 |
| Essential Fish Habitat                                      |                             | X  | Essential fish habitat is not present within the Upper San Marcos Watershed.                                                                                                                                                                                    |
| Forest Resources                                            |                             | X  | Forests make up 38 percent of the resources within the hydrologic unit code 8 watershed and 50 percent of those in the Purgatory Creek drainage basin. These forest resources are located in uplands and not likely to be impacted by any of the alternatives.  |
| Ecologically Critical Areas                                 |                             | X  | According to the U.S. Fish and Wildlife Service (USFWS), there are no critical habitats present within the project area. See the Information for Planning and Consultation (IPAC) report in the Ecological Resources Inventory and Analysis memo in Appendix E. |
| Humans                                                      |                             |    |                                                                                                                                                                                                                                                                 |
| Social Issues                                               |                             | X  | There were no social issues or controversy identified with any of the alternatives beyond public safety, which is addressed separately.                                                                                                                         |
| Parklands (national parks, monuments, & historic landmarks) |                             | X  | There are no local, State, or Federal parklands within the study area. No monuments or state antiquities landmarks are present within the project area.                                                                                                         |
| Significant Scientific Resources                            |                             | X  | According to USGS and U.S. National Parks Service, there are no significant scientific resources present in the project area.                                                                                                                                   |
| Ecosystems Services                                         |                             |    |                                                                                                                                                                                                                                                                 |
| Provisioning                                                |                             | X  | Rangeland protection.                                                                                                                                                                                                                                           |
| Regulating                                                  |                             | X  | Flood attenuation of dams, water quality filtration of natural green space/parkland.                                                                                                                                                                            |
| Cultural                                                    |                             | X  | Public safety and scenic beauty of resources.                                                                                                                                                                                                                   |

## ENVIRONMENTAL REVIEW & CONSULTATION

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

### **NEPA: Consideration of Reasonably Foreseeable Impacts**

#### **Potentially Affected Environment STATUS OF EXISTING RESOURCES**

The project area is located within the Balcones Canyonlands ecoregion of the Edwards Plateau. The Balcones Escarpment separates the Blackland Prairie on the east from the Edwards Plateau on the west. Across this physiographic boundary are changes in many of the natural attributes of the topography, soils, flora, and fauna. Limestone hills, thin soils, and narrow watercourses in steep canyons characterize the Edwards Plateau region west of the escarpment, while the Blackland Prairie to the east is characterized by deep, fertile soils on level to gently rolling terrain, with low gradient streams (Griffith et al. 2004; Texas Parks and Wildlife Department 2011). High-gradient streams originating from springs in steep-sided canyons bisect the landscape through porous limestone soils (USEPA, 2013).

#### **SOILS AND GEOLOGY**

Terrain within the study area is characterized by relatively flat karstic uplands that slope down into gently rolling valleys formed by numerous narrow streams and draws. According to the USGS, the Balcones fault zone is the dominant geologic feature in the area, with surface geology consisting primarily of Cretaceous-aged limestone, dolomite, and chert overlain by quaternary-aged alluvium and fluvial terrace deposits (USGS 2018).

#### **SOILS**

According to the Hays County soil survey maps, there are four distinct soil types that comprise the majority of the study area, including the Comfort Rock Outcrop complex (1 to 8 percent slopes), the Rumple-Comfort association (1 to 8 percent slopes), Orif (0 to 3 percent slopes), and Denton Silty Clay (3 to 5 percent slopes). The Comfort Rock Outcrop complex consists of shallow, extremely stony, clay soils, and limestone bedrock outcrops, usually found on ridgetops and hillslopes. The Rumple-Comfort association consists of several different intermixed soil types, ranging in depth from generally shallow to moderately deep. This soil association is also generally found on ridgetops or hillslopes. Orif soils parallel the banks of Purgatory Creek, and the Denton Silty Clay is moderately deep clay found on valley soils along the tributaries of Purgatory Creek. According to the NRCS list of hydric soils, none of the soil series within the USM Site 4 project area are classified as hydric, while the Orif Soils present in the USM Site 5 project area are considered partially hydric (0 to 25 percent). See map figures in Appendix C.

#### **PRIME AND UNIQUE FARMLANDS**

Soils classified as prime or unique farmland make up less than 4 percent (815.4 acres) of the soils within the study area. For USM Site 4, these soils are located within the upper reaches of



the drainage area and well outside of the area surrounding the dam and its appurtenances. For Site 5, these soils are located northeast and southwest of the dam, and outside of the area surrounding the dam and its appurtenances. Prime and unique farmlands are a minor part of the soils within the study area and unlikely to be impacted by any of the proposed alternatives. Therefore, this resource will be dismissed from detailed evaluation in the Environmental Consequences section. See map figures in Appendix C.

## **WATER RESOURCES**

Resources evaluated under existing conditions include floodplain management, waters of the United States, water quality, sole source aquifers, and groundwater, as they are related resources. Coastal zone management, coral reefs, and wild and scenic rivers were all dismissed during scoping and will not be discussed in the Environmental Consequences section, as they are not applicable resources.

## **FLOODPLAIN MANAGEMENT**

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps 48209C0369F and 48209C0370F for Site 4, and 48209C0388F, 48209C0476F, and 48209C0477F

for Site 5, the dam sites are all located within the regulatory floodplain of Purgatory Creek (Figure 4). The City of San Marcos' "floodplain damage prevention ordinance" requires a floodplain permit for any building permit on a lot where land is not already 2 feet higher than the city regulated floodplain or adjacent floodplain.

## **WATERS OF THE UNITED STATES, WETLANDS, AND SPECIAL AQUATIC SITES**

### *Waters of the United States*

The U. S. Army Corps of Engineers regulates the discharge of dredged and fill material into waters of the United States, including wetlands, under Section 404 of the Clean Water Act.

Desktop mapping indicated the presence of one open water body feature in each of the USM Sites 4 and 5 project areas. Both dam sites impound flow along Purgatory Creek (Figure 5). The area below the normal pool elevation of both USM Sites 4 and 5 dams were dry at the time of the pedestrian survey and appear to only hold water temporarily following periods of significant precipitation.

Most of streams within the Purgatory Creek subbasin are relatively non-permanent, ephemeral streams. The ephemeral reach of Purgatory Creek flows generally east through the USM Sites 4 and 5 project areas and has an average ordinary high water mark width of 20 feet. An approximate 1,000-foot reach of the creek mapped by the USGS National Hydrography Dataset above the USM Site 4 dam appears to be an ephemeral swale, which does not exhibit bed and banks or an ordinary high water mark. It may have been impacted by past agricultural activities. Additionally, there are four ephemeral tributaries that flow into Purgatory Creek within the USM Site 5 project area that

exhibit ordinary high water marks with an average width of 10 feet. Table 2 shows the feature type along with acreage and linear feet present within the USM Sites 4 and 5 project areas.

**TABLE 2. WATER BODIES PRESENT WITHIN USM SITES 4 AND 5 PROJECT AREAS**

| Area in                    |                  |       | Length in   |       |
|----------------------------|------------------|-------|-------------|-------|
| Feature Name               | Feature Type     | Acres | Linear Feet |       |
| USM Site 4                 |                  |       |             |       |
| Purgatory Creek (Stream 1) | Ephemeral stream | 2.89  |             | 6,255 |
| Normal Pool                | Impoundment      | 15.67 |             | -     |
| USM Site 5                 |                  |       |             |       |
| Purgatory Creek (Stream 1) | Ephemeral stream | 2.61  |             | 5,693 |
| Stream 2                   | Ephemeral stream | 0.36  |             | 1,581 |
| Stream 3                   | Ephemeral stream | 1.07  |             | 3,108 |
| Stream 4                   | Ephemeral stream | 0.39  |             | 1,687 |
| Stream 5                   | Ephemeral stream | 0.32  |             | 1,382 |
| Normal Pool                | Impoundment      | 22.95 |             | -     |

#### *Wetlands*

No wetlands or special aquatic sites were identified within the USM Sites 4 and 5 project areas (Figure 5).

Detailed information on waters of the United States and wetlands can be found in the Ecological Resources Inventory and Analysis reports for each dam site, in Appendix E.

#### **WATER QUALITY**

The TCEQ is charged through Federal mandate with protecting the quality of waters within Texas. TCEQ's approach to this mandate includes measuring water quality at locations across the State; determining if the quality in streams, lakes, and creeks is acceptable; and implementing plans to clean up water bodies that are impacted.

The TCEQ Texas Surface Water Quality Standards are rules designed to establish goals for water quality throughout the state and provide a basis for regulatory programs to attain those goals. Water quality standards serve to signal a situation where water quality may be inadequate to meet the use or uses of a particular water body. Five general categories for water use, known as "designated uses," are defined in Texas:

- General
- Aquatic life use
- Recreation
- Public water supply
- Fish consumption

Major surface water bodies in the state have been classified with site-specific designated uses in Title 30, Chapter 307 of the Texas Administrative Code, but many smaller water bodies have not been classified and do not have site-specific designated uses. All unclassified surface water bodies without site-specific designated uses are protected by a “general criteria” defined in the same chapter of the code.

The TCEQ requires that the classified segment that first receives discharges from the USM Site 4 project limits, either directly or indirectly, be identified. This evaluation has determined stormwater discharges from USM Site 4 project eventually reach the following classified segment: Upper San Marcos River (Segment 1814).

Segment 1814 is located east of the USM Site 4 project and receives stormwater discharges from the USM Site 4 project indirectly by way of Purgatory Creek. According to the 2024 305(b) list, Segment 1814 fully supports general use, recreation use, aquatic life use, and domestic water supply use (Texas Integrated Report - Assessment Results for Basin 18 - Guadalupe River, 2024).

Segment 1814 is identified on the 2024 Texas 303(d) List of Impaired Waters for Total Dissolved Solids. However, Segment 1814 is not subject to TMDL requirements at this time; therefore, the Purgatory Creek-San Marcos River watershed does not have a TMDL to which stormwater discharges contribute. Segment 1814 is subject to the Upper San Marcos River Watershed Protection Plan; however, that plan does not have BMPs in place that will affect USM Sites 4 and 5 project areas.

## **SOLE SOURCE AQUIFER**

The Edwards Aquifer is a confined aquifer composed primarily of porous or karst limestone that is 300 to 700 feet thick. During normal conditions, flow is guided by barrier faults that create a pathway or pipeline for groundwater (The Meadows Center 2018)

An estimated 25 to 55 million acre-feet of water are stored in the aquifer, with annual recharge rates of 692,000 acre-feet over 80 years. Rainfall is the primary source of recharge but is highly variable and can differ dramatically over time.

USM Sites 4 and 5 are located within the Edwards Aquifer Recharge Zone (Figure 6), and must meet all applicable requirements of, and operate according to, 30 TAC §213 (Edwards Aquifer Rule). The operator or operators at USM Sites 4 and 5 project must comply with the Edwards Aquifer Rule due to the anticipated construction activities that include “*clearing, excavation, or other activities which alter or disturb the topographic or existing stormwater runoff characteristics of a site...*” and “*any other activities that pose a potential for*

*contaminating stormwater runoff...*". A recharge zone plan must be prepared and submitted for approval by TCEQ prior to commencement of regulated activities.

The City of San Marcos has in place land development codes to protect water quality and prevent flood damage throughout the city and its extraterritorial jurisdiction. These codes are intended in part to support efforts of the Edwards Aquifer Habitat Conservation Plan, as the city and project area are within the recharge, transition, and upland zones of the aquifer.

Neither the problem that is the subject of this project nor potential measures to address the problems would be likely to introduce contamination to the aquifer; therefore, sole source aquifers are not relevant and will not be discussed in the Environmental Consequences section.

## **GROUNDWATER**

Upper San Marcos River Watershed Protection Plan states that the potential for surface water and groundwater interactions throughout the watershed are greatly increased by the karstic nature of the landscape, the number of faults and fractures, and the direct conduits of recharge and discharge features along streambeds (The Meadows Center 2018). Additionally, the plan notes that there are many pressures on the Edwards Aquifer, which is the source water for the San Marcos River and a major source of drinking water for communities in central and south-central Texas. Growth and nonpoint source pollution impact water quality and quantity of both surface and groundwater resources within the watershed. Increased impervious cover within the watershed related to urbanization can lead to increased pollutant concentrations.

Annual groundwater discharge from combined springflow and pumping for the time period of 1934 to 2022 is estimated to range from a low of 388,800 acre-feet in 1955, to a high of 1,130,000 acre-feet in 1992. The total discharge from both sources is estimated at 607,200 acre-feet (Edwards Aquifer Authority 2024).

## **REGIONAL WATER RESOURCE PLANS**

Two water resource plans have been developed to assist with protection and management of water resources using a watershed-based approach: The Upper San Marcos River Watershed Protection Plan, developed by the Meadows Center in 2018, and the Edwards Aquifer Recovery Implementation Plan Habitat Conservation Plan, developed by Recon Environmental in 2012 and updated in 2021. The Meadows Center plan was developed to address nine key elements critical for achieving improvements in water quality identified by the EPA. The second plan was developed as a means to implement the Edwards Aquifer Implementation Recovery Program under the 1993 Edwards Aquifer Authority Act. Both plans note that most of the Upper San Marcos River Watershed lies within the recharge zone of the Edwards Aquifer, and that the percentage of developed land compared with undeveloped land is relatively small within the watershed. However, development within the watershed is required by TCEQ and the City of San Marcos to implement water quality controls. The plans recognize the importance of the floodwater dams within the watershed for their contribution to the reduction of pollutants in downstream reaches by allowing sediment and pollutants to settle out.

Neither of these plans specifically mention USM Sites 4 and 5, nor do they provide specific requirements related to these dams that would be affected by the proposed measures. Therefore, regional water resource plans are not relevant and will not be included in discussions in the Environmental Consequences section of the Plan-EA.

## **AIR RESOURCES**

Climate is the only resource considered in this plan, as air quality was dismissed in scoping.

## **CLIMATE**

The Texas climate is characterized by hot summers and mild to cool winters. Three geographical features largely influence the state's varied climate: the Rocky Mountains block intrusions of moist Pacific air from the west and tend to channel arctic air masses southward during the winter; the relatively flat central North American continent allows easy north and south movement of air masses; and the Gulf of Mexico serves as the primary source of moisture, which is most readily available to the eastern part of the state. As a result of these factors, the state exhibits large east-west variations in precipitation and is subject to frequent and varied extreme events, including hurricanes, tornadoes, droughts, heat waves, cold waves, and extreme precipitation. Due to rapid population growth, especially in urban areas, increased demand for limited water supplies may increase Texas's vulnerability to naturally occurring droughts. A key take away from the 2022 National Oceanic and Atmospheric Administration's climate summary for Texas is:

- Temperatures in Texas have risen almost 1.5 °F since the beginning of the 20<sup>th</sup> century. Historically unprecedented warming is projected during this century, with associated increases in extreme heat events.

Within the planning and study area, Hays County has a humid subtropical climate with hot summers and mild winters. Average summer temperatures are near 84 °F and are near 52 °F during the winter. Precipitation is abundant throughout the year, with an approximate yearly average of 37 inches, though thunderstorms are common during the spring and summer months. The county rarely receives snow during the colder months.

## **PLANT AND ANIMAL RESOURCES**

The importance of plant and animal resources within the study area was made clear by several people and agencies early in the planning process and as evidenced by the presence of the Purgatory Creek Natural Area and the emphasis on protection of the Edwards Aquifer, in part to protect threatened and endangered species. The following resource concerns were evaluated during scoping and will not be discussed in the Environmental Consequences section, as they are not relevant resources: bald and golden eagles, essential fish habitat, forests, ecologically critical areas, and forest resources.

## **FISH AND WILDLIFE HABITAT**

According to the Texas Parks and Wildlife Department (TPWD), a variety of mammals, reptiles and amphibians, birds, and fish species are commonly found within this part of Texas.

Common terrestrial vertebrates found in Hays County include: American badger (*Taxidea taxus*), American beaver (*Castor canadensis*), American mink (*Mustela vison*), black-tailed jackrabbit (*Lepus californicus*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), deer mouse (*Peromyscus maniculatus*), eastern cottontail (*Sylvilagus floridanus*), eastern fox squirrel (*Sciurus niger*), eastern gray squirrel (*Sciurus carolinensis*), eastern mole (*Scalopus aquaticus*), eastern woodrat (*Neotoma floridana*), eastern spotted skunk (*Spilogale putorius*), fulvous harvest mouse (*Reithrodontomys fulvescens*), gray fox (*Urocyon cinereoargenteus*), hispid cotton rat (*Sigmodon hispidus*), hispid pocket mouse (*Chaetodipus hispidus*), hog-nosed skunk (*Conepatus leuconotus*), long-tailed weasel (*Mustela frenata*), least shrew (*Cryptotis parva*), Mexican ground squirrel (*Spermophilus mexicanus*), mountain lion (*Puma concolor*), nine-banded armadillo (*Dasypus novemcinctus*), northern pygmy mouse (*Baiomys taylori*), nutria (*Myocastor coypus*), raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), ringtail (*Bassariscus astutus*), rock squirrel (*Spermophilus variegatus*), southern plains woodrat (*Neotoma micropus*), striped skunk (*Mephitis mephitis*), swamp rabbit (*Sylvilagus aquaticus*), Texas mouse (*Peromyscus attwateri*), white-ankled mouse (*Peromyscus pectoralis*), white-footed mouse (*Peromyscus leucopus*), and Virginia opossum (*Didelphis virginiana*). White-tailed deer (*Odocoileus virginianus*) and wild hogs (*Sus scrofa*) were the only terrestrial vertebrates observed during the pedestrian survey.

Common amphibians and reptiles found in Hays County include: American bullfrog (*Lithobates catesbeianus*), barking frog (*Eleutherodactylus augusti*), Blanchard's cricket frog (*Acris blanchardi*), cliff chirping frog (*Eleutherodactylus marnockii*), Cope's gray treefrog (*Hyla chrysoscelis*), couch's spadefoot toad (*Scaphiopus couchii*), gray treefrog (*Hyla versicolor*), green treefrog (*Hyla cinerea*), green toad (*Bufo debilis*), Gulf Coast toad (*Bufo nebulifer*), fern bank salamander (*Eurycea pterophila*), Rio Grande leopard frog (*Lithobates berlandieri*), small-mouthed salamander (*Ambystoma texanum*), southern leopard frog (*Lithobates sphenoccephala*), spotted chorus frog (*Pseudacris clarkii*), Strecker's chorus frog (*Pseudacris streckeri*), Texas salamander (*Eurycea neotenes*), Texas toad (*Bufo speciosus*), western narrow-mouthed toad (*Gastrophryne olivacea*), Woodhouse's toad (*Anaxyrus woodhousii*), and western slimy salamander (*Plethodon albagula*), black-necked gartersnake (*Thamnophis cyrtopsis*), checkered gartersnake (*Thamnophis marcianus*), coachwhip (*Masticophis flagellum*), common box turtle (*Terrapene carolina*), common kingsnake (*Lampropeltis getula*), common snapping turtle (*Chelydra serpentina*), common spotted whiptail (*Cnemidophorus gularis*), copperhead (*Agkistrodon contortrix*), cottonmouth (*Agkistrodon piscivorus*), Dekay's brownsnake (*Storeria dekayi*), diamondback watersnake (*Nerodia rhombifer*), eastern collared lizard (*Crotaphytus collaris*), eastern hog-nosed snake (*Heterodon platirhinos*), eastern mud turtle (*Kinosternon subrubrum*), eastern musk turtle (*Sternotherus odoratus*), eastern racer (*Coluber constrictor*), flat-headed snake (*Tantilla gracilis*), four-lined skink (*Eumeces tetragrammus*), glossy snake (*Arizona elegans*), gophersnake (*Pituophis catenifer*), greater earless lizard (*Cophosaurus texanus*), Great Plains ratsnake (*Elaphe emoryi*), green anole (*Anolis carolinensis*), lined snake (*Tropidoclonion lineatum*), little brown skink (*Scincella lateralis*), long-nosed snake (*Rhinocheilus lecontei*), milksnake (*Lampropeltis triangulum*), ornate box turtle (*Terrapene ornate*), plain-bellied watersnake (*Nerodia erythrogaster*), pond slider (*Trachemys scripta*), prairie kingsnake (*Lampropeltis calligaster*), prairie lizard (*Sceloporus consobrinus*), ring-necked snake (*Diadophis punctatus*), rough earthsnake

(*Virginia striatulata*), rough greensnake (*Opheodrys aestivus*), six-lined racerunner (*Aspidoscelis sexlineatus*), slender glass lizard (*Ophisaurus attenuatus*), spiny softshell (*Apalone spinifera*), spot-tailed earless lizard (*Holbrookia lacerate*), Texas alligator lizard (*Gerrhonotus infernalis*), Texas cooter (*Pseudemys texana*), Texas coralsnake (*Micrurus tener*), Texas map turtle (*Graptemys versa*), Texas ratsnake (*Elaphe obsoleta*), Texas threadsnake (*Leptotyphlops dulcis*), western diamondback rattlesnake (*Crotalus atrox*), western groundsnake (*Sonora semiannulata*), western ribbonsnake (*Thamnophis Proximus*), and yellow mud turtle (*Kinosternon flavescens*). While no amphibians were observed during the pedestrian survey, the Texas spiny lizard (*Sceloporus olivaceus*) was the only reptile observed.

Common fish found in Hays County include: Bigscale logperch (*Percina maculata*), black bullhead (*Ameiurus melas*), black crappie (*Pomoxis nigromaculatus*), blackstripe topminnow (*Fundulus notatus*), blacktail shiner (*Cyprinella venusta*), blue catfish (*Ictalurus furcatus*), bluegill (*Lepomis macrochirus*), bullhead minnow (*Pimephales vigilax*), burrhead chub (*Macrhybopsis marconis*), central stoneroller (*Campostoma anomalum*), channel catfish (*Ictalurus punctatus*), common carp (*Cyprinus carpio*), dusky darter (*Percina sciera*), Fathead minnow (*Pimephales promelas*), flathead catfish (*Pylodictis olivaris*), freshwater drum (*Aplodinotus grunniens*), gizzard shad (*Dorosoma cepedianum*), golden shiner (*Notemigonus crysoleucas*), grass carp (*Ctenopharyngodon idella*), green sunfish (*Lepomis cyanellus*), gray redhorse (*Moxostoma congestum*), Guadalupe bass (*Micropterus treculii*), Guadalupe roundnose minnow (*Dionda nigrotaeniata*), largemouth bass (*Micropterus salmoides*), largespring gambusia (*Gambusia geiseri*), longear sunfish (*Lepomis megalotis*), longnose gar (*Lepisosteus osseus*), Mexican tetra (*Astyanax mexicanus*), mimic shiner (*Notropis volucellus*), orangethroat darter (*Etheostoma spectabile*), red shiner (*Cyprinella lutrensis*), redbreast sunfish (*Lepomis auritus*), redear sunfish (*Lepomis microlophus*), redspotted sunfish (*Lepomis miniatus*), Rio Grande cichlid (*Herichthys cyanoguttatus*), river carpsucker (*Carpiodes carpio*), smallmouth buffalo (*Ictiobus bubalus*), spotted gar (*Lepisosteus oculatus*), tadpole madtom (*Noturus gyrinus*), Texas logperch (*Percina carbonaria*), Texas shiner (*Notropis amabilis*), warmouth (*Lepomis gulosus*), western mosquitofish (*Gambusia affinis*), white bass (*Morone chrysops*), white crappie (*Pomoxis annularis*), and yellow bullhead (*Ameiurus natalis*). No fish species were observed during the pedestrian survey.

## THREATENED AND ENDANGERED SPECIES

### *Federally Listed Species*

According to the USFWS IPAC resource list (Jan 2025), there are 15 wildlife species and one plant species listed as threatened, endangered, potentially threatened, or candidate species that may potentially occur within Hays County, Texas:

The **tricolored bat** (*Perimyotis subflavus*) is a species proposed for federal listing as endangered in Hays County. Tricolored bats roost in deciduous hardwood forests, pine trees, eastern red cedar (*Juniperus virginiana*), Spanish moss (*Tillandsia usneoides*), and human structures such as barns, beneath porch roofs, bridges, and concrete bunkers during the spring, summer, and fall. They prefer mature deciduous hardwood forests, which provide more structural diversity for roosting sites. Winter hibernacula in the southern United States

frequently include road-associated culverts and other human structures; caves and tree cavities may also be used. While no individuals were identified during the pedestrian survey, preferred summer habitat for this species was identified within the project area.

The **golden-cheeked warbler** (*Setophaga chrysoparia*) is Federally listed as endangered in Hays County. Golden cheeked warblers breed in oak (*Quercus* spp.) and Ashe juniper woodlands along hillslopes. They require Ashe juniper bark to construct their nests. While no individuals were identified during the pedestrian survey, preferred breeding habitat for this species was identified within the project area.

The **piping plover** (*Charadrius melodus*) is Federally listed as threatened in Hays County. In the interior United States, piping plovers nest on the unvegetated shorelines of alkaline lakes, reservoirs, or river sandbars. Additionally, the piping plover is currently designated within the area as only needing impact considerations for wind energy projects. No shorelines/sandbars that may serve as nesting habitat were identified within the proposed project area.

The **rufa red knot** (*Calidris canutus rufa*) is Federally listed as threatened in Hays County. In the interior United States, rufa red knots use saline lakes and possibly large wetlands and riverine sandbars as stopover habitat. Additionally, the rufa red knot is currently designated within the area as only needing impact considerations for wind energy projects. No potential stopover habitats were identified within the proposed project area.

The **whooping crane** (*Grus americana*) is Federally listed as endangered in Hays County. Whooping cranes winter in Canada and breed on the Texas gulf coast, utilizing sparsely vegetated, shallow wetlands, and flooded fields in rolling terrain away from human activity during migration. No potential stopover habitats were identified within the proposed project area.

The **Austin blind salamander** (*Eurycea waterlooensis*) is Federally listed as endangered in Hays County. Austin blind salamanders inhabit high quality waters maintained by groundwater sources from the Barton Springs Segment of the Edwards Aquifer and are typically found in subterranean habitats within caves or underground areas. The project area is not one of the four Barton Springs outlets where the salamanders have been identified, and no caves exhibiting groundwater were identified within the project area.

The **San Marcos salamander** (*Eurycea nana*) is Federally listed as threatened in Hays County. San Marcos salamanders inhabit thermally stable, spring-fed streams with velocities around one centimeter per second that contain cobble, gravel, and boulder substrates with coverage from *Amblystegium* moss and filamentous algae. The project area is not within or adjacent to the San Marcos Springs to which the salamander is endemic, and no streams that constitute habitat for the San Marcos salamander were identified in the project area.

The **Texas blind salamander** (*Eurycea rathbuni*) is Federally listed as endangered in Hays County. Texas blind salamanders inhabit water-filled subterranean caverns of the Edwards Aquifer in San Marcos. Additionally, the Texas blind salamander is currently designated within the area as only needing impact considerations for projects which would adversely affect the water quality and quantity of the Edwards Aquifer and surface waters that contribute to the Edwards Aquifer. No caves which constitute habitat for the salamander were identified within



the project area. Streams within the project area may contribute to recharge of the Edwards Aquifer; however, the proposed project, which only temporarily impounds flows of the stream during flood events, would not adversely affect the water quality or quantity of these surface waters.

The **fountain darter** (*Etheostima fonticola*) is Federally listed as endangered in Hays County. Fountain Darters inhabit clean, undisturbed stream bottoms with constant temperatures, adequate flows, and a mix of submergent plants such as algae, mosses, and vascular plants. No streams that constitute habitat for the Fountain Darter were identified in the project area.

The **Guadalupe fatmucket** (*Lampsilis bergmanni*) is Federally listed as endangered in Hays County. Guadalupe Fatmucket inhabit small, flowing streams and rivers with mud, sand, and gravel substrates. No streams that constitute habitat for the Guadalupe Fatmucket were identified in the project area.

The **Guadalupe orb** (*Cyclonaias necki*) is Federally listed as endangered in Hays County. Guadalupe Orbs inhabit riffles and runs of moderately sized rivers to depths of 3.3 feet with mud, silt, gravel, or cobble substrates. No streams that constitute habitat for the Guadalupe Orb were identified in the project area.

The **Comal Springs dryopid beetle** (*Stygoparnus comalensis*) is Federally listed as endangered in Hays County. Comal Springs dryopid beetles inhabit both gravel- and cobble-dominated surface waters with aquatic vegetation and subterranean spaces associated with springs issuing from the Edwards Aquifer. The project area is not within or adjacent to the Comal or Fern Bank Springs where the beetle has been identified, and no streams or caves that constitute habitat for the beetle were identified in the project area.

The **Comal Springs riffle beetle** (*Heterelmis comalensis*) is Federally listed as endangered in Hays County. Comal Springs riffle beetles inhabit gravel-dominated riffles associated with springs issuing from the Edwards Aquifer. The project area is not within or adjacent to the Comal or San Marcos Springs where the beetle has been identified, and no streams that constitute habitat for the beetle were identified in the project area.

The **monarch butterfly** (*Danaus plexippus*) is a species proposed for federal listing as threatened in Hays County. Monarch butterflies undergo long-distance migrations throughout North America and lay their eggs on obligate milkweed host plants in a variety of forested and grassland habitats. Native grasslands that could support milkweed are located within the project area.

The **Peck's cave amphipod** (*Stygobromus pecki*) is Federally listed as endangered in Hays County. Peck's cave amphipod inhabits water-filled subterranean caverns and springs of the Edwards Aquifer in San Marcos. The project area is not within or adjacent to San Marcos Springs where the amphipod has been identified, and no streams that constitute habitat for the amphipod were identified in the project area.

**Texas wild-rice** (*Zizania texana*) is Federally listed as endangered in Hays County. Texas wild-rice is a submergent aquatic perennial grass that stands at depths up to 3.3 feet and requires clear, thermally constant, flowing water. Texas wild-rice is only found in the San

Marcos River and prefers spring-fed gravel and sand substrates overlying clay. The project area is not within or adjacent to the San Marcos River, and no streams that constitute habitat for Texas wild-rice were identified in the project area.

### *State-listed Species*

The TPWD's list of rare, threatened, and endangered species of Texas by county designates species that are State and Federally listed as threatened and endangered, as well as rare species, which are not listed as threatened or endangered. The following abbreviated list includes 16 State-listed threatened or endangered species that may occur within Hays County, Texas:

The **interior least tern** (*Sternula antillarum athalassos*) is State-listed as endangered within Hays County. Interior least terns nest and stop over along sand and gravel bars within large, braided streams and man-made structures, such as inland beaches, wastewater treatment plants, and gravel mines in the interior United States. No potential stopover or nesting habitats were identified within the proposed project area.

The **white-faced ibis** (*Plegadis chihi*) is State-listed as threatened within Hays County. White-faced ibis winter in the northern Great Plains and breeds on the Texas Gulf Coast, utilizing freshwater marshes, sloughs, and irrigated rice fields, as well as brackish and saltwater habitats, as stop-over habitat during migration. No potential stopover habitats were identified within the proposed project area. Therefore, no alternatives may affect the white-faced ibis.

The **wood stork** (*Mycteria americana*) is State-listed as threatened within Hays County. Wood storks forage in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water in Texas during the non-breeding season, roosting in tall snags and sometimes in heronries with other wading birds. No roosting or foraging habitats for the wood stork were identified in the project area.

The **Cagle's map turtle** (*Graptemys caglei*) is State-listed as threatened within Hays County. Cagle's map turtles inhabit swift to moderately flowing streams with gravel or cobble substrates connected by silt or mud bottomed pools, and nest on gently sloping sand banks. No streams that constitute habitat for the turtle were identified within the project area.

The **Texas horned lizard** (*Phrynosoma cornutum*) is State-listed as threatened within Hays County. Texas horned lizards use open, sandy to rocky habitats with sparse vegetation, including grassland, prairie, cactus, scattered brush, or scrubby trees. While no individuals were identified during the pedestrian survey, preferred habitat for this species was identified contiguously across the proposed project area.

The **Texas salamander** (*Eurycea neotenes*) is State-listed as threatened within Hays County. Texas salamanders inhabit streams maintained by groundwater sources from the Edwards Aquifer and can be found in both surface and subterranean habitats within caves or underground areas. No streams or caves that constitute habitat for the Texas salamander were identified in the project area.

The **Barton Springs salamander** (*Eurycea sosorum*) is state and Federally listed as endangered in Hays County but was not listed in the USFWS IPAC for the project area. Barton

Springs salamanders inhabit streams maintained by groundwater sources from the Barton Springs Segment of the Edwards Aquifer and can be found in both surface and subterranean habitats within caves or underground areas. The project area is not one of the four Barton Springs outlets where the salamanders have been identified, and no surface waters or caves exhibiting groundwater were identified within the project area.

The **Blanco blind salamander** (*Eurycea robusta*) is State-listed as threatened in Hays County. The Blanco blind salamander is thought to inhabit water-filled subterranean caverns of the Edwards Aquifer near the Blanco River in San Marcos, Texas. Blanco blind salamanders were identified in 1951, and no other individuals have been identified since. No streams or caves that constitute habitat for the Blanco blind salamander were identified in the project area.

The **Texas troglobitic water slater** (*Lirceolus smithii*) is State-listed as threatened in Hays County. The Texas troglobitic water slater is an obligate inhabitant of subterranean caves with groundwater sources from the Edwards Aquifer. No caves that constitute habitat for the Texas troglobitic water slater were identified in the project area. Therefore, no alternatives may affect the Texas troglobitic water slater.

The **Guadalupe darter** (*Percina apristis*) is State-listed as threatened in Hays County. The Guadalupe darter inhabits stream riffles with moderately turbid water and boulder substrate. No streams that constitute habitat for the Guadalupe darter were identified in the project area.

The **headwater catfish** (*Ictalurus lupus*) is State-listed as threatened in Hays County. Headwater catfish inhabit riffles, runs, and pools of sandy to rocky creeks, rivers, and associated springs. No streams that constitute habitat for the Headwater catfish were identified in the project area.

The **Balcones spike** (*Fusconaia iheringi*) is State- and Federally listed as endangered in Hays County but was not listed in the USFWS IPAC for the project area. Balcones spikes inhabit flowing streams and rivers with sand, gravel, and cobble substrate riffles and runs. No streams that constitute habitat for the Balcones spike were identified in the project area.

The **False spike** (*Fusconaia mitchelli*) is State- and Federally listed as endangered in Hays County but was not listed in the USFWS IPAC for the project area. False spike inhabit flowing streams and rivers with sand, gravel, and cobble substrate riffles and runs. No streams that constitute habitat for the false spike were identified in the project area.

The **Texas fatmucket** (*Lampsilis bracteata*) is State-listed as threatened and Federally listed as endangered in Hays County but was not listed in the USFWS IPAC for the project area. Texas fatmucket inhabits flowing streams and rivers with mud, sand, and gravel substrates. No streams that constitute habitat for the Texas fatmucket were identified in the project area.

The **Texas fawnsfoot** (*Truncilla macrodon*) is State- and Federally listed as threatened in Hays County but was not listed in the USFWS IPAC for the project area. Texas fawnsfoot inhabits flowing medium to large streams and rivers with mud, sand, and gravel substrates. No streams that constitute habitat for the Texas fawnsfoot were identified in the project area.

The **Texas pimpleback** (*Cyclonaias petrina*) is State- and Federally listed as endangered in Hays County but was not listed in the USFWS IPAC for the project area. Texas pimpleback inhabit flowing medium to large streams and rivers with riffle and run habitats of gravel and bedrock substrates. No streams that constitute habitat for the Texas pimpleback were identified in the project area.

Table 3 presents state and federally-listed threatened and endangered (T&E) species that may occur within Hays County.

**TABLE 3. STATE AND FEDERAL LISTED T&E SPECIES<sup>1</sup>**

| Common Name                    | Scientific Name                       | Federal Status <sup>2</sup> | State Status <sup>2</sup> |
|--------------------------------|---------------------------------------|-----------------------------|---------------------------|
| Tricolored bat                 | <i>Perimyotis subflavus</i>           | PE                          | -                         |
| Golden-cheeked warbler         | <i>Setophaga chrysoparia</i>          | E                           | E                         |
| Interior least tern            | <i>Sternula antillarum athalassos</i> | -                           | E                         |
| Piping plover                  | <i>Charadrius melodus</i>             | T                           | T                         |
| Rufa red knot                  | <i>Calidris canutus rufa</i>          | T                           | T                         |
| White-faced ibis               | <i>Plegadis chihi</i>                 | -                           | T                         |
| Whooping crane                 | <i>Grus americana</i>                 | E                           | E                         |
| Wood stork                     | <i>Mycteria americana</i>             | -                           | T                         |
| Cagle's map turtle             | <i>Graptemys caglei</i>               | -                           | T                         |
| Texas horned lizard            | <i>Phrynosoma cornutum</i>            | -                           | T                         |
| Austin blind salamander        | <i>Eurycea waterlooensis</i>          | E                           | E                         |
| San Marcos salamander          | <i>Eurycea nana</i>                   | T                           | T                         |
| Barton Springs salamander      | <i>Eurycea sosorum</i>                | E*                          | E                         |
| Blanco blind salamander        | <i>Eurycea robusta</i>                | -                           | T                         |
| Texas blind salamander         | <i>Eurycea rathbuni</i>               | E                           | E                         |
| Texas salamander               | <i>Eurycea neotenes</i>               | -                           | T                         |
| Texas troglobitic water slater | <i>Lirceolus smithii</i>              | -                           | T                         |
| Fountain darter                | <i>Etheostoma fonticola</i>           | E                           | E                         |
| Headwater catfish              | <i>Ictalurus lupus</i>                | -                           | T                         |

|                     |                            |    |   |
|---------------------|----------------------------|----|---|
| Guadalupe darter    | <i>Percina apristis</i>    | -  | T |
| Balcones spike      | <i>Fusconaia iheringi</i>  | E* | E |
| False spike         | <i>Fusconaia mitchelli</i> | E* | E |
| Guadalupe fatmucket | <i>Lampsilis bergmanni</i> | E  | T |
| Guadalupe orb       | <i>Cyclonaias necki</i>    | E  | E |
| Texas fatmucket     | <i>Lampsilis bracteata</i> | E* | T |

| Common Name                  | Scientific Name               | Federal Status <sup>2</sup> | State Status <sup>2</sup> |
|------------------------------|-------------------------------|-----------------------------|---------------------------|
| Texas fawnsfoot              | <i>Truncilla macrodon</i>     | T*                          | T                         |
| Texas pimpleback             | <i>Cyclonaias petrina</i>     | E*                          | E                         |
| Comal Springs dryopid beetle | <i>Stygoparnus comalensis</i> | E                           | E                         |
| Comal Springs riffle beetle  | <i>Heterelmis comalensis</i>  | E                           | E                         |
| Monarch butterfly            | <i>Danaus plexippus</i>       | PT                          | -                         |
| Peck's cave amphipod         | <i>Stygobromus pecki</i>      | E                           | E                         |
| Texas wild-rice              | <i>Zizania texana</i>         | E                           | E                         |

1 According to TPWD (2025) and USFWS (2025).

2 E = Endangered; T = Threatened; PE = Proposed Endangered; PT = Proposed Threatened; C = Candidate; E\* = Endangered based on RTEST but not present in IPaC Report; T\* = Threatened based on RTEST but not present in IPaC Report.

## MIGRATORY BIRDS

The Migratory Bird Treaty Act of 1918, prohibits the “take” (e.g., pursue, hunt, shoot, wound, kill, trap, capture, or collect) or possession of migratory birds, as well as the parts, nest, or eggs of migratory birds. According to the U.S. Department of the Interior Director’s Order No. 225, “incidental take,” which includes the take or kill of migratory birds that results from—but is not the purpose of—an activity, is included as “take” under the act.

The following migratory birds were observed during the pedestrian survey of USM Site 4: black vulture (*Coragyps atatus*), blue-gray gnatcatcher (*Polioptila caerulea*), canyon wren (*Catherpes mexicanus*), downy woodpecker (*Picoides pubescens*), northern cardinal (*Cardinalis cardinalis*), red-shouldered hawk (*Buteo lineatus*), tufted titmouse (*Baeolophus bicolor*), turkey vulture (*Cathartes aura*), white-eyed vireo (*Vireo griseus*), white-wing dove (*Zenaida asiatica*), and yellow warbler (*Setophaga petechia*).

The following migratory birds were observed during the pedestrian survey of USM Site 5: bluejay (*Cyanocitta cristata*), canyon wren (*Catherpes mexicanus*), chimney swift (*Chaetura pelagica*), lesser goldfinch (*Spinus psaltria*), mourning dove (*Zenaida macroura*), northern cardinal (*Cardinalis cardinalis*), northern mockingbird (*Mimus polyglottos*), tufted titmouse (*Baeolophus bicolor*), turkey vulture (*Cathartes aura*), upland sandpiper (*Bartamia longicauda*), and white-eyed vireo (*Vireo griseus*).

No migratory bird nests were observed during the survey, but migratory birds are likely to nest within the project area or the immediate vicinity.

## INVASIVE SPECIES (FLORA AND FAUNA)

Wild hogs (*Sus scrofa*) were the only invasive animal identified in the project area. Vegetative invasive species observed during the pedestrian surveys include common lantana within the USM Site 5 project area. Because this species is ubiquitous within the project area, if excavated fill from the project area is not removed but is used on-site for project related earthwork, construction of the proposed project would not contribute to the spread of vegetative invasive species within or outside the project area. No evidence of invasive fungi or microbial organisms was observed during the pedestrian survey, and no areas at risk for future invasions were identified.

## RIPARIAN AREAS

Riparian areas adjacent to Purgatory Creek are located within the project area. These areas contribute to floodplain function, streambank stability and integrity, nutrient cycling, pollutant filtering, sediment retention, and biological diversity of these habitats. NRCS policy requires project alternatives to maintain or improve water quality benefits of riparian areas as a result of project construction. If preferred alternatives do not maintain or improve water quality benefits, the NRCS must discontinue assistance on those portions of the plan impacting riparian areas.

## **NATURAL AREAS**

Purgatory Creek Natural Area, which is one of six natural areas in the City of San Marcos, lies within the boundaries of the project area. The purpose of these large natural areas is to provide flood mitigation, water quality, clean air, wildlife refuge, recreation, exercise opportunities, transportation corridors, and outdoor classrooms (San Marcos Greenbelt Alliance 2020). The 902-acre natural area has three distinctly designated areas, including Prospect Park, Lower Purgatory Creek, and Upper Purgatory Creek. The Upper Purgatory Creek area (Figure 8), which is within the project area, is popular with trail runners, mountain bikers, hikers, birders, and nature explorers.

## **HUMAN ENVIRONMENT**

The human environment relates to concerns defined by human interactions with the environment and includes land use/land cover, public health and safety, cultural resources, economics, recreation, and scenic beauty. The following concerns were dismissed during scoping: social issues, parklands, and significant scientific resources, as they are not relevant to the project.

## **LAND USE**

The National Land Cover Database mapping indicates the presence of 17 land cover types within the Upper San Marcos River Watershed (Figure 9).

Forests, grasslands, and developed areas are the top three land uses within the county, the watershed, and the study area. Forests occupy 51.1 percent (31,192 acres) of the watershed and 60.1 percent (11,972 acres) of the project area. Grasslands, predominantly used for grazing livestock, occupy 33.2 percent (20,256 acres) of the watershed and 39.2 percent (8,605 acres) of the project area. Dense urbanization (development) occurs in the southeastern portion of the watershed and is spreading westward along established transportation corridors (The Meadows Center 2018). This urbanization is evidenced by the new development occurring in the USM Site 5 drainage basin. Development presently occupies 13.5 percent (8,267 acres) of the watershed and only 6.2 percent (1,353 acres) of the project area. While there is agriculture cropland and improved pasture/rangeland present in the county, there is none present within the project area. These cover types have been summarized in Table 4 for the county, watershed, and project area.

**TABLE 4. SUMMARY OF LAND COVER TYPES**

|                                   | <b>Hays<br/>County</b> | <b>USM WS<br/>Drainage Area</b> |         | <b>USM Site 4<br/>Drainage Area</b> |         | <b>USM Site 5<br/>Drainage Area</b> |         |
|-----------------------------------|------------------------|---------------------------------|---------|-------------------------------------|---------|-------------------------------------|---------|
| <b>Land Use</b>                   | Acres                  | Acres                           | Percent | Acres                               | Percent | Acres                               | Percent |
| <b>Agriculture/Cropland</b>       | 14,974                 | 556                             | 3.7     | 0                                   | 0       | 0                                   | 0       |
| <b>Grassland<br/>(Herbaceous)</b> | 177,778                | 20,256                          | 11.4    | 6,026                               | 29.7    | 2,579                               | 12.7    |
| <b>Pasture/Rangeland</b>          | 4,727                  | 486                             | 10.3    | 0                                   | 0       | 0                                   | 0       |
| <b>Forest</b>                     | 179,993                | 31,192                          | 17.3    | 6,480                               | 20.8    | 5,492                               | 17.6    |
| <b>Developed/ Open<br/>Space</b>  | 53,093                 | 8,267                           | 15.6    | 280                                 | 3.4     | 1,073                               | 13.0    |
| <b>Wetlands/ Open<br/>Water</b>   | 3,664                  | 281                             | 7.7     | 2                                   | 0.7     | 0                                   | 0       |
| <b>Total</b>                      | 434,228                | 61,038                          | -       | 12,787                              | -       | 9,144                               | -       |

## **PUBLIC HEALTH AND SAFETY**

Due to the proximity of USM Sites 4 and 5 to the City of San Marcos, development has encroached and will likely continue to encroach upon the project area. Results of a breach inundation study indicate that nearly 1,200 structures and 11 major roadways located downstream of SM Site 4, and nearly 1,820 structures and 16 major roadways located downstream of USM Site 5 are within the breach inundation zones for each site and would be at risk from catastrophic failure of the dams.

## **CULTURAL RESOURCES, HISTORIC PROPERTIES, AND TRIBAL CONSULTATION**

As the NRCS has oversight on this project, it triggers compliance with Section 106 of the National Historic Preservation Act (NHPA), as amended. Per the requirements of the NHPA and 36 Code of Federal Regulations (CFR) §800, both a direct and indirect APE were determined for this undertaking, as well as an archaeological study buffer for best practices research into the known archaeological sites of the area. The NRCS set the Section 106 Cultural Resources APE for direct effects as the project footprint, and the area of indirect effects as a 1-mile (1.62-kilometer) study buffer surrounding the center point of each dam. The archaeological study buffer was a 1-mile (1.62 kilometers) area surrounding the direct APE (**Figures 10 and 11**). The NRCS based the APEs on the standards and best practices for archaeological and historic structure surveys in Texas as outlined in guidelines by the Council of Texas Archaeologists and approved by the THC (SHPO) in April 2020. These boundaries



are standards consistent with state and federal agencies in Texas and were documented and relayed in correspondence to all tribes, SHPO, city, state, and other concerned parties.

Approximately 140 acres (56.7 hectares) of the direct effects APE (all of which is associated with USM Site 5) is owned or administered by the City of San Marcos, and a portion of the direct APE is located within lands owned by the Texas Department of Transportation. Because both are political subdivisions of the State of Texas, these portions of the project are also subject to the requirements of both the Antiquities Code of Texas and Section 106 of the Federal NHPA. The entire area associated with USM Site 4 (212 acres [85.8 hectares]), and small portions of the area associated with USM Site 5 (32.8 acres [13.3 hectares]), have no local or state nexus; therefore, these portions of the project area are subject only to the requirements of Section 106. The direct and indirect APEs, and study buffer were also approved by the THC and remained the same for the state-owned property and the nonstate-owned property.

Archaeologists and historians conducted a desktop review of all previously recorded archaeological sites and all known historic structures within the APEs and the study buffer. The review included the *Restricted Texas Archaeological Sites Atlas*, the NRHP database, historic aerials, historic topographic maps, county historic records, city historic records, and the *Texas Freedom Colonies Atlas*, in order to search for possible prehistoric and historic buried and above ground cultural resources. The search showed there were no known historic built resources listed on the NRHP, historic properties, or properties deemed eligible as a State Historic Landmark by the THC located within the project boundaries. Therefore, no historic resources survey was pursued for this project.

After completion of a desktop review of all previously recorded archaeological sites and historic structures within the APEs and study buffer archaeologists conducted fieldwork within the USM sites' direct and indirect APEs in March 2024. An intensive archeological survey in the direct APE of USM Site 5, located within the city and state-owned property was conducted per Category 7 under 13 TAC (Texas Administrative Code) §26.15 and using the definitions in 13 TAC §26.3. The field methods complied with or exceeded the requirements of 13 TAC §26.10 to §26.18 and with survey guidelines established by the Council of Texas Archeologists and approved by the Texas Historical Commission in April 2020. The field methodology was approved by the NRCS prior to the survey. All fieldwork on the city and state-owned property was conducted under Texas Antiquities Permit No. 31501.

In total, 165 shovel test units were excavated within the direct APE of USM Site 5, none of which contained archeological materials of any kind. Investigators discovered large portions of the APE were disturbed by past development of the surrounding park, roadway improvements, and large-scale dam and drainage improvements. Archaeologists recorded one previously unknown site during the survey, 41HY623, a sparse, surficial historic-age artifact scatter. This site was recommended as not eligible for listing on the NRHP or as a State Antiquities Landmark, and no further investigations were recommended at the site. In addition, previously recorded sites 41HY163, 41HY323, 41HY415, 41HY450, and 41HY461 were revisited. While originally the archaeological sites were a concern, no evidence of deposits eligible for NRHP listings were observed at any of these sites. Within the remaining portions of the surveyed area, no resources eligible for listing on the national or state registry listing were observed, and no further archeological investigations of the APE were recommended.

For USM Site 4 and the remainder of USM Site 5, the NRCS determined further archaeological surveys were unlikely to make discoveries to significantly add to the archaeological record, and the rehabilitation of the thirty-nine- and thirty-five-year-old earthen dams was likely to reduce the scouring effect in the event of a flood and would only further protect any archaeological sites in the flood pool downstream. Additionally, little to no ground disturbance outside of the existing facility was anticipated and borrow pits and staging areas were already under consideration. Therefore, no additional archaeological investigations within the remaining portions of the APE were required (see Consultation letter in Appendix A).

## LOCAL, REGIONAL, AND NATIONAL ECONOMY

An analysis of local, regional, and national economic impacts identifies those aspects of the economic and social environment that are sensitive to change and that may be affected by activities associated with the proposed action. Socioeconomic factors describe the local demographics, income characteristics, and employment in the region that could be affected by the proposed project.

Demographic and economic data for this region is compared with that of the State to provide a regional context of socioeconomic conditions. Table 5 compares demographic and economic data for the San Marcos City Council District, Hays County, and the State of Texas.

**TABLE 5. POPULATION AND DEMOGRAPHIC DATA FOR HAYS COUNTY, TEXAS**

|                                                  | San Marcos<br>City Council<br>Dist. <sup>1/</sup> | Hays<br>County <sup>1/</sup> | Texas <sup>1/</sup> |
|--------------------------------------------------|---------------------------------------------------|------------------------------|---------------------|
| Population                                       | 76,198                                            | 241,069                      | 29,149,458          |
| Households                                       | 30,526                                            | 94,499                       | 10,747,240          |
| Median Per Capita Income                         | \$27,996                                          | \$41,931                     | \$39,446            |
| Median Household Income                          | \$52,147                                          | \$85,827                     | \$76,292            |
| Median value owner-occupied<br>housing units     | \$273,600                                         | \$371,400                    | \$260,400           |
| Families living at or below the poverty<br>level | 26.7%                                             | 9.8%                         | 13.7%               |
| Native American Population                       | 0.6%                                              | 1.3%                         | 1.1%                |
| Black Population                                 | 5.6%                                              | 5.0%                         | 13.6%               |
| Asian Population                                 | 2.1%                                              | 2.5%                         | 6.0%                |
| Hispanic population                              | 41.9%                                             | 39.6%                        | 39.8%               |

1/ U.S. Census American Census Survey-5 year Estimate (2019-2023).

Based on data from the U.S. Census Bureau, the City of San Marcos has had a 1.7 percent average rate of change in population since 2015, while Hays County has seen a 4.2 percent rate of change during this same timeframe.

The per capita and median household income for the San Marcos City Council District is about two-thirds that of the county and the State. Housing value is about three-quarters of the value in the county and slightly higher than the State. The poverty rate in the San Marcos City Council District is double the rate in the county and nearly double that in the State.

## **RECREATION**

The project area encompasses part of the Purgatory Creek Natural Area, which is used for recreational activities, including trail running, mountain biking, hiking, bird watching, and nature exploration.

## **SCENIC BEAUTY**

Scenic beauty encompasses landforms, water, vegetation, structures, and other types of visual resources in the landscape. Hays County is a relatively rural county, with the primary landcover types being forests and grasslands, which provides a natural and relatively undisturbed look to the viewshed in the county. The large Purgatory Creek Natural Area also provides scenic value to the county and the project area through the protection of more than 700 acres of natural landscape features in an area that is rapidly urbanizing. During scoping, scenic beauty was noted as a resource of importance that is valued by landowners and the public.

## **ECOSYSTEM SERVICES**

Within the Upper San Marcos River Watershed and the project area, ecosystem service benefits are largely derived from forests and grasslands, and the large acreage preserved within the Purgatory Creek Natural Area. The benefits from these resources are derived by their direct consumption or use, regulation of natural and human processes, and the cultural value of their existence.

The provisioning services result from the grasslands used to graze livestock and direct use of the resources present within the natural area for recreation. Grazing livestock is the predominant agricultural use. Thus, these areas produce direct benefits from harvested values, while indirectly contributing to the production of meat products.

Cultural ecosystem services within the project area are primarily provided by the aesthetic value of the natural systems, including the forests and the grasslands used for livestock. Residents within the project area value the natural and open space character of the watershed.

## **FORECAST FUTURE CONDITIONS**

Forecasting future resource conditions within the Upper San Marcos River Watershed will focus on the impacts of changes in land use and climate conditions. Urbanization within the project area is expected to continue, especially westward along major transportation corridors. Long-term changes in land use and climate may alter ecological and physical conditions within the watershed, resulting in changes throughout both the natural and human environment. Although the rehabilitation measures are designed to meet current applicable dam safety and design criteria based on available hydrologic data and projections, future changes in

watershed conditions and hydrology associated with continued development and climate variability remain inherently uncertain and could influence long-term watershed and infrastructure performance in ways that cannot be fully quantified at this time.

## **CLIMATE**

As noted in Section 4.2.3, climate conditions within the State are predicted to include historically unprecedented warming and an increase in extreme precipitation events, which will lead to an increase in the intensity of future droughts and may increase the risk of flooding. Environmental resources, including aquatic and terrestrial habitats, are likely to be stressed by these changing conditions, which may result in species changes favoring those that are more capable of exploiting these conditions. Increased droughts and flooding are likely to increase soil erosion. The presence of highly vegetated systems including forests and grasslands within this watershed will help to alleviate issues with erosion.

Climate change may affect human health and safety, with the potential for increased flooding due to extreme precipitation events, which could expand floodplain areas and render existing floodplains even more prone to floods. These changes may result in greater flood risk in local communities and increased levels of flood damage to infrastructure and structures. Increased flooding can have an economic impact, as expenditures for recovery are expected to rise, which may have adverse economic effects within communities.

## **LAND USE**

The population in the City of San Marcos is expected to increase by 2 to 4 percent over 20 years. While this rate of growth is not particularly high, it is still expected to contribute to increased development and urbanization in the watershed. Increased urbanization may result in additional impervious surfaces and fragmentation of the landscape, potentially impacting water quality and biodiversity (The Meadows Center 2018). The extent and location of future development, as well as the associated environmental risks and uncertainties, are difficult to predict and would depend on a variety of factors, including future land use decisions, economic conditions, and regulatory requirements.

## **Environmental Impacts**

***What are the reasonably foreseeable short- and long-term and adverse or beneficial effects of the proposed action and alternatives (if any) on the environment, to public health and safety, on economics, and to the quality of life of the American people? What are the negative environmental impacts or consequences to public health and safety, economics, or the quality of life of the American people if the proposed action or alternatives (if any) are not implemented?***

## **EFFECTS OF ALTERNATIVES RELATIVE TO RESOURCE CONCERNS**

The potential effects of the alternatives on the following resources are evaluated in detail in this section. Resources eliminated from detailed evaluation were noted in Table 1.

## SOILS

Alternative No. 1 – No Action: There would be limited effects from soil erosion and sedimentation associated with current operation of both dams. This alternative would have negligible effects from ongoing operations and maintenance of the existing dams. Therefore, the no action alternative would have direct, adverse, negligible, long-term, and localized effects on soils.

Alternative No. 2 – Decommissioning: Dams would be decommissioned by notching the dam embankment to remove storage function and capacity. Soils excavated from the embankment would be redistributed on site, and disturbed areas would be stabilized using BMPs common to construction projects, especially those consistent with NRCS practices and policies. In the short-term, effects would be direct, adverse, minor, and localized. In the long-term, effects would be direct, adverse, negligible, and localized.

Alternative No. 3 - Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: Soil erosion would be related to construction activities for rehabilitation and subsequent operation and maintenance of the dams. This alternative would have adverse, negligible, long-term, and localized effects on soils.

Alternative No. 4 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effects as Alternative 2.

Alternative No. 5 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: This alternative would have the same effects as Alternative 2.

Alternative No. 6 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effects as Alternative 2.

## FLOODPLAIN MANAGEMENT

Alternative No. 1 – No Action: Under this alternative, there would be no changes to the current levels of flooding or floodplain function, as no substantial repairs or rehabilitation would occur. The FEMA Flood Insurance Rate Map panels indicate numerous structures and road infrastructure downstream of both dams. There would be no effect on floodplain management from this alternative.

Alternative No. 2 – Decommissioning: The hydraulic modeling indicates that if this alternative were implemented, over 2,000 structures and 40 major roadways below USM Site 4 dam, and 1,982 structures and 39 major roadways below USM Site 5 dam within the breach inundation zone would be inundated during the 100-year storm. Decommissioning the dams would include property

buyouts, flood proofing, and raising roads. The effects on floodplain management would be direct, major, long-term, and localized.

Alternative No. 3 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: The effects of this alternative would be the same as the No Action Alternative, as rehabilitation

would keep the dams in place and maintain the current levels of flooding and floodplain function. There would no effect on floodplain management from this alternative.

Alternative No. 4 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effects as Alternative 2.

Alternative No. 5 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: This alternative would have the same effects as Alternative 2.

Alternative No. 6 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effects as Alternative 2.

## **WATER QUALITY**

Alternative No. 1 – No Action: This alternative would result in no substantial repairs or rehabilitation. The dam impoundments would not release additional sediment or pollutants into Purgatory Creek that could cause the designation of these waters to become listed on the EPA's Section 303(d) list of impaired waters. Segment 1814 of Purgatory Creek downstream of USM Site 5 is not currently subject to TMDL requirements. It is subject to requirements within the Upper San Marcos watershed protection plan. This alternative would have no effects on water quality.

Alternative No. 2 – Decommissioning: Implementation of BMPs is important to minimizing impacts to water quality during construction and stabilization of disturbed areas, and to ensure future flooding doesn't result in impacts to water quality due to additional sediment loading and pollutants from stormwater runoff. This alternative is not anticipated to impact water quality.

Alternative No. 3 – Site 4 - Dam & ASW Raise; Site 5 – Widen ASW: The effects of this alternative would be the same as the No Action Alternative, as rehabilitation would keep the dams in place and maintain the current water quality levels. This alternative would have no effects on water quality.

Alternative No. 4 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: The effects of this alternative would be the same as the No Action Alternative, as rehabilitation would keep the dams in place and maintain the current water quality levels. This alternative would have no effects on water quality.

Alternative No. 5 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: The effects of this alternative would be the same as the No Action Alternative, as rehabilitation would keep the dams in place and maintain the current water quality levels. This alternative would have no effects on water quality.

Alternative No. 6 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: The effects of this alternative would be the same as the No Action Alternative, as rehabilitation would keep the dams in place and maintain the current water quality levels. This alternative would have no effects on water quality.

## **GROUNDWATER**

Alternative No. 1 – No Action: This alternative would maintain the existing surface and groundwater interconnectivity that exists between the USM Sites 4 and 5 dam structures and the regional sole source aquifer. There are no effects on groundwater from either dam.

Alternative No. 2 – Decommissioning: Decommissioning the dams would eliminate the storage function of the dams and any groundwater recharge relationship between the dam and the regional sole source aquifer. Under this alternative, groundwater effects are indirect, adverse, minor, long-term, and would be localized or regional in extent.

Alternative No. 3 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: The effects of this alternative would be the same as the No Action Alternative, as rehabilitation would retain the dams and the relationship between the dams and the regional sole source aquifer. There are no effects on groundwater from either dam.

Alternative No. 4 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effects as Alternative 2.

Alternative No. 5 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: This alternative would have the same effects as Alternative 2.

Alternative No. 6 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effects as Alternative 2.

## **CLIMATE**

Alternative No. 1 – No Action: Ongoing operation and maintenance of the dams would not contribute additional emissions of greenhouse gases into the atmosphere. However, changes in climate resulting in increased frequency of storm events and flooding could have severe impacts on the dams, supporting infrastructure, and the surrounding area based on the level of storm and flooding intensity. This alternative would have no impact on climate. However, there could be minor, long-term effects on the dams and Purgatory Creek over the course of the life of the project.

Alternative No. 2 – Decommissioning: Construction activities would result in the generation of greenhouse gases. However, the level of activity would be minimal, and the total emissions would be undetectable in comparison to emissions of the State and the Nation. This alternative would have negligible long-term effects on emissions. However, changes in climate would have long-term, minor effects on the dams and Purgatory Creek over the course of the life of the project.

Alternative No. 3 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: Greenhouse gas emissions would be similar to Alternative 1 during construction and would then be similar to the No Action alternative during operation and maintenance. This alternative

would have no impact on climate. However, there could be minor, long-term effects on the dams and Purgatory Creek over the course of the life of the project.

Alternative No. 4 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effects as Alternative 2.

Alternative No. 5 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: This alternative would have the same effects as Alternative 2.

Alternative No. 6 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effects as Alternative 2.

## **FISH AND WILDLIFE HABITAT**

Alternative No. 1 – No Action: Ongoing operation and maintenance of the dam would have no effect on wildlife, as terrestrial and aquatic habitats would remain relatively undisturbed. Wildlife in the area would continue to exist under current conditions. This alternative would have no new effects and negligible ongoing effects on existing wildlife. Terrestrial and aquatic habitats would remain relatively undisturbed, and wildlife already present would likely continue to exist under current conditions.

Alternative No. 2 – Decommissioning: Construction activities in the area could disrupt wildlife activity in the area for 1 to 2 years. Terrestrial and aquatic habitats would be disturbed during and immediately after construction with changes to vegetation and topography. Little to no mortality of wildlife should occur, as most species can move away from construction activities. Implementation of BMPs, including the restriction of earth-moving activities during nesting seasons and replanting native species in disturbed areas to the greatest possible extent, would be required. Habitat structure would shift towards riparian with restoration of the impoundment areas. This alternative would have short-term minor effects from construction activities and minor long-term effects as the forest and grassland habitats are restored to pre-dam conditions.

Alternative No. 3 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: Construction activities would result in similar effects as the No Action alternative. There would be minor, short-term, adverse effects during and immediately after construction. Effects would be expected to last 1 to 2 years, and effects would be reduced or avoided with the implementation of BMPs. In the long term, effects would be minimal, as fish and wildlife would use the habitat areas they likely had prior to rehabilitation of the dams.

Alternative No. 4 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effects as Alternative 2.

Alternative No. 5 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: This alternative would have the same effects as Alternative 2.



Alternative No. 6 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effects as Alternative 2.

## **THREATENED AND ENDANGERED SPECIES**

Alternative No. 1 – No Action: Ongoing operation and maintenance of the dam would have no effect on threatened and endangered species. Threatened and endangered species that may be present in the Purgatory Creek Natural Area are not affected by the presence of the dam other than through temporary disturbance during operation and maintenance activities. This alternative would have minor long-term effects on threatened and endangered species.

Alternative No. 2 – Decommissioning: Construction activities in the area could disrupt threatened and endangered species activity in the area for 1 to 2 years. Terrestrial and aquatic habitats would be disturbed during and immediately after construction with changes to vegetation and topography. Little to no mortality of these species should occur, as direct harm would be avoided to the greatest extent possible through the implementation of BMPs, including the restriction of earth-moving activities during nesting seasons and replanting native species in disturbed areas to the greatest possible extent, would be required. Habitat structure would shift towards riparian with restoration of the impoundment areas. This alternative would have short-term minor effects from construction activities and minor long-term effects as the forest and grassland habitats are restored to pre-dam conditions.

Alternative No. 3 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: Construction activities related to rehabilitation of the dam would be limited to the area immediately surrounding the existing dams and associated accoutrements. Effects would be expected to last 1 to 2 years. Terrestrial and aquatic habitats would be disturbed during and immediately after construction with changes to vegetation and topography. Little to no mortality of these species should occur, as direct harm would be avoided to the greatest extent possible through the implementation of BMPs, including the restriction of earth-moving activities during nesting seasons and replanting native species in disturbed areas to the greatest possible extent, would be required. In the long term, effects would be minimal, as threatened and endangered species would use the habitat areas they likely had prior to rehabilitation of the dams.

Alternative No. 4 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effects as Alternative 2.

Alternative No. 5 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: This alternative would have the same effects as Alternative 2.

Alternative No. 6 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effects as Alternative 2.

## **MIGRATORY BIRDS**

Alternative No. 1 – No Action: Ongoing operation and maintenance of the dam would not have an effect on migratory birds and their use of the project area for breeding and nesting.

Alternative No. 2 – Decommissioning: Migratory birds are likely to nest within the project area. Implementation of BMPs to reduce the potential for the incidental take of migratory birds can include (1) clearing or grading of the site during the non-breeding season, or (2) conducting migratory bird nest surveys shortly before project construction to confirm the absence of nesting birds. While migratory birds are likely to avoid active construction areas, regular monitoring of areas within the project site should be done given that construction activities may take up to 2 years to complete. Restoration of the stream channel and revegetation of the corridor with native riparian woodland species would provide long-term benefits in increased habitat suitable for many migratory bird species.

Alternative No. 3 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: This alternative would have the same effects as Alternative 1 for construction activities. Long term, this alternative would have negligible effects as it would maintain much of the existing habitat that is suitable for use by migratory birds.

Alternative No. 4 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effects as Alternative 2.

Alternative No. 5 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: This alternative would have the same effects as Alternative 2.

Alternative No. 6 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effects as Alternative 2.

## **INVASIVE SPECIES**

Alternative No. 1 – No Action: Invasive species present will continue to be present and will need to be managed by landowners to prevent their spread to other sites. Land disturbances should be monitored for the potential to spread invasives within the project area and to adjoining landscapes. This alternative would have a negligible effect.

Alternative No. 2 – Decommissioning: Because the invasive vegetative species noted are ubiquitous within the project area, if excavated fill from the project area is not removed but is used on-site for project related earthwork, construction of the proposed project would not contribute to the spread of vegetative invasive species within or outside the project area. However, BMPs, including inspection and washing of equipment on-site, should be implemented to avoid the potential for spreading invasive plant materials off site during construction. This alternative would have no effect on invasive species.

Alternative No. 3 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: Implementation of construction BMPs to minimize the spread of existing invasive vegetative

species would have negligible effects. Existing conditions present with the dam would continue in the long term. This alternative would have negligible effects due to the potential to facilitate the spread of invasive vegetative species during construction but, would be less likely to occur for the remainder of the life of the project.

Alternative No. 4 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effects as Alternative 2.

Alternative No. 5 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: This alternative would have the same effects as Alternative 2.

Alternative No. 6 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effects as Alternative 2.

## **RIPARIAN AREAS**

Alternative No. 1 – No Action: This alternative would have no new effects on riparian areas. Any impacts associated with the original placement and construction of the dams would remain unchanged. This alternative would have no effect.

Alternative No. 2 – Decommissioning: Notching the dam to remove storage capacity and restoration of the stream and riparian area would provide long-term benefits by reconnecting the stream channel and floodplain and restoration of forest and grassland habitats to pre-dam condition. This alternative would have minor short- and long-term effects. There would be additional minor long-term effects due to the establishment of riparian vegetation.

Alternative No. 3 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: Construction would clear vegetation adjacent to the existing dam embankment and auxiliary spillway. This effect would begin during construction and persist in the long-term as the area would be incorporated into the enlarged dam and spillway. BMPs should be implemented to protect trees and other riparian vegetation from construction equipment and project implementation. This alternative would have minor, short- and long-term effects on adjacent riparian vegetation.

Alternative No. 4 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the similar effects as Alternative 2, with minor long-term effects due to the establishment of riparian vegetation in the vacated auxiliary spillway.

Alternative No. 5 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: This alternative would have the same effects as Alternative 2.

Alternative No. 6 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effects as Alternative 3.

## **NATURAL AREAS**

Alternative No. 1 – No Action: This alternative would have no new effects on the Purgatory Creek Natural Area. Any impacts associated with the original placement and construction of the dams would remain unchanged. This alternative would have no effect.

Alternative No. 2 – Decommissioning: Construction activities in the area could affect habitats and natural features, including vegetation and topography within the Purgatory Creek Natural Area located in the project area for USM Site 5. Implementation of BMPs, including the restriction of earth-moving activities during nesting seasons and replanting native species in disturbed areas to the greatest possible extent, would be required. Habitat structure within the natural area would shift towards riparian with restoration of the impoundment areas. This alternative would have short-term minor effects from construction activities and minor long-term effects as riparian forest and grassland habitats are restored to pre-dam conditions.

Alternative No. 3 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: This alternative would have the same construction related effects as Alternative 1 and the long-term effects associated with the No Action alternative, due to impacts from placement and operation and maintenance of the dams. Effects would be reduced or avoided with the implementation of BMPs. In the long-term, effects would be negligible.

Alternative No. 4 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effects as Alternative 2.

Alternative No. 5 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: This alternative would have the same effects as Alternative 2.

Alternative No. 6 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effects as Alternative 2.

## **LAND USE**

Alternative No. 1 – No Action: This alternative would have no new effects on land use. Any impacts associated with the original placement and construction of the dams would remain unchanged. Urbanization within the project area is anticipated to continue, even if at a relatively slow rate. This alternative would have no effects on land use.

Alternative No. 2 – Decommissioning: There would be short-term use of the areas adjacent to the existing dams for construction staging and laydown. The land would return to forest and grassland after restoration. The stream channel would be maintained and adjacent riparian areas restored to pre-dam conditions. The 100-year floodplain would be enlarged, requiring even more property buyouts. The effects of this alternative would be direct, adverse, major, long-term, and localized.

Alternative No. 3 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: Construction for rehabilitation of the dams would have no impacts on land use within the project area. Land use in the Purgatory Creek Natural Area portion of USM Site 5 would remain limited due to the conservation easement in place. Development is anticipated to

continue in this portion of the watershed and will not be affected by the rehabilitation project. This alternative would have no effect on land use.

Alternative No. 4 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effect as Alternative 2.

Alternative No. 5 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: This alternative would have the same effect as Alternative 2.

Alternative No. 6 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effect as Alternative 2.

## **PUBLIC HEALTH AND SAFETY**

Alternative No. 1 – No Action: This alternative would result in no major repairs or rehabilitation of the dams, which would continue to be operated and maintained under existing conditions and requirements. There would be no new effects to public health and safety within the breach inundation area. This alternative would have no effects on public health and safety.

Alternative No. 2 – Decommissioning: Decommissioning of the dams would remove health and safety issues related to breach risk and future flooding. The effects on safety would be direct, major, long-term, and localized.

Alternative No. 3 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: Rehabilitation would result in conditions similar to existing conditions with the dams maintained and operational. This alternative would have no effects on public health and safety.

Alternative No. 4 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effect as Alternative 2.

Alternative No. 5 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: This alternative would have the same effect as Alternative 2.

Alternative No. 6 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effect as Alternative 2.

## **LOCAL, REGIONAL, AND NATIONAL ECONOMICS**

Alternative No. 1 – No Action: Operation and maintenance of the dams would continue and may generate limited short-term employment, resulting in minimal effects on the local economy. The effects would be negligible.

Alternative No. 2 – Decommissioning: Decommissioning the dam could create short-term, local employment opportunities and demand for supplies that would likely be sourced from local suppliers. Buyouts would have significant benefits to the socioeconomics of the area. Long-term effects would be negligible.

Alternative No. 3 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: Rehabilitation of the dams could create short-term, local employment opportunities and demand for supplies that would likely be sourced from local suppliers. Construction would have minor, short-term benefits to the local economy. Rehabilitation of the dams would provide flood protection, which would have long-term, beneficial impacts to downstream structures and roads.

Alternative No. 4 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effect as Alternative 2.

Alternative No. 5 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: This alternative would have the same effect as Alternative 2.

Alternative No. 6 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effect as Alternative 2.

## **RECREATION**

Alternative No. 1 – No Action: Continued operation and maintenance of the dams would have no effect on the existing recreational activities. There would be no effects to recreation.

Alternative No. 2 – Decommissioning: Construction to decommission each dam would temporarily limit recreational activities in the areas adjacent to the dams, especially in the Purgatory Creek Natural Area. Upon completion of construction and restoration of forests and grasslands to pre-dam conditions, recreational activities could resume. This alternative would have minor, short-term adverse effects and negligible effects in the long-term.

Alternative No. 3 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: Construction activities for rehabilitation would limit recreational activities within the USM Site 5 area, but they would resume after construction was completed. This alternative would have negligible effects on recreation.

Alternative No. 4 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effect as Alternative 2.

Alternative No. 5 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: This alternative would have the same effect as Alternative 2.

Alternative No. 6 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effect as Alternative 2.

## **SCENIC BEAUTY**

Alternative No. 1 – No Action: Continued operation and maintenance of the dams would have no effect on the scenic beauty of the project area. Views of the physical structure of the dam and the surrounding landscape within the Purgatory Creek Natural Area at USM Site 5 would continue to exist. The views of USM Site 4 would continue to be dominated by

the surrounding forests and grasslands. Views of development are encroaching on both sites as urbanization pushes west and north from the City of San Marcos. This alternative would have no effect on scenic beauty.

Alternative No. 2 – Decommissioning: Removal of each dam and restoration of its stream channel and adjoining riparian vegetation, including forests and grasslands, would change the aesthetics to pre-dam conditions, resulting in no net change in the overall scenic beauty of the area. This alternative would have short-term negligible effects on scenic beauty from construction activities within the first few years and while the vegetative restoration was becoming established.

Alternative No. 3 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: Construction activities and changes to the dam structures would have minor, short-term, adverse effects on aesthetics. Rehabilitation of the dams would preserve existing aesthetics and views within the project area. This alternative would have short-term minor effects during construction and long-term minor effects resulting from an enlarged dam and auxiliary spillway.

Alternative No. 4 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effect as Alternative 2.

Alternative No. 5 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Widen Auxiliary Spillway: This alternative would have the same effect as Alternative 2.

Alternative No. 6 – Site 4 - Dam and Auxiliary Spillway Raise; Site 5 – Dam Raise and Auxiliary Spillway Armoring: This alternative would have the same effect as Alternative 2.

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

No

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

N/A

## **Endangered Species Act**

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

Table 2: May Affect, Likely to Adversely Affect Determination for TEPC Species/Critical Habitat

| Species/Habitat                                         | Status                 | Proposed or Designated Critical Habitat Present? | Brief Rationale (or refer to other proposal documentation)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------|------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tricolored bat ( <i>Perimyotis subflavus</i> )          | Potentially Endangered | Yes                                              | The <b>tricolored bat</b> ( <i>Perimyotis subflavus</i> ) is a species proposed for federal listing as endangered in Hays County. Tricolored bats roost in deciduous hardwood forests, pine trees, eastern red cedar ( <i>Juniperus virginiana</i> ), Spanish moss ( <i>Tillandsia usneoides</i> ), and human structures such as barns, beneath porch roofs, bridges, and concrete bunkers during the spring, summer, and fall. They prefer mature deciduous hardwood forests, which provide more structural diversity for roosting sites. Winter hibernacula in the southern United States frequently include road-associated culverts and other human structures; caves and tree cavities may also be used. While no individuals were identified during the pedestrian survey, preferred summer habitat for this species was identified within the project area. |
| Golden-cheeked warbler ( <i>Setophaga chrysoparia</i> ) | Endangered             | Yes                                              | The <b>golden-cheeked warbler</b> ( <i>Setophaga chrysoparia</i> ) is Federally listed as endangered in Hays County. Golden cheeked warblers breed in oak ( <i>Quercus</i> spp.) and Ashe juniper woodlands along hillslopes. They require Ashe juniper bark to construct their nests. While no individuals were identified during the pedestrian survey, preferred breeding habitat for this species was identified within the project area.                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Piping plover ( <i>Charadrius melodus</i> )             | Threatened             | No                                               | The <b>piping plover</b> ( <i>Charadrius melodus</i> ) is Federally listed as threatened in Hays County. In the interior United States, piping plovers nest on the unvegetated shorelines of alkaline lakes, reservoirs, or river sandbars. Additionally, the piping plover is currently designated within the area as only needing impact considerations for wind energy projects. No shorelines/sandbars that may serve as nesting habitat were identified within the proposed project area.                                                                                                                                                                                                                                                                                                                                                                     |
| Rufa red knot ( <i>Calidris canutus rufa</i> )          | Threatened             | No                                               | The <b>rufa red knot</b> ( <i>Calidris canutus rufa</i> ) is Federally listed as threatened in Hays County. In the interior United States, rufa red knots use saline lakes and possibly large wetlands and riverine sandbars as stopover habitat. Additionally, the rufa red knot is currently designated within the area as only needing impact considerations for wind energy projects. No potential stopover habitats were identified within the proposed project area.                                                                                                                                                                                                                                                                                                                                                                                         |



| Species/Habitat                                          | Status     | Proposed or Designated Critical Habitat Present? | Brief Rationale (or refer to other proposal documentation)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------------|------------|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Whooping crane ( <i>Grus americana</i> )                 | Endangered | No                                               | The <b>whooping crane</b> ( <i>Grus americana</i> ) is Federally listed as endangered in Hays County. Whooping cranes winter in Canada and breed on the Texas gulf coast, utilizing sparsely vegetated, shallow wetlands, and flooded fields in rolling terrain away from human activity during migration. No potential stopover habitats were identified within the proposed project area.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Austin blind salamander ( <i>Eurycea waterlooensis</i> ) | Endangered | No                                               | The <b>Austin blind salamander</b> ( <i>Eurycea waterlooensis</i> ) is Federally listed as endangered in Hays County. Austin blind salamanders inhabit high quality waters maintained by groundwater sources from the Barton Springs Segment of the Edwards Aquifer and are typically found in subterranean habitats within caves or underground areas. The project area is not one of the four Barton Springs outlets where the salamanders have been identified, and no caves exhibiting groundwater were identified within the project area.                                                                                                                                                                                                                                                                                                                                      |
| San Marcos salamander ( <i>Eurycea nana</i> )            | Threatened | No                                               | The <b>San Marcos salamander</b> ( <i>Eurycea nana</i> ) is Federally listed as threatened in Hays County. San Marcos salamanders inhabit thermally stable, spring-fed streams with velocities around one centimeter per second that contain cobble, gravel, and boulder substrates with coverage from <i>Amblystegium</i> moss and filamentous algae. The project area is not within or adjacent to the San Marcos Springs to which the salamander is endemic, and no streams that constitute habitat for the San Marcos salamander were identified in the project area.                                                                                                                                                                                                                                                                                                            |
| Texas blind salamander ( <i>Eurycea rathbuni</i> )       | Endangered | No                                               | The <b>Texas blind salamander</b> ( <i>Eurycea rathbuni</i> ) is Federally listed as endangered in Hays County. Texas blind salamanders inhabit water-filled subterranean caverns of the Edwards Aquifer in San Marcos. Additionally, the Texas blind salamander is currently designated within the area as only needing impact considerations for projects which would adversely affect the water quality and quantity of the Edwards Aquifer and surface waters that contribute to the Edwards Aquifer. No caves which constitute habitat for the salamander were identified within the project area. Streams within the project area may contribute to recharge of the Edwards Aquifer; however, the proposed project, which only temporarily impounds flows of the stream during flood events, would not adversely affect the water quality or quantity of these surface waters. |

| Species/Habitat                                                | Status     | Proposed or Designated Critical Habitat Present? | Brief Rationale (or refer to other proposal documentation)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------|------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fountain darter ( <i>Etheostoma fonticola</i> )                | Endangered | No                                               | The <b>fountain darter</b> ( <i>Etheostoma fonticola</i> ) is Federally listed as endangered in Hays County. Fountain Darters inhabit clean, undisturbed stream bottoms with constant temperatures, adequate flows, and a mix of submergent plants such as algae, mosses, and vascular plants. No streams that constitute habitat for the Fountain Darter were identified in the project area.                                                                                                                                                      |
| Guadalupe fatmucket ( <i>Lampsilis bergmanni</i> )             | Endangered | No                                               | The <b>Guadalupe fatmucket</b> ( <i>Lampsilis bergmanni</i> ) is Federally listed as endangered in Hays County. Guadalupe Fatmucket inhabit small, flowing streams and rivers with mud, sand, and gravel substrates. No streams that constitute habitat for the Guadalupe Fatmucket were identified in the project area.                                                                                                                                                                                                                            |
| Guadalupe orb ( <i>Cyclonaias necki</i> )                      | Endangered | No                                               | The <b>Guadalupe orb</b> ( <i>Cyclonaias necki</i> ) is Federally listed as endangered in Hays County. Guadalupe Orbs inhabit riffles and runs of moderately sized rivers to depths of 3.3 feet with mud, silt, gravel, or cobble substrates. No streams that constitute habitat for the Guadalupe Orb were identified in the project area.                                                                                                                                                                                                         |
| Comal Springs dryopid beetle ( <i>Stygoparnus comalensis</i> ) | Endangered | No                                               | The <b>Comal Springs dryopid beetle</b> ( <i>Stygoparnus comalensis</i> ) is Federally listed as endangered in Hays County. Comal Springs dryopid beetles inhabit both gravel- and cobble-dominated surface waters with aquatic vegetation and subterranean spaces associated with springs issuing from the Edwards Aquifer. The project area is not within or adjacent to the Comal or Fern Bank Springs where the beetle has been identified, and no streams or caves that constitute habitat for the beetle were identified in the project area. |
| Comal Springs riffle beetle ( <i>Heterelmis comalensis</i> )   | Endangered | No                                               | The <b>Comal Springs riffle beetle</b> ( <i>Heterelmis comalensis</i> ) is Federally listed as endangered in Hays County. Comal Springs riffle beetles inhabit gravel-dominated riffles associated with springs issuing from the Edwards Aquifer. The project area is not within or adjacent to the Comal or San Marcos Springs where the beetle has been identified, and no streams that constitute habitat for the beetle were identified in the project area.                                                                                    |

| Species/Habitat                                                  | Status              | Proposed or Designated Critical Habitat Present? | Brief Rationale (or refer to other proposal documentation)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------|---------------------|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Monarch butterfly<br>( <i>Danaus Plexippus</i> )                 | Proposed Threatened | No                                               | The <b>monarch butterfly</b> ( <i>Danaus plexippus</i> ) is a species proposed for federal listing as threatened in Hays County. Monarch butterflies undergo long-distance migrations throughout North America and lay their eggs on obligate milkweed host plants in a variety of forested and grassland habitats. Native grasslands that could support milkweed are located within the project area.                                                                                                                                             |
| Peck's cave amphipod<br>( <i>Stygobromus pecki</i> )             | Endangered          | No                                               | The <b>Peck's cave amphipod</b> ( <i>Stygobromus pecki</i> ) is Federally listed as endangered in Hays County. Peck's cave amphipod inhabits water-filled subterranean caverns and springs of the Edwards Aquifer in San Marcos. The project area is not within or adjacent to San Marcos Springs where the amphipod has been identified, and no streams that constitute habitat for the amphipod were identified in the project area.                                                                                                             |
| Texas wild-rice                                                  | Endangered          | No                                               | <b>Texas wild-rice</b> ( <i>Zizania texana</i> ) is Federally listed as endangered in Hays County. Texas wild-rice is a submergent aquatic perennial grass that stands at depths up to 3.3 feet and requires clear, thermally constant, flowing water. Texas wild-rice is only found in the San Marcos River and prefers spring-fed gravel and sand substrates overlying clay. The project area is not within or adjacent to the San Marcos River, and no streams that constitute habitat for Texas wild-rice were identified in the project area. |
| interior least tern<br>( <i>Sternula antillarum athalassos</i> ) | Endangered          | No                                               | The <b>interior least tern</b> ( <i>Sternula antillarum athalassos</i> ) is State-listed as endangered within Hays County. Interior least terns nest and stop over along sand and gravel bars within large, braided streams and man-made structures, such as inland beaches, wastewater treatment plants, and gravel mines in the interior United States. No potential stopover or nesting habitats were identified within the proposed project area.                                                                                              |
| white-faced ibis<br>( <i>Plegadis chihi</i> )                    | Threatened          | No                                               | The <b>white-faced ibis</b> ( <i>Plegadis chihi</i> ) is State-listed as threatened within Hays County. White-faced ibis winter in the northern Great Plains and breeds on the Texas Gulf Coast, utilizing freshwater marshes, sloughs, and irrigated rice fields, as well as brackish and saltwater habitats, as stop-over habitat during migration. No potential stopover habitats were identified within the proposed project area. Therefore, no alternatives may affect the white-faced ibis.                                                 |

| Species/Habitat                                      | Status     | Proposed or Designated Critical Habitat Present? | Brief Rationale (or refer to other proposal documentation)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------|------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| wood stork ( <i>Mycteria americana</i> )             | Threatened | No                                               | The <b>wood stork</b> ( <i>Mycteria americana</i> ) is State-listed as threatened within Hays County. Wood storks forage in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water in Texas during the non-breeding season, roosting in tall snags and sometimes in heronries with other wading birds. No roosting or foraging habitats for the wood stork were identified in the project area.                                                                                                                                                                                                     |
| Cagle's map turtle ( <i>Graptemys caglei</i> )       | Threatened | No                                               | The <b>Cagle's map turtle</b> ( <i>Graptemys caglei</i> ) is State-listed as threatened within Hays County. Cagle's map turtles inhabit swift to moderately flowing streams with gravel or cobble substrates connected by silt or mud bottomed pools, and nest on gently sloping sand banks. No streams that constitute habitat for the turtle were identified within the project area.                                                                                                                                                                                                                                           |
| Texas horned lizard ( <i>Phrynosoma cornutum</i> )   | Threatened | Yes                                              | The <b>Texas horned lizard</b> ( <i>Phrynosoma cornutum</i> ) is State-listed as threatened within Hays County. Texas horned lizards use open, sandy to rocky habitats with sparse vegetation, including grassland, prairie, cactus, scattered brush, or scrubby trees. While no individuals were identified during the pedestrian survey, preferred habitat for this species was identified contiguously across the proposed project area.                                                                                                                                                                                       |
| Texas salamander ( <i>Eurycea neotenes</i> )         | Threatened | No                                               | The <b>Texas salamander</b> ( <i>Eurycea neotenes</i> ) is State-listed as threatened within Hays County. Texas salamanders inhabit streams maintained by groundwater sources from the Edwards Aquifer and can be found in both surface and subterranean habitats within caves or underground areas. No streams or caves that constitute habitat for the Texas salamander were identified in the project area.                                                                                                                                                                                                                    |
| Barton Springs salamander ( <i>Eurycea sosorum</i> ) | Endangered | No                                               | The <b>Barton Springs salamander</b> ( <i>Eurycea sosorum</i> ) is state and Federally listed as endangered in Hays County but was not listed in the USFWS IPAC for the project area. Barton Springs salamanders inhabit streams maintained by groundwater sources from the Barton Springs Segment of the Edwards Aquifer and can be found in both surface and subterranean habitats within caves or underground areas. The project area is not one of the four Barton Springs outlets where the salamanders have been identified, and no surface waters or caves exhibiting groundwater were identified within the project area. |

| Species/Habitat                                             | Status     | Proposed or Designated Critical Habitat Present? | Brief Rationale (or refer to other proposal documentation)                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------|------------|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Blanco blind salamander ( <i>Eurycea robusta</i> )          | Threatened | No                                               | The <b>Blanco blind salamander</b> ( <i>Eurycea robusta</i> ) is State-listed as threatened in Hays County. The Blanco blind salamander is thought to inhabit water-filled subterranean caverns of the Edwards Aquifer near the Blanco River in San Marcos, Texas. Blanco blind salamanders were identified in 1951, and no other individuals have been identified since. No streams or caves that constitute habitat for the Blanco blind salamander were identified in the project area. |
| Texas troglobitic water slater ( <i>Lirceolus smithii</i> ) | Threatened | No                                               | The <b>Texas troglobitic water slater</b> ( <i>Lirceolus smithii</i> ) is State-listed as threatened in Hays County. The Texas troglobitic water slater is an obligate inhabitant of subterranean caves with groundwater sources from the Edwards Aquifer. No caves that constitute habitat for the Texas troglobitic water slater were identified in the project area. Therefore, no alternatives may affect the Texas troglobitic water slater.                                          |
| Guadalupe darter ( <i>Percina apristis</i> )                | Threatened | No                                               | The <b>Guadalupe darter</b> ( <i>Percina apristis</i> ) is State-listed as threatened in Hays County. The Guadalupe darter inhabits stream riffles with moderately turbid water and boulder substrate. No streams that constitute habitat for the Guadalupe darter were identified in the project area.                                                                                                                                                                                    |
| headwater catfish ( <i>Ictalurus lupus</i> )                | Threatened | No                                               | The <b>headwater catfish</b> ( <i>Ictalurus lupus</i> ) is State-listed as threatened in Hays County. Headwater catfish inhabit riffles, runs, and pools of sandy to rocky creeks, rivers, and associated springs. No streams that constitute habitat for the Headwater catfish were identified in the project area.                                                                                                                                                                       |
| Balcones spike ( <i>Fusconaia iheringi</i> )                | Endangered | No                                               | The <b>Balcones spike</b> ( <i>Fusconaia iheringi</i> ) is State- and Federally listed as endangered in Hays County but was not listed in the USFWS IPAC for the project area. Balcones spikes inhabit flowing streams and rivers with sand, gravel, and cobble substrate riffles and runs. No streams that constitute habitat for the Balcones spike were identified in the project area.                                                                                                 |
| False spike ( <i>Fusconaia mitchelli</i> )                  | Endangered | No                                               | The <b>False spike</b> ( <i>Fusconaia mitchelli</i> ) is State- and Federally listed as endangered in Hays County but was not listed in the USFWS IPAC for the project area. False spike inhabit flowing streams and rivers with sand, gravel, and cobble substrate riffles and runs. No streams that constitute habitat for the false spike were identified in the project area.                                                                                                          |

| Species/Habitat                                | Status     | Proposed or Designated Critical Habitat Present? | Brief Rationale (or refer to other proposal documentation)                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------|------------|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Texas fatmucket ( <i>Lampsilis bracteata</i> ) | Endangered | No                                               | The <b>Texas fatmucket</b> ( <i>Lampsilis bracteata</i> ) is State-listed as threatened and Federally listed as endangered in Hays County but was not listed in the USFWS IPAC for the project area. Texas fatmucket inhabits flowing streams and rivers with mud, sand, and gravel substrates. No streams that constitute habitat for the Texas fatmucket were identified in the project area.                      |
| Texas fawnsfoot ( <i>Truncilla macrodon</i> )  | Threatened | No                                               | The <b>Texas fawnsfoot</b> ( <i>Truncilla macrodon</i> ) is State- and Federally listed as threatened in Hays County but was not listed in the USFWS IPAC for the project area. Texas fawnsfoot inhabits flowing medium to large streams and rivers with mud, sand, and gravel substrates. No streams that constitute habitat for the Texas fawnsfoot were identified in the project area.                           |
| Texas pimpleback ( <i>Cyclonaias petrina</i> ) | Endangered | No                                               | The <b>Texas pimpleback</b> ( <i>Cyclonaias petrina</i> ) is State- and Federally listed as endangered in Hays County but was not listed in the USFWS IPAC for the project area. Texas pimpleback inhabit flowing medium to large streams and rivers with riffle and run habitats of gravel and bedrock substrates. No streams that constitute habitat for the Texas pimpleback were identified in the project area. |

Table 3: Applicable proposal record documentation to support ESA compliance

| Documentation Type      | File Name (if applicable/needed) |
|-------------------------|----------------------------------|
| Consultation with USFWS | <a href="#">Appendix A</a>       |
| IPaC Report             | <a href="#">Appendix E</a>       |

## National Historic Preservation Act – Section 106 Review

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

No potential to cause effects. The proposal is a type of activity that does not have the potential to cause effects on any kind of prehistoric or historic resource, even if such resources were in the project area.

As the NRCS has oversight on this project, it triggers compliance with Section 106 of the National Historic Preservation Act (NHPA), as amended. Per the requirements of the NHPA and 36 Code of Federal Regulations (CFR) §800, both a direct and indirect APE were determined for this undertaking, as well as an archaeological study buffer for best practices research into the known archaeological sites of the area. The NRCS set the Section 106 Cultural Resources APE for direct effects as the project footprint, and the area of indirect effects as a 1-mile (1.62-kilometer) study buffer surrounding the center point of each dam. The archaeological study buffer was a 1-mile (1.62 kilometers) area

surrounding the direct APE. The NRCS based the APEs on the standards and best practices for archaeological and historic structure surveys in Texas as outlined in guidelines by the Council of Texas Archaeologists and approved by the THC (SHPO) in April 2020. These boundaries are standards consistent with state and federal agencies in Texas and were documented and relayed in correspondence to all tribes, SHPO, city, state, and other concerned parties.

Approximately 140 acres (56.7 hectares) of the direct effects APE (all of which is associated with USM Site 5) is owned or administered by the City of San Marcos, and a portion of the direct APE is located within lands owned by the Texas Department of Transportation. Because both are political subdivisions of the State of Texas, these portions of the project are also subject to the requirements of both the Antiquities Code of Texas and Section 106 of the Federal NHPA. The entire area associated with USM Site 4 (212 acres [85.8 hectares]), and small portions of the area associated with USM Site 5 (32.8 acres [13.3 hectares]), have no local or state nexus; therefore, these portions of the project area are subject only to the requirements of Section 106. The direct and indirect APEs, and study buffer were also approved by the THC and remained the same for the state-owned property and the nonstate-owned property.

Archaeologists and historians conducted a desktop review of all previously recorded archaeological sites and all known historic structures within the APEs and the study buffer. The review included the *Restricted Texas Archaeological Sites Atlas*, the NRHP database, historic aerials, historic topographic maps, county historic records, city historic records, and the *Texas Freedom Colonies Atlas*, in order to search for possible prehistoric and historic buried and above ground cultural resources. The search showed there were no known historic built resources listed on the NRHP, historic properties, or properties deemed eligible as a State Historic Landmark by the THC located within the project boundaries. Therefore, no historic resources survey was pursued for this project.

After completion of a desktop review of all previously recorded archaeological sites and historic structures within the APEs and study buffer archaeologists conducted fieldwork within the USM sites' direct and indirect APEs in March 2024. An intensive archeological survey in the direct APE of USM Site 5, located within the city and state-owned property was conducted per Category 7 under 13 TAC (Texas Administrative Code) §26.15 and using the definitions in 13 TAC §26.3. The field methods complied with or exceeded the requirements of 13 TAC §26.10 to §26.18 and with survey guidelines established by the Council of Texas Archeologists and approved by the Texas Historical Commission in April 2020. The field methodology was approved by the NRCS prior to the survey. All fieldwork on the city and state-owned property was conducted under Texas Antiquities Permit No. 31501.

In total, 165 shovel test units were excavated within the direct APE of USM Site 5, none of which contained archeological materials of any kind. Investigators discovered large portions of the APE were disturbed by past development of the surrounding park, roadway improvements, and large-scale dam and drainage improvements. Archaeologists recorded one previously unknown site during the survey, 41HY623, a sparse, surficial historic-age artifact scatter. This site was recommended as not eligible for listing on the NRHP or as a State Antiquities Landmark, and no further investigations

were recommended at the site. In addition, previously recorded sites 41HY163, 41HY323, 41HY415, 41HY450, and 41HY461 were revisited. While originally the archaeological sites were a concern, no evidence of deposits eligible for NRHP listings were observed at any of these sites.

Table 4: Applicable proposal record documentation to support NHPA compliance

| Documentation Type                 | File Name (if applicable/needed) |
|------------------------------------|----------------------------------|
| Programmatic Agreement             | <a href="#">Appendix E</a>       |
| Copies of Section 106 Consultation | <a href="#">Appendix A</a>       |

## Consultation with Federally Recognized Tribes

Consultation with federally recognized tribes was conducted as follows:

Section 106 consultation with agencies and Tribes is listed below. Tribal consultation was coordinated by NRCS. Initial consultation letters were sent to the following agencies and Tribes and is included in Appendix A. Section 106 consultation was initiated with the THC early in the project to obtain a Texas antiquities permit (31501) for conducting the cultural resources fieldwork. Section 106 consultation continued with the submittal of a draft archeological survey report, dated September 5, 2024. Consultation is ongoing with submittal of another Survey Report to THC dated July 23, 2025. As NHPA consultation is a government-to-government responsibility that NRCS cannot delegate, the agency initiated consultation with Federally recognized Tribes with ancestral interests in the county on March 4, 2023.

- Texas Historical Commission (Serves as Texas' SHPO)
- Coushatta Tribe of Louisiana
- Apache Tribe of Oklahoma
- Tonkawa Tribe of Oklahoma
- Comanche Nation of Oklahoma
- National Water Management Center Archaeologists
- Acting NRCS Federal Preservation Officer (FPO)

Table 5: Applicable proposal record documentation to support tribal consultation

| Documentation Type                           | File Name (if applicable/needed) |
|----------------------------------------------|----------------------------------|
| Copies of Consultation Letters and Responses | <a href="#">Appendix A</a>       |
| Programmatic Agreement                       | <a href="#">Appendix E</a>       |

## Clean Water Act

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

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



The U. S. Army Corps of Engineers regulates the discharge of dredged and fill material into waters of the United States, including wetlands, under Section 404 of the Clean Water Act.

Desktop mapping indicated the presence of one open water body feature in each of the USM Sites 4 and 5 project areas. Both dam sites impound flow along Purgatory Creek (Figure 5). The area below the normal pool elevation of both USM Sites 4 and 5 dams were dry at the time of the pedestrian survey and appear to only hold water temporarily following periods of significant precipitation.

Most of streams within the Purgatory Creek subbasin are relatively non-permanent, ephemeral streams. The ephemeral reach of Purgatory Creek flows generally east through the USM Sites 4 and 5 project areas and has an average ordinary high water mark width of 20 feet. An approximate 1,000-foot reach of the creek mapped by the USGS National Hydrography Dataset above the USM Site 4 dam appears to be an ephemeral swale, which does not exhibit bed and banks or an ordinary high water mark. It may have been impacted by past agricultural activities. Additionally, there are four ephemeral tributaries that flow into Purgatory Creek within the USM Site 5 project area that exhibit ordinary high water marks with an average width of 10 feet. Table 2 shows the feature type along with acreage and linear feet present within the USM Sites 4 and 5 project areas.

Table 6: Applicable proposal record documentation to support CWA compliance

| Documentation Type     | File Name (if applicable/needed) |
|------------------------|----------------------------------|
| Project Correspondence | <a href="#">Appendix A</a>       |

## Clean Air Act

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

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

## Special Management Area Considerations

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

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

## Pertinent Executive Orders

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

**EO 11988, Floodplain Management** – requires determination of action occurring in a floodplain, using HUD floodplain map or more detailed map if available.

Before construction of any project for flood prevention, the sponsor must agree to participate in and comply with applicable Federal floodplain management and flood insurance programs. The sponsor is required to have development controls in place below low and significant hazard dams prior to NRCS or the sponsor entering into a construction contract.

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

Purgatory Creek and the unnamed tributaries within this portion of the watershed and study area are all relatively non-permanent, ephemeral streams and would not be considered jurisdictional. There are no wetlands within the study area.

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

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

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

One invasive plant and one wildlife species were observed at both sites during the pedestrian survey. No evidence of invasive animals, fungi, or microbial organisms were observed. Site and soil disturbance during construction could facilitate spread of the invasive plant species. Implementing BMPs, including contractor requirements to clean equipment prior to arriving on site and before leaving the site, will minimize potential spread and introduction of invasive species to and from the site.

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

Long term, this alternative would have negligible effects as it would maintain much of the existing habitat that is suitable for use by migratory birds.

**EO 13443, Facilitation of Hunting Heritage and Wildlife Conservation** – expand and enhance hunting opportunities.

Table 7: Applicable proposal record documentation to support EO compliance

| Documentation Type     | File Name (if applicable/needed) |
|------------------------|----------------------------------|
| Project Correspondence | <a href="#">Appendix A</a>       |

## **Certifying Statement for EA Page Limit and Deadline**

The Responsible Official certifies that this EA:

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

## APPENDICES

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Examples of items that may be included as appendices are:

- [References](#)
- [Appendix A – Comments and Responses](#)
- [Appendix B – Project Map](#)
- [Appendix C – Support Maps](#)
- [Appendix E – Other Supporting Information](#)

## References

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## **Appendix A – Comments and Responses**

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**From:** [noreply@thc.state.tx.us](mailto:noreply@thc.state.tx.us) <[noreply@thc.state.tx.us](mailto:noreply@thc.state.tx.us)>

**Sent:** Thursday, August 21, 2025 11:55 AM

**To:** Sandroock, David <[david.sandroock@stantec.com](mailto:david.sandroock@stantec.com)>; [reviews@thc.state.tx.us](mailto:reviews@thc.state.tx.us) <[reviews@thc.state.tx.us](mailto:reviews@thc.state.tx.us)>; [ryanpatrickperckins@gmail.com](mailto:ryanpatrickperckins@gmail.com) <[ryanpatrickperckins@gmail.com](mailto:ryanpatrickperckins@gmail.com)>

**Subject:** City of San Marcos Dams 4 and 5 Rehabilitation, Hays County, Texas



**Re:** Project Review under Section 106 of the National Historic Preservation Act and/or the Antiquities Code of Texas

**THC Tracking #202512688**

**Date:** 08/21/2025

City of San Marcos Dams 4 and 5 Rehabilitation, Hays County, Texas (Permit 31501)  
Wonderland Drive

**Description:** Updated report, per THC and NRCS comments.

Dear David Sandroock:

Thank you for your submittal regarding the above-referenced project. This response represents the comments of the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission (THC), pursuant to review under Section 106 of the National Historic Preservation Act and the Antiquities Code of Texas.

The review staff, led by Tiffany Osburn and Caitlin Brashear, has completed its review and has made the following determinations based on the information submitted for review:

#### **Above-Ground Resources**

- No historic properties are present or affected by the project as proposed. However, if historic properties are discovered or unanticipated effects on historic properties are found, work should cease in the immediate area; work can continue where no historic properties are present. Please contact the THC's History Programs Division at 512-463-5853 to consult on further actions that may be necessary to protect historic properties.

#### **Archeology Comments**

- No adverse effects on historic properties.
- This draft report is acceptable. To facilitate review and make project information and final reports available through the Texas Archeological Sites Atlas, we appreciate submission of tagged pdf copies of the final report including one restricted version with all site location information (if applicable), and one public version with all site location information redacted; an online abstract form submitted via the abstract tab on eTRAC; and survey area shapefiles submitted via the shapefile tab on eTRAC. For questions on how to submit these please visit our



video training series at:

<https://www.youtube.com/playlist?list=PLONbbv2pt4cog5t6mCgZVaEAx3d0MkgQ>

C Please note that these steps are required for projects conducted under a Texas Antiquities Permit.

We have the following comments: We concur that there will be no effects to SAL-eligible or SAL-listed archeological sites within the surveyed portion APE. We also concur with the NRHP and SAL eligibility recommendations that sites 41HY415, 41HY450, 41HY461, 41HY323, and 41HY623 are not eligible within the surveyed APE. For 41HY163 all ground-disturbing work be completely avoided in this area, which should be fenced off during nearby construction. If impacts to this area are unavoidable, additional work, potentially including mitigation and/or construction-phase monitoring, may be required in this location.

We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your cooperation in this review process, and for your efforts to preserve the irreplaceable heritage of Texas. If the project changes, or if new historic properties are found, please contact the review staff. If you have any questions concerning our review or if we can be of further assistance, please email the following reviewers: [tiffany.osburn@thc.texas.gov](mailto:tiffany.osburn@thc.texas.gov), [caitlin.brashear@thc.texas.gov](mailto:caitlin.brashear@thc.texas.gov).

This response has been sent through the electronic THC review and compliance system (eTRAC). Submitting your project via eTRAC eliminates mailing delays and allows you to check the status of the review, receive an electronic response, and generate reports on your submissions. For more information, visit <http://thc.texas.gov/etrac-system>.

Sincerely,



for Joseph Bell, State Historic Preservation Officer  
Executive Director, Texas Historical Commission

**Please do not respond to this email.**

cc: [ryanpatrickperckins@gmail.com](mailto:ryanpatrickperckins@gmail.com)

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June 18, 2024

Stantec  
c/o Scotty Moore, Senior Archaeologist  
15990 North Barkers Landing Rd, Suite 125  
Houston, TX 77079

Dear Mr. Moore,

In response to your query about obtaining landowner permissions for shovel testing and upon closer review of the proposed area of potential effect (APE), I consulted the Cultural Resource Specialists at the National Watershed Management Center (NWMC). The determinations below are a result of this conversation.

In this case, shovel testing on private lands is a level of effort not warranted for several reasons. Beyond the proximity of the shovel testing on adjacent public lands (City of San Marcos), any rehabilitation of the thirty-nine- and thirty-five-year-old earthen dams is to reduce the scouring effect in the event of a flood and will only further protect any archaeological site in the flood event pool downstream. Additionally, little to no ground disturbance outside of the existing facility is anticipated and barrow pits and staging areas are already under consideration.

NRCS recommends that Stantec has already performed a good faith identification effort of historic properties and further survey is unlikely to significantly add to the archaeological record.

Very Respectfully,



Angela Moody  
STATE CULTURAL RESOURCE SPECIALIST

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**Re: Rehabilitation of Upper San Marcos Sites Site 4 and Site 5, Hays County, TX**

Please reply to this Section 106 invitation with whether you are interested in participating in consultation regarding this project and assist us in identifying whether there are any culturally or religiously significant places, or other Tribal interests, we should be aware of that might be affected by this project. Below is the NRCS initial background review for each Site along with project maps. You can also find documents and resources that may be relevant to your review at <https://app.box.com/s/909ejt2idl0fh3ni9dryitr6txl06by>. As project planning progresses, expect email updates as they come available and don't hesitate to contact us if you have any questions, concerns, or need something more for your review.

The Natural Resources Conservation Service (NRCS) is proposing to improve two dam sites USM Site 4 and Site 5, located in Hays County, Texas. The precise nature of improvements to the dam sites are currently under evaluation; however, **the majority of proposed work is anticipated to occur within the existing dam facilities and little to no ground disturbance outside of existing facility is anticipated. The maximum depth of impacts from both construction activities and potential breach events is anticipated to be less than 3 feet (0.91 meters).**

An intensive pedestrian archaeological survey that meets or exceeds the State Archeological Survey Standards for Texas is planned under Archeology Permit # 31501 with the State Historic Preservation Office (SHPO), also known as the Texas Historical Commission (THC). This survey includes subsurface shovel testing of pedestrian survey transects and mechanical testing in appropriate alluvial areas. Results of this survey will be shared with you via email and/or the BoxDrive link when it becomes available.

**Upper San Marcos (USM) Site 4** was constructed thirty-nine years ago in 1985 and is located approximately 4.5 miles west of the City of San Marcos, Texas in Hays County (coordinates **29.884968 -98.031858**). A check of the state file archaeological database (Atlas) did not reveal any recorded archaeological sites in the Area of Potential Effect (APE), however, within a 0.62 mi search around the APE's boundaries were two lithic scatters, 41HY504 (Archaic) and 41HY505 (Paleo-Indian).

**Upper San Marcos (USM) Site 5** is located about 1.8 miles southwest of the City of San Marcos, Texas in Hays County (coordinates **29.868916 -97.969241**). It was constructed thirty-five years ago in 1989 under the authority of Public Law 83-566 as high hazard potential dams. A search of the Texas Archeological Sites Atlas (Atlas) maintained by the THC and the Texas Archeological Research Laboratory (TARL) was conducted to identify previously conducted surveys and previously recorded archeological sites, historical markers, Recorded Texas Historic Landmarks, properties or districts listed on the National Register of Historic Places (NRHP), State Antiquities Landmarks (SALs), and cemeteries in the APE. Other resource searches included the use of the Texas Freedom Colonies Project Atlas.

The review indicated that there are 23 previously investigated linear and areal / block surveys and 20 known archeological sites within and near the APE. Seven previously identified archeological sites are located within or adjacent to the direct effect APE; an additional 13 archeological sites are located outside of the APE, within the 1-mile (1.6-kilometer) study area. The portion of the APE

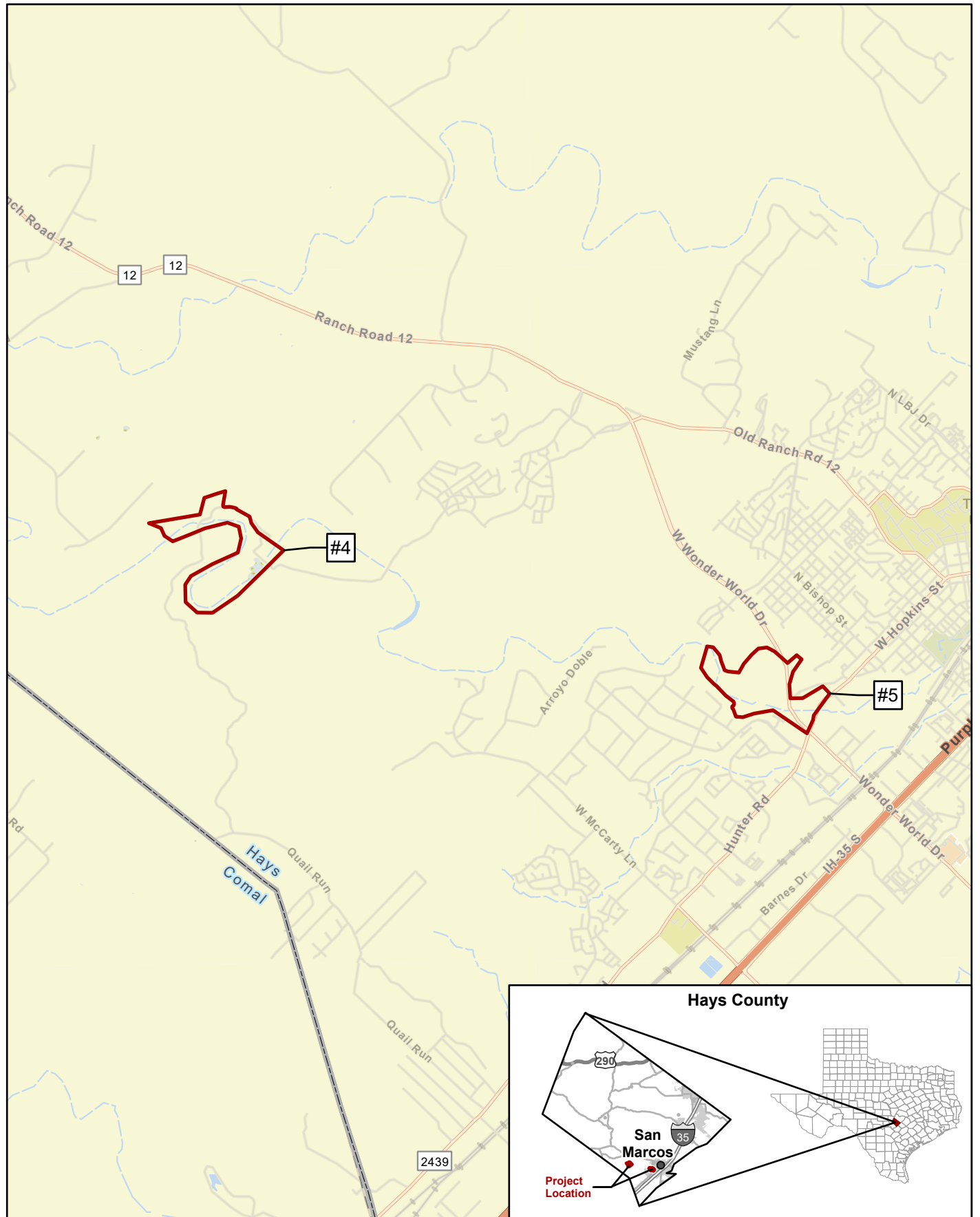
encompassing Dam 4 has not been previously surveyed; however, approximately 70 percent of the Dam 5 portion of the APE has been substantially surveyed between the late 1970s and 2009.

The most significant known archeological resource within the APE is site 41HY163, also known as the Zatopec Site. First identified in the 1970's and investigated in the 1980's by Southwest Texas State University, the site is a multi-component prehistoric camp site with intact deposits spanning from the Late Paleoindian to Toyah time period (approximately 9,000 to 600 years BP). Portions of the site were substantially investigated in the late 2000's to offset the City of San Marcos' construction of Wonder World Drive (Karbula et al. 2003; Lohse 2011). Because of extensive erosion sometime after ca. 5,000 years ago, very few sediment deposits remain from the earliest periods and since then the site structure came to consist primarily of anthropogenic deposits, with little natural sedimentation. Consequently, the earliest components were found to be frequently intermixed with later materials, and all components showed some degree of natural and/or cultural disturbance (Lohse 2011). Intact deposits from later periods suggests that the site was a "moderately size aggregation" site whose temporary residents first exploited bison and then later deer, pronghorn antelope, and an assortment of smaller animals (Lohse 2011:453).

Other sites identified within or adjacent to the APE consist primarily of historic age trash or features that lack research potential under Criterion D of NHPA. However, site 41HY446, located just outside the APE, has been determined eligible for inclusion on the NRHP due to the presence of a single metal arrowhead, which indicates that the site may contain a Contact period component (THC 2023).

| Known Cultural Resources Within or Adjacent to APE       |                                                                                                     |                   |
|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------|
| Trinomial / Designation                                  | Description                                                                                         | NRHP*-eligibility |
| 41HY163                                                  | Zatopec Site; multi-component prehistoric campsite with Archaic through Middle Woodland Occupations | Eligible          |
| 41HY323                                                  | Historic-age cistern                                                                                | Ineligible        |
| 41HY415                                                  | Historic-age trash dump                                                                             | Undetermined      |
| 41HY416                                                  | Historic-age trash dump                                                                             | Ineligible        |
| 41HY446                                                  | Historic age/Contact Period campsite with metal arrowhead                                           | Eligible          |
| 41HY450                                                  | Historic-age wall sections                                                                          | Ineligible        |
| 41HY461                                                  | Historic-age trash scatter                                                                          | Ineligible        |
| Source: THC (2023) *National Register of Historic Places |                                                                                                     |                   |

[Upper San Marcos River 4 and 5 BoxDrive Link](#) includes .kmz files for ease of review.



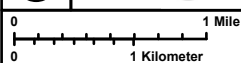
**Figure 1.**  
**Project Location (Road Base)**

**Upper San Marcos Dams 4 & 5**

 Project Location



 **Stantec**



1 in = 1 mile  
Scale: 1:63,360  
Date: 8/18/2023

Basemap Source: Esri (2023)





UPPER SAN MARCOS SITE #4 & #5

PROJECT AREA MAP



United States  
Department of  
Agriculture  
Natural Resources Conservation Service







March 4, 2024

Coushatta Tribe of Louisiana  
Chairman Jonathan Cernek  
Post Office Box 10  
Elton, Louisiana 70532

Dear Mr. Cernek:

This letter is regarding consultation under Section 106 of the National Historic Preservation Act of 1966, as amended for the Upper San Marcos Sites (USM) Site 4 and Site 5 located in Hays County, Texas. While the Natural Resource Conservation Service (NRCS) Texas works to build a relationship with your Tribe through establishing Tribal consultation protocols, I would like to invite your Tribe to consult over whether a proposed project on private lands might impact any of your Tribe's places of cultural or religious significance, National Historic Preservation Act historic properties, and other Tribal interests. We recognize your Tribal sovereignty and importance of your Tribe's interests on ancestral lands, including those on private lands.

The Natural Resources Conservation Service (NRCS) is proposing to improve two dam sites USM Site 4 and Site 5, located in Hays County, Texas. Upper San Marcos Site 4 is located approximately 4.5 miles west of the City of San Marcos, Texas in Hays County. Upper San Marcos Site 4 was constructed in 1985. Upper San Marcos Site 5 is located about 1.8 miles southwest of the City of San Marcos, Texas in Hays County. It was constructed in 1989 under the authority of Public Law 83-566 as a high hazard potential dam. They currently do not meet Federal safety standards therefore, the project sponsors and USDA-NRCS are preparing this Plan-Environment Assessment (EA) to evaluate alternatives to meet the current performance and safety criteria. The Plan-EA will consider alternatives for Site 4 and 5 and will include: (1) No Action (future without federal funding investment), (2) Decommissioning in addition to non-structural, (3) Non-Structural (floodproofing and/or relocation of at-risk properties), and (4) Structural Rehabilitation.

Please reply with whether you are interested in participating in consultation regarding this project and assist us in identifying whether there are any culturally or religiously significant places, or other Tribal interests, we should be aware of that might be affected by this project. Enclosed is the NRCS initial background review for each Site along with project maps. You can also find documents and resources that may be relevant to your review at <https://app.box.com/s/909ejt2idl0fh3ni9dryitr6txl06by>. As project planning progresses, expect email updates as they come available.



Jonathan Cernek

Page 2

In responding, please refer to the **Upper San Marcos River 4 and 5** project. The point of contact for reply or further information is Angela Moody, Archaeologist/Cultural Resource Specialist at [angela.moody@usda.gov](mailto:angela.moody@usda.gov), 830-719-5750 or by mail to the address above. Your prompt reply to this request is greatly appreciated and we thank you for your assistance.

Sincerely,

KRISTY OATES  
State Conservationist

Enclosure

March 4, 2024

Apache Tribe of Oklahoma  
Darrin Cisco (Cultural Coordinator)  
Post Office Box 1330  
Anadarko, Oklahoma 73005

Dear Mr. Cisco:

This letter is regarding consultation under Section 106 of the National Historic Preservation Act of 1966, as amended for the Upper San Marcos Sites (USM) Site 4 and Site 5 located in Hays County, Texas. While the Natural Resource Conservation Service (NRCS) Texas works to build a relationship with your Tribe through establishing Tribal consultation protocols, I would like to invite your Tribe to consult over whether a proposed project on private lands might impact any of your Tribe's places of cultural or religious significance, National Historic Preservation Act historic properties, and other Tribal interests. We recognize your Tribal sovereignty and importance of your Tribe's interests on ancestral lands, including those on private lands.

The Natural Resources Conservation Service (NRCS) is proposing to improve two dam sites USM Site 4 and Site 5, located in Hays County, Texas. Upper San Marcos Site 4 is located approximately 4.5 miles west of the City of San Marcos, Texas in Hays County. Upper San Marcos Site 4 was constructed in 1985. Upper San Marcos Site 5 is located about 1.8 miles southwest of the City of San Marcos, Texas in Hays County. It was constructed in 1989 under the authority of Public Law 83-566 as a high hazard potential dam. They currently do not meet Federal safety standards therefore, the project sponsors and USDA-NRCS are preparing this Plan-Environment Assessment (EA) to evaluate alternatives to meet the current performance and safety criteria. The Plan-EA will consider alternatives for Site 4 and 5 and will include: (1) No Action (future without federal funding investment), (2) Decommissioning in addition to non-structural, (3) Non-Structural (floodproofing and/or relocation of at-risk properties), and (4) Structural Rehabilitation.

Please reply with whether you are interested in participating in consultation regarding this project and assist us in identifying whether there are any culturally or religiously significant places, or other Tribal interests, we should be aware of that might be affected by this project. Enclosed is the NRCS initial background review for each Site along with project maps. You can also find documents and resources that may be relevant to your review at <https://app.box.com/s/909ejt2idl0fh3ni9dryitr6txl06by>. As project planning progresses, expect email updates as they come available.

Darrin Cisco

Page 2

In responding, please refer to the **Upper San Marcos River 4 and 5** project. The point of contact for reply or further information is Angela Moody, Archaeologist/Cultural Resource Specialist at [angela.moody@usda.gov](mailto:angela.moody@usda.gov), 830-719-5750 or by mail to the address above. Your prompt reply to this request is greatly appreciated and we thank you for your assistance.

Sincerely,

KRISTY OATES  
State Conservationist

Enclosure

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March 7, 2024

Apache Tribe of Oklahoma  
Chairman Durrel Cooper  
Post Office Box 1330  
Anadarko, Oklahoma 73005

Dear Mr. Cooper:

This letter is regarding consultation under Section 106 of the National Historic Preservation Act of 1966, as amended for the Upper San Marcos Sites (USM) Site 4 and Site 5 located in Hays County, Texas. While the Natural Resource Conservation Service (NRCS) Texas works to build a relationship with your Tribe through establishing Tribal consultation protocols, I would like to invite your Tribe to consult over whether a proposed project on private lands might impact any of your Tribe's places of cultural or religious significance, National Historic Preservation Act historic properties, and other Tribal interests. We recognize your Tribal sovereignty and importance of your Tribe's interests on ancestral lands, including those on private lands.

The Natural Resources Conservation Service (NRCS) is proposing to improve two dam sites USM Site 4 and Site 5, located in Hays County, Texas. Upper San Marcos Site 4 is located approximately 4.5 miles west of the City of San Marcos, Texas in Hays County. Upper San Marcos Site 4 was constructed in 1985. Upper San Marcos Site 5 is located about 1.8 miles southwest of the City of San Marcos, Texas in Hays County. It was constructed in 1989 under the authority of Public Law 83-566 as high hazard potential dams. They currently do not meet Federal safety standards therefore, the project sponsors and USDA-NRCS are preparing this Plan-EA to evaluate alternatives to meet the current performance and safety criteria. The Plan-EA will consider alternatives for Site 4 and 5 and will include: (1) No Action (future without federal funding investment), (2) Decommissioning in addition to non-structural, (3) Non-Structural (floodproofing and/or relocation of at-risk properties), and (4) Structural Rehabilitation.

Please reply with whether you are interested in participating in consultation regarding this project and assist us in identifying whether there are any culturally or religiously significant places, or other Tribal interests, we should be aware of that might be affected by this project. Enclosed is the NRCS initial background review for each Site along with project maps. You can also find documents and resources that may be relevant to your review at <https://app.box.com/s/909ejt2idl0fh3ni9dryitrv6txl06by>. As project planning progresses, expect email updates as they come available.

Durrel Cooper

Page 2

In responding, please refer to the **Upper San Marcos River 4 and 5** project. The point of contact for reply or further information is Angela Moody, Archaeologist/Cultural Resource Specialist at [angela.moody@usda.gov](mailto:angela.moody@usda.gov), 830-719-5750 or by mail to the address above. Your prompt reply to this request is greatly appreciated and we thank you for your assistance.

Sincerely,

KRISTY OATES  
State Conservationist

Enclosure

March 4, 2024

Tonkawa Tribe of Oklahoma  
President Russell Martin  
Historical Preservation Office  
1 Rush Buffalo Road  
Tonkawa, Oklahoma 74653-4449

Dear Mr. Martin:

This letter is regarding consultation under Section 106 of the National Historic Preservation Act of 1966, as amended for the Upper San Marcos Sites (USM) Site 4 and Site 5 located in Hays County, Texas. While the Natural Resource Conservation Service (NRCS) Texas works to build a relationship with your Tribe through establishing Tribal consultation protocols, I would like to invite your Tribe to consult over whether a proposed project on private lands might impact any of your Tribe's places of cultural or religious significance, National Historic Preservation Act historic properties, and other Tribal interests. We recognize your Tribal sovereignty and importance of your Tribe's interests on ancestral lands, including those on private lands.

The Natural Resources Conservation Service (NRCS) is proposing to improve two dam sites USM Site 4 and Site 5, located in Hays County, Texas. Upper San Marcos Site 4 is located approximately 4.5 miles west of the City of San Marcos, Texas in Hays County. Upper San Marcos Site 4 was constructed in 1985. Upper San Marcos Site 5 is located about 1.8 miles southwest of the City of San Marcos, Texas in Hays County. It was constructed in 1989 under the authority of Public Law 83-566 as a high hazard potential dam. They currently do not meet Federal safety standards therefore, the project sponsors and USDA-NRCS are preparing this Plan-Environment Assessment (EA) to evaluate alternatives to meet the current performance and safety criteria. The Plan-EA will consider alternatives for Site 4 and 5 and will include: (1) No Action (future without federal funding investment), (2) Decommissioning in addition to non-structural, (3) Non-Structural (floodproofing and/or relocation of at-risk properties), and (4) Structural Rehabilitation.

Please reply with whether you are interested in participating in consultation regarding this project and assist us in identifying whether there are any culturally or religiously significant places, or other Tribal interests, we should be aware of that might be affected by this project. Enclosed is the NRCS initial background review for each Site along with project maps. You can also find documents and resources that may be relevant to your review at <https://app.box.com/s/909ejt2idl0fh3ni9dryitr6txl06by>. As project planning progresses, expect email updates as they come available.



Russell Martin  
Page 2

In responding, please refer to the **Upper San Marcos River 4 and 5** project. The point of contact for reply or further information is Angela Moody, Archaeologist/Cultural Resource Specialist at [angela.moody@usda.gov](mailto:angela.moody@usda.gov), 830-719-5750 or by mail to the address above. Your prompt reply to this request is greatly appreciated and we thank you for your assistance.

Sincerely,

KRISTY OATES  
State Conservationist

Enclosure

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March 4, 2024

Comanche Nation of Oklahoma  
THPO Martina Minthorn  
6 SW D Avenue Suite C  
Lawton, Oklahoma 73501

Dear Ms. Minthorn:

This letter is regarding consultation under Section 106 of the National Historic Preservation Act of 1966, as amended for the Upper San Marcos Sites (USM) Site 4 and Site 5 located in Hays County, Texas. While the Natural Resource Conservation Service (NRCS) Texas works to build a relationship with your Tribe through establishing Tribal consultation protocols, I would like to invite your Tribe to consult over whether a proposed project on private lands might impact any of your Tribe's places of cultural or religious significance, National Historic Preservation Act historic properties, and other Tribal interests. We recognize your Tribal sovereignty and importance of your Tribe's interests on ancestral lands, including those on private lands.

The Natural Resources Conservation Service (NRCS) is proposing to improve two dam sites USM Site 4 and Site 5, located in Hays County, Texas. Upper San Marcos Site 4 is located approximately 4.5 miles west of the City of San Marcos, Texas in Hays County. Upper San Marcos Site 4 was constructed in 1985. Upper San Marcos Site 5 is located about 1.8 miles southwest of the City of San Marcos, Texas in Hays County. It was constructed in 1989 under the authority of Public Law 83-566 as a high hazard potential dam. They currently do not meet Federal safety standards therefore, the project sponsors and USDA-NRCS are preparing this Plan-Environment Assessment (EA) to evaluate alternatives to meet the current performance and safety criteria. The Plan-EA will consider alternatives for Site 4 and 5 and will include: (1) No Action (future without federal funding investment), (2) Decommissioning in addition to non-structural, (3) Non-Structural (floodproofing and/or relocation of at-risk properties), and (4) Structural Rehabilitation.

Please reply with whether you are interested in participating in consultation regarding this project and assist us in identifying whether there are any culturally or religiously significant places, or other Tribal interests, we should be aware of that might be affected by this project. Enclosed is the NRCS initial background review for each Site along with project maps. You can also find documents and resources that may be relevant to your review at <https://app.box.com/s/909ejt2idl0fh3ni9dryitr6txl06by>. As project planning progresses, expect email updates as they come available.

Martina Minthorn

Page 2

In responding, please refer to the **Upper San Marcos River 4 and 5** project. The point of contact for reply or further information is Angela Moody, Archaeologist/Cultural Resource Specialist at [angela.moody@usda.gov](mailto:angela.moody@usda.gov), 830-719-5750 or by mail to the address above. Your prompt reply to this request is greatly appreciated and we thank you for your assistance.

Sincerely,

KRISTY OATES  
State Conservationist

Enclosure

March 4, 2024

Comanche Nation of Oklahoma  
Chairman William Nelson, Sr. and  
Comanche Tribal Business Committee  
Post Office Box 908  
Lawton, Oklahoma 73502

Dear Mr. Nelson:

This letter is regarding consultation under Section 106 of the National Historic Preservation Act of 1966, as amended for the Upper San Marcos Sites (USM) Site 4 and Site 5 located in Hays County, Texas. While the Natural Resource Conservation Service (NRCS) Texas works to build a relationship with your Tribe through establishing Tribal consultation protocols, I would like to invite your Tribe to consult over whether a proposed project on private lands might impact any of your Tribe's places of cultural or religious significance, National Historic Preservation Act historic properties, and other Tribal interests. We recognize your Tribal sovereignty and importance of your Tribe's interests on ancestral lands, including those on private lands.

The Natural Resources Conservation Service (NRCS) is proposing to improve two dam sites USM Site 4 and Site 5, located in Hays County, Texas. Upper San Marcos Site 4 is located approximately 4.5 miles west of the City of San Marcos, Texas in Hays County. Upper San Marcos Site 4 was constructed in 1985. Upper San Marcos Site 5 is located about 1.8 miles southwest of the City of San Marcos, Texas in Hays County. It was constructed in 1989 under the authority of Public Law 83-566 as a high hazard potential dam. They currently do not meet Federal safety standards therefore, the project sponsors and USDA-NRCS are preparing this Plan-Environment Assessment (EA) to evaluate alternatives to meet the current performance and safety criteria. The Plan-EA will consider alternatives for Site 4 and 5 and will include: (1) No Action (future without federal funding investment), (2) Decommissioning in addition to non-structural, (3) Non-Structural (floodproofing and/or relocation of at-risk properties), and (4) Structural Rehabilitation.

Please reply with whether you are interested in participating in consultation regarding this project and assist us in identifying whether there are any culturally or religiously significant places, or other Tribal interests, we should be aware of that might be affected by this project. Enclosed is the NRCS initial background review for each Site along with project maps. You can also find documents and resources that may be relevant to your review at <https://app.box.com/s/909ejt2idl0fh3ni9dryitr6t6txl06by>. As project planning progresses, expect email updates as they come available.

William Nelson

Page 2

In responding, please refer to the **Upper San Marcos River 4 and 5** project. The point of contact for reply or further information is Angela Moody, Archaeologist/Cultural Resource Specialist at [angela.moody@usda.gov](mailto:angela.moody@usda.gov), 830-719-5750 or by mail to the address above. Your prompt reply to this request is greatly appreciated and we thank you for your assistance.

Sincerely,

KRISTY OATES  
State Conservationist

Enclosure

March 4, 2024

Tonkawa Tribe of Oklahoma  
THPO Lauren Norman-Brown  
Historical Preservation Office  
1 Rush Buffalo Road  
Tonkawa, Oklahoma 74653-4449

Dear Ms. Norman-Brown:

This letter is regarding consultation under Section 106 of the National Historic Preservation Act of 1966, as amended for the Upper San Marcos Sites (USM) Site 4 and Site 5 located in Hays County, Texas. While the Natural Resource Conservation Service (NRCS) Texas works to build a relationship with your Tribe through establishing Tribal consultation protocols, I would like to invite your Tribe to consult over whether a proposed project on private lands might impact any of your Tribe's places of cultural or religious significance, National Historic Preservation Act historic properties, and other Tribal interests. We recognize your Tribal sovereignty and importance of your Tribe's interests on ancestral lands, including those on private lands.

The Natural Resources Conservation Service (NRCS) is proposing to improve two dam sites USM Site 4 and Site 5, located in Hays County, Texas. Upper San Marcos Site 4 is located approximately 4.5 miles west of the City of San Marcos, Texas in Hays County. Upper San Marcos Site 4 was constructed in 1985. Upper San Marcos Site 5 is located about 1.8 miles southwest of the City of San Marcos, Texas in Hays County. It was constructed in 1989 under the authority of Public Law 83-566 as a high hazard potential dam. They currently do not meet Federal safety standards therefore, the project sponsors and USDA-NRCS are preparing this Plan-Environment Assessment (EA) to evaluate alternatives to meet the current performance and safety criteria. The Plan-EA will consider alternatives for Site 4 and 5 and will include: (1) No Action (future without federal funding investment), (2) Decommissioning in addition to non-structural, (3) Non-Structural (floodproofing and/or relocation of at-risk properties), and (4) Structural Rehabilitation.

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Lauren Norman-Brown

Page 2

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Sincerely,

KRISTY OATES  
State Conservationist

Enclosure

---

March 4, 2024

Coushatta Tribe of Louisiana  
THPO Kristian Poncho  
Post Office Box 10  
Elton, Louisiana 70532

Dear Mr. Poncho:

This letter is regarding consultation under Section 106 of the National Historic Preservation Act of 1966, as amended for the Upper San Marcos Sites (USM) Site 4 and Site 5 located in Hays County, Texas. While the Natural Resource Conservation Service (NRCS) Texas works to build a relationship with your Tribe through establishing Tribal consultation protocols, I would like to invite your Tribe to consult over whether a proposed project on private lands might impact any of your Tribe's places of cultural or religious significance, National Historic Preservation Act historic properties, and other Tribal interests. We recognize your Tribal sovereignty and importance of your Tribe's interests on ancestral lands, including those on private lands.

The Natural Resources Conservation Service (NRCS) is proposing to improve two dam sites USM Site 4 and Site 5, located in Hays County, Texas. Upper San Marcos Site 4 is located approximately 4.5 miles west of the City of San Marcos, Texas in Hays County. Upper San Marcos Site 4 was constructed in 1985. Upper San Marcos Site 5 is located about 1.8 miles southwest of the City of San Marcos, Texas in Hays County. It was constructed in 1989 under the authority of Public Law 83-566 as a high hazard potential dam. They currently do not meet Federal safety standards therefore, the project sponsors and USDA-NRCS are preparing this Plan-Environment Assessment (EA) to evaluate alternatives to meet the current performance and safety criteria. The Plan-EA will consider alternatives for Site 4 and 5 and will include: (1) No Action (future without federal funding investment), (2) Decommissioning in addition to non-structural, (3) Non-Structural (floodproofing and/or relocation of at-risk properties), and (4) Structural Rehabilitation.

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Kristian Poncho

Page 2

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Sincerely,

KRISTY OATES  
State Conservationist

Enclosure

## Moody, Angela - FPAC-NRCS, TX

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**From:** Moody, Angela - FPAC-NRCS, TX  
**Sent:** Thursday, March 7, 2024 6:28 PM  
**To:** THPO Tonkawa Tribe of Indians of O  
**Cc:** Nauls, Floyd - FPAC-NRCS, TX; Lilly, Dawson - FPAC-NRCS, TX  
**Subject:** Consultation Invitation - Upper San Marcos Site 4 and 5 Dam Rehab  
**Attachments:** USM 4-5 TribalConsultInvite (Martin) signed.pdf; USM 4-5 TribalConsultInvite (Norman-Brown) signed.pdf; Upper San Marcos River Site 4.kmz; Upper San Marcos River Site 5.kmz

Greetings!

Please find attached a signed copy of a Tribal Consultation Invitation Package for the proposed rehabilitation of the Upper San Marcos River Sites 4 and 5. Apologies, the certified mail copy did NOT include the ENCLOSURE and it was too big to attach to this email, so I put a copy in the BoxDrive Link below. Don't hesitate to contact me if you need anything else for your review.

**Upper San Marcos (USM) Site 4** was constructed thirty-nine years ago in 1985 and is located approximately 4.5 miles west of the City of San Marcos, Texas in Hays County (coordinates **29.884968 -98.031858**). A check of the state file archaeological database (Atlas) did not reveal any recorded archaeological sites in the Area of Potential Effect (APE), however, within a 0.62 mi search around the APE's boundaries were two lithic scatters, 41HY504 (Archaic) and 41HY505 (Paleo- Indian).

**Upper San Marcos (USM) Site 5** is located about 1.8 miles southwest of the City of San Marcos, Texas in Hays County (coordinates **29.868916 -97.969241**). It was constructed thirty-five years ago in 1989 under the authority of Public Law 83-566 as high hazard potential dams. A search of the Texas Archeological Sites Atlas (Atlas) maintained by the THC and the Texas Archeological Research Laboratory (TARL) was conducted to identify previously conducted surveys and previously recorded archeological sites, historical markers, Recorded Texas Historic Landmarks, properties, or districts listed on the National Register of Historic Places (NRHP), State Antiquities Landmarks (SALs), and cemeteries in the APE. Other resource searches included the use of the Texas Freedom Colonies Project Atlas.

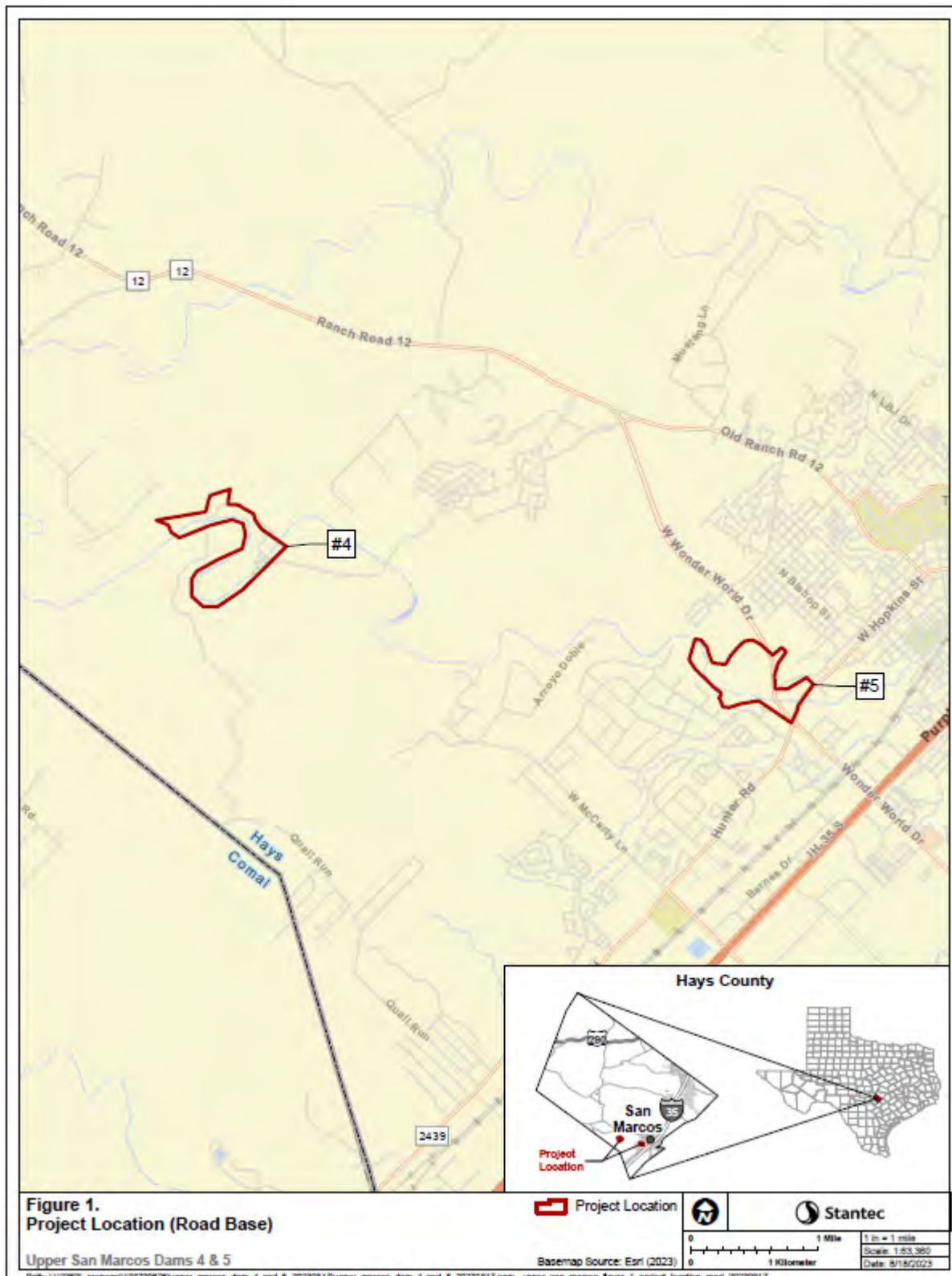
The review indicated that there are 23 previously investigated linear and areal / block surveys and 20 known archeological sites within and near the APE. Seven previously identified archeological sites are located within or adjacent to the direct effect APE; an additional 13 archeological sites are located outside of the APE, within the 1-mile (1.6-kilometer) study area. The portion of the APE Dam 5 portion of the APE has been substantially surveyed between the late 1970s and 2009.

The most significant known archeological resource within the APE is site 41HY163, also known as the Zatopec Site. First identified in the 1970's and investigated in the 1980's by Southwest Texas State University, the site is a multi-component prehistoric camp site with intact deposits spanning from the Late Paleoindian to Toyah time period (approximately 9,000 to 600 years BP). Portions of the site were substantially investigated in the late 2000's to offset the City of San Marcos' construction of Wonder World Drive. Because of extensive erosion sometime after ca. 5,000 years ago, very few sediment deposits remain from the earliest periods and since then the site structure came to consist primarily of anthropogenic deposits, with little natural sedimentation. Consequently, the earliest components were found to be frequently intermixed with later materials, and all components showed some degree of natural and/or cultural disturbance. Intact deposits from later periods suggests that the site was a "moderately size aggregation" site whose temporary residents first exploited bison and then later deer, pronghorn antelope, and an assortment of smaller animals.

Other sites identified within or adjacent to the APE consist primarily of historic age trash or features that lack research potential under Criterion D of NHPA. However, site 41HY446, located just outside the APE, has been

determined eligible for inclusion on the NRHP due to the presence of a single metal arrowhead, which indicates that the site may contain a Contact period component.

You can find the ENCLOSURE and other resources that may be relevant to your review at <https://app.box.com/s/vy9107e31clhtwbhpy6dz999edvupfbu>. As project planning progresses, expect email updates as they come available.



Please reply with whether you are interested in participating in consultation regarding this project and assist us in identifying whether there are any culturally or religiously significant places, or other Tribal interests, we should be aware of that might be affected by this project.

Very Respectfully,

Angela Moody  
(she/her)  
State Cultural Resource Specialist/Archaeologist  
USDA Natural Resources Conservation Service  
101 S Main Temple, Texas 76501  
Office 254-742-9834  
Cell 830-719-5750  
[Angela.Moody@usda.gov](mailto:Angela.Moody@usda.gov)

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## Moody, Angela - FPAC-NRCS, TX

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**From:** Moody, Angela - FPAC-NRCS, TX  
**Sent:** Thursday, March 7, 2024 6:25 PM  
**To:** Apache Tribe Of Oklahoma; darrin.cisco@apachetribe.org  
**Cc:** Nauls, Floyd - FPAC-NRCS, TX; Lilly, Dawson - FPAC-NRCS, TX  
**Subject:** Consultation Invitation - Upper San Marcos Site 4 and 5 Dam Rehab  
**Attachments:** USM 4-5 TribalConsultInvite (Cooper) signed.pdf; USM 4-5 TribalConsultInvite (Cisco).pdf; Upper San Marcos River Site 4.kmz; Upper San Marcos River Site 5.kmz

Greetings!

Please find attached a signed copy of a Tribal Consultation Invitation Package for the proposed rehabilitation of the Upper San Marcos River Sites 4 and 5. Apologies, the certified mail copy did NOT include the ENCLOSURE and it was too big to attach to this email, so I put a copy in the BoxDrive Link below. Don't hesitate to contact me if you need anything else for your review.

**Upper San Marcos (USM) Site 4** was constructed thirty-nine years ago in 1985 and is located approximately 4.5 miles west of the City of San Marcos, Texas in Hays County (coordinates **29.884968 -98.031858**). A check of the state file archaeological database (Atlas) did not reveal any recorded archaeological sites in the Area of Potential Effect (APE), however, within a 0.62 mi search around the APE's boundaries were two lithic scatters, 41HY504 (Archaic) and 41HY505 (Paleo- Indian).

**Upper San Marcos (USM) Site 5** is located about 1.8 miles southwest of the City of San Marcos, Texas in Hays County (coordinates **29.868916 -97.969241**). It was constructed thirty-five years ago in 1989 under the authority of Public Law 83-566 as high hazard potential dams. A search of the Texas Archeological Sites Atlas (Atlas) maintained by the THC and the Texas Archeological Research Laboratory (TARL) was conducted to identify previously conducted surveys and previously recorded archeological sites, historical markers, Recorded Texas Historic Landmarks, properties, or districts listed on the National Register of Historic Places (NRHP), State Antiquities Landmarks (SALs), and cemeteries in the APE. Other resource searches included the use of the Texas Freedom Colonies Project Atlas.

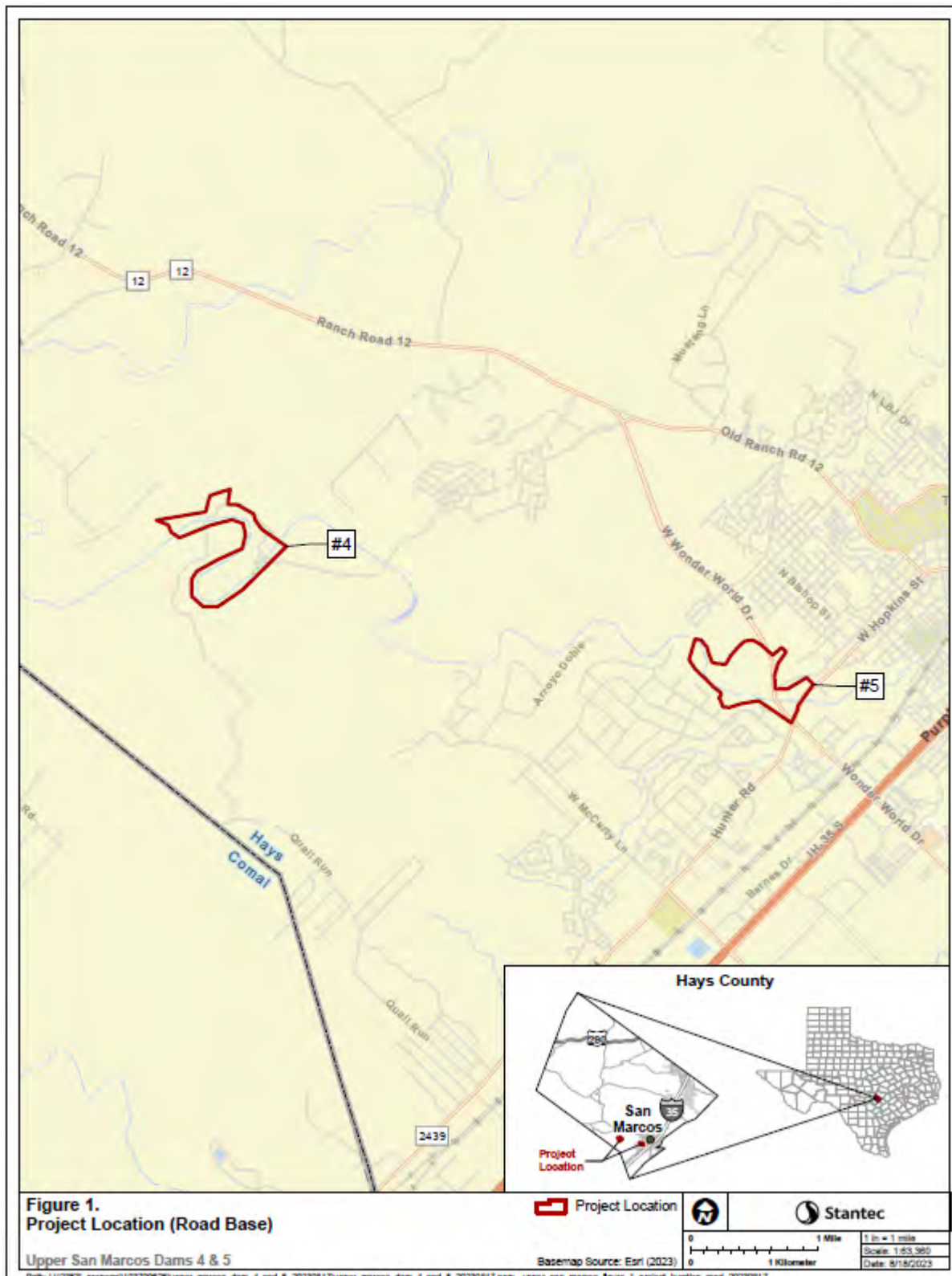
The review indicated that there are 23 previously investigated linear and areal / block surveys and 20 known archeological sites within and near the APE. Seven previously identified archeological sites are located within or adjacent to the direct effect APE; an additional 13 archeological sites are located outside of the APE, within the 1-mile (1.6-kilometer) study area. The portion of the APE Dam 5 portion of the APE has been substantially surveyed between the late 1970s and 2009.

The most significant known archeological resource within the APE is site 41HY163, also known as the Zatopec Site. First identified in the 1970's and investigated in the 1980's by Southwest Texas State University, the site is a multi-component prehistoric camp site with intact deposits spanning from the Late Paleoindian to Toyah time period (approximately 9,000 to 600 years BP). Portions of the site were substantially investigated in the late 2000's to offset the City of San Marcos' construction of Wonder World Drive. Because of extensive erosion sometime after ca. 5,000 years ago, very few sediment deposits remain from the earliest periods and since then the site structure came to consist primarily of anthropogenic deposits, with little natural sedimentation. Consequently, the earliest components were found to be frequently intermixed with later materials, and all components showed some degree of natural and/or cultural disturbance. Intact deposits from later periods suggests that the site was a "moderately size aggregation" site whose temporary residents first exploited bison and then later deer, pronghorn antelope, and an assortment of smaller animals.

Other sites identified within or adjacent to the APE consist primarily of historic age trash or features that lack research potential under Criterion D of NHPA. However, site 41HY446, located just outside the APE, has been

determined eligible for inclusion on the NRHP due to the presence of a single metal arrowhead, which indicates that the site may contain a Contact period component.

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Very Respectfully,

Angela Moody  
(she/her)  
State Cultural Resource Specialist/Archaeologist  
USDA Natural Resources Conservation Service  
101 S Main Temple, Texas 76501  
Office 254-742-9834  
Cell 830-719-5750  
[Angela.Moody@usda.gov](mailto:Angela.Moody@usda.gov)

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## Moody, Angela - FPAC-NRCS, TX

---

**From:** Moody, Angela - FPAC-NRCS, TX  
**Sent:** Thursday, March 7, 2024 6:26 PM  
**To:** THPO Coughatta Tribe of LA  
**Cc:** Nauls, Floyd - FPAC-NRCS, TX; Lilly, Dawson - FPAC-NRCS, TX  
**Subject:** FW: Consultation Invitation - Upper San Marcos Site 4 and 5 Dam Rehab  
**Attachments:** USM 4-5 TribalConsultInvite (Poncho) signed.pdf; USM 4-5 TribalConsultInvite (Cerneke) signed.pdf; Upper San Marcos River Site 4.kmz; Upper San Marcos River Site 5.kmz

Greetings!

Please find attached a signed copy of a Tribal Consultation Invitation Package for the proposed rehabilitation of the Upper San Marcos River Sites 4 and 5. Apologies, the certified mail copy did NOT include the ENCLOSURE and it was too big to attach to this email, so I put a copy in the BoxDrive Link below. Don't hesitate to contact me if you need anything else for your review.

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## Moody, Angela - FPAC-NRCS, TX

---

**From:** Moody, Angela - FPAC-NRCS, TX  
**Sent:** Thursday, March 7, 2024 6:29 PM  
**To:** Martina Callahan 2  
**Cc:** Nauls, Floyd - FPAC-NRCS, TX; Lilly, Dawson - FPAC-NRCS, TX  
**Subject:** Consultation Invitation - Upper San Marcos Site 4 and 5 Dam Rehab  
**Attachments:** USM 4-5 TribalConsultInvite (Nelson) signed.pdf; USM 4-5 TribalConsultInvite (Minthorn) signed.pdf; Upper San Marcos River Site 5.kmz; Upper San Marcos River Site 4.kmz

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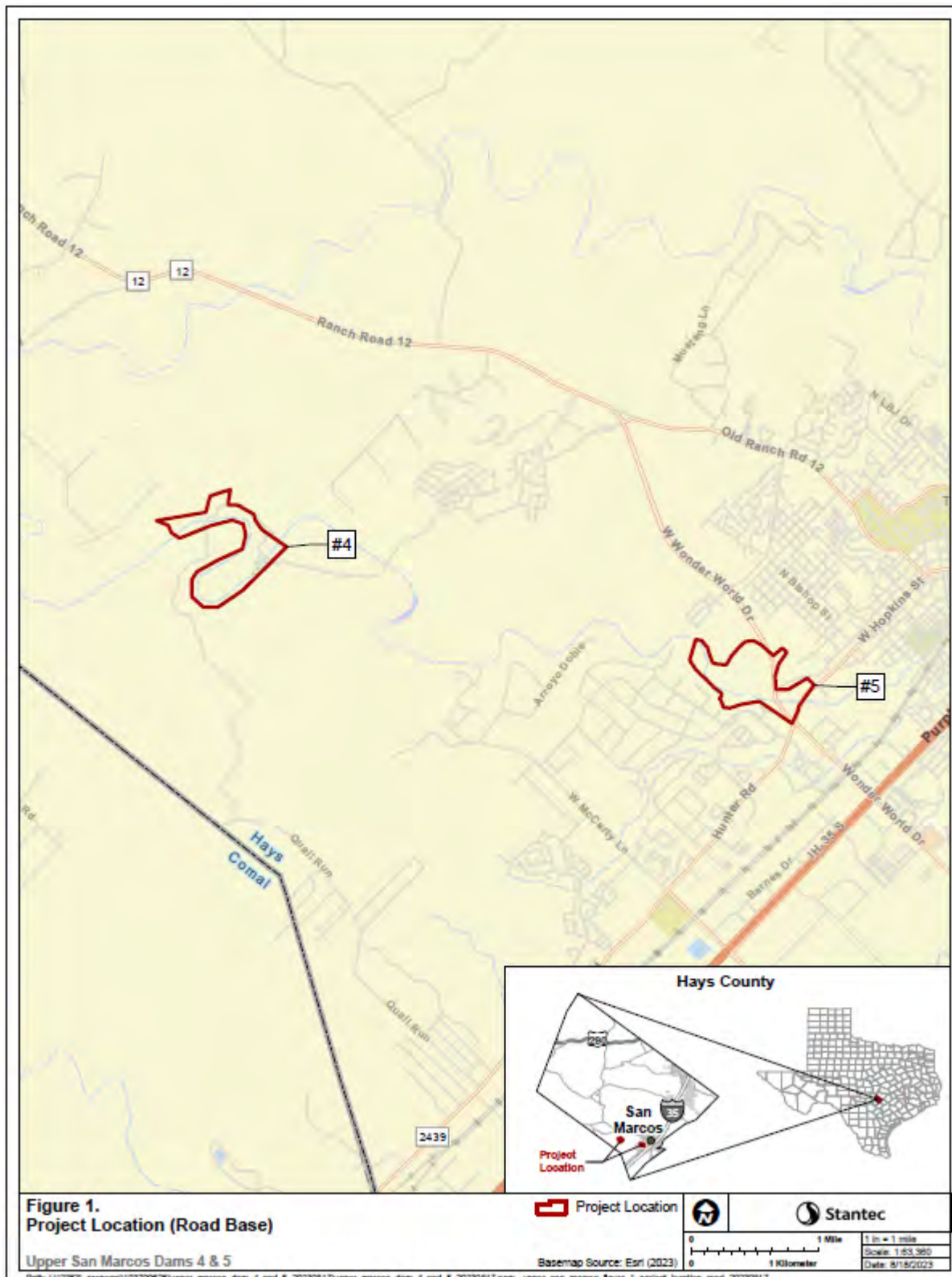
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| NRCS RECORD OF TRIBAL CONSULTATIONS                                        |                                                                                                                                                                                                                                                                   |                                                        |                                                        |                                                                                                                                    |                                                                                                                                                                                                                    |                                                                                                  |                                                             |                                                                                                                      |                                   |
|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| PROJECT/REASON FOR INITIATING CONSULTATION: Upper San Marcos River 4 and 5 |                                                                                                                                                                                                                                                                   |                                                        |                                                        |                                                                                                                                    |                                                                                                                                                                                                                    |                                                                                                  |                                                             |                                                                                                                      |                                   |
| PROGRAM: Watershed Rehabilitation Program (REHAB)                          |                                                                                                                                                                                                                                                                   |                                                        |                                                        |                                                                                                                                    |                                                                                                                                                                                                                    |                                                                                                  |                                                             |                                                                                                                      |                                   |
| FEDERALLY RECOGNIZED TRIBE                                                 | MAIL CONTACT(S) NAME AND ADDRESS(S)                                                                                                                                                                                                                               | DATE CONSULTATION INVITATION PACKAGE MAILED BY NRCS(1) | DATE CONSULTATION INVITATION PACKAGE RECEIVED BY TRIBE | RESPONSE TO CONSULTATION INVITATION PACKAGE (INCLUDE FORM [LETTER, PHONE CALL, E-MAIL, ETC.], DATE, RESPONDENT NAME, AND RESPONSE) | FOLLOW-UP CONTACT NAME, E-MAIL ADDRESS, PHONE NUMBER                                                                                                                                                               | DATE FOLLOW-UP ATTEMPTED OR MADE                                                                 | PHONE CALL NOTES                                            | RESPONSE TO FOLLOW-UP CONTACT (INCLUDE FORM [LETTER, PHONE CALL, E-MAIL, ETC.], DATE, RESPONDENT NAME, AND RESPONSE) | DATE TRIBAL CONSULTATION COMPLETE |
| Apache Tribe of Oklahoma                                                   | Chairman Durrel Cooper and<br>Darrin Cisco (Cultural Coordinator)<br>PO Box 1330 Anadarko, OK 73005                                                                                                                                                               | 3/7/2024                                               | Certified Tracking Card received by NRCS 3/11/2024     | No response to the initial invitation.                                                                                             | Darrin Cisco prefers <a href="mailto:apacheculture510@yahoo.com">apacheculture510@yahoo.com</a> but can get mail at <a href="mailto:darrin.cisco@apachetribe.org">darrin.cisco@apachetribe.org</a><br>405-933-7701 | 3/7/2024 Emailed signed Invitations<br><br><b>DATE</b> Emailed determination letter to follow-up | Contact info up-to date                                     | No response yet to initial letter nor follow-up email.                                                               | <b>DATE</b>                       |
| Comanche Nation of Oklahoma                                                | Chairman <del>William Nelson, Sr.</del> Mr. Forrest Tahdooahnippah <del>Comanche Tribal Business Committee</del><br>PO Box 908 Lawton, OK 73502<br>and<br>THPO and Martina Minthorn<br>c/o Historic Preservation Office<br>6 SW D avenue Suite C Lawton, OK 73501 | 3/6/2024                                               | Certified Tracking Card received by NRCS 3/11/2024     | No response to the initial invitation.                                                                                             | <a href="mailto:martinac@comanchenation.com">martinac@comanchenation.com</a> 580-492-1153                                                                                                                          | 3/7/2024 Emailed signed Invitations<br><br><b>DATE</b> Emailed determination letter to follow-up | 8/12/2025 new Chairman's name is Mr. Forrest Tahdooahnippah | No response yet to the initial letter nor follow-up email.                                                           | <b>DATE</b>                       |
| Coushatta Tribe of Louisiana                                               | Chairman Jonathan Cernek and<br>THPO Mr. Kristian Poncho<br>P.O. Box 10 Elton, LA 70532                                                                                                                                                                           | 3/6/2024                                               | Certified Tracking Card received by NRCS 3/11/2024     | No response to the initial invitation.                                                                                             | Kristian Poncho (THPO)<br><a href="mailto:kponcho@coushatta.org">kponcho@coushatta.org</a><br>337-584-1560                                                                                                         | 3/7/2024 Emailed signed Invitations<br><br><b>DATE</b> Emailed determination letter to follow-up |                                                             | No response yet to initial letter nor follow-up email.                                                               | <b>DATE</b>                       |
| Tonkawa Tribe of Indians of Oklahoma                                       | President Russell Martin and<br>THPO Lauren Norman-Brown<br>Historical Preservation Office 1 Rush<br>Buffalo Road Tonkawa, OK 74653-4449                                                                                                                          | 3/6/2024                                               | Certified Tracking Card received by NRCS 3/11/2024     | No response to the initial invitation.                                                                                             | <a href="mailto:lbrown@tonkawatribe.com">lbrown@tonkawatribe.com</a><br>580-628-2561 ext 214                                                                                                                       | 3/7/2024 Emailed signed Invitations<br><br><b>DATE</b> Emailed determination letter to follow-up |                                                             | No response yet to initial letter nor follow-up email.                                                               | <b>DATE</b>                       |
|                                                                            |                                                                                                                                                                                                                                                                   |                                                        |                                                        |                                                                                                                                    |                                                                                                                                                                                                                    |                                                                                                  |                                                             |                                                                                                                      |                                   |

(1) Initial consultation invitation packages should be sent by certified mail, return receipt requested unless a Tribal Government official specifies otherwise. Title 190, 315.8.F(1) provides specific guidance on this issue. Return receipt requested, although not specified in 315.8.F(1), allows us to get a receipt with a date and signature. 315.8.F(1)(ii) instructs to send a pdf version of the consultation invitation package by email after the certified mail package has been sent. Although not specified, attaching a read receipt request to all official consultation emails allows us to get confirmation of receipt.

Boyer update January 23, 2023.



## Natural Resources Conservation Service

U.S. DEPARTMENT OF AGRICULTURE

### Texas State Office

101 South Main Street  
Temple, Texas, 76501

January 30, 2026

U.S. Department of the Interior  
U.S. Fish and Wildlife Service  
Austin Ecological Services Field Office  
1505 Ferguson Lane  
Austin, Texas 78754

RE: Formal request for U.S. Fish and Wildlife Service (USFWS) to provide agency input and/or consultation on the Upper San Marcos River Watershed for the Rehabilitation Watershed Plan and Environmental Assessment (Plan-EA) of Floodwater Retarding Structure (FRS) No. 4 and 5 located in Hays County, Texas.

In accordance with the Council on Environmental Quality regulations implementing the National Environmental Policy Act (NEPA), Endangered Species Act (ESA) Section 7 consultation related to threatened and endangered species, and regulations at 7 CFR 650 and 7 CFR 622, specifically 622.4 reference, as part of Public Law 83-566, Section 12, the U.S. Department of Agriculture - Natural Resources Conservation Service (USDA-NRCS) is formally requesting your agency provide input and/or consultation related to ESA Section 7, and Public Law 83-566 Section 12, as part of the planning and development of the Upper San Marcos River Watershed for the Rehabilitation Watershed Plan and Plan-EA for FRS No. 4 and 5. This request is being made because your agency has been identified as having special expertise or jurisdiction related to the project. The Plan-EA is being prepared to fulfill USDA-NRCS' NEPA compliance responsibilities pertaining to our potential federal financial assistance through the Watershed Protection and Flood Prevention Program (Public Law 83-566). Under Public Law 83-566, Section 12, requires USDA-NRCS to notify USFWS to make surveys and investigations and prepare a report, as they deem appropriate, with recommendations concerning the conservation and development of wildlife resources and participate, under arrangements satisfactory to the USDA-NRCS, in the preparation of a plan for works of improvement that is acceptable to the USDA-NRCS.

The City of San Marcos, Hays County Soil and Water Conservation District, and Upper San Marcos Watershed Reclamation and Flood Control District, have received funding to develop a Plan-EA for FRS No. 4 and 5. FRS No. 1 was constructed in 1985 and 1989 by the Soil Conservation Service as a single-purpose dam (flood prevention). Upper San Marcos Floodwater Retarding Structures No. 4 and No. 5 (USM 4 and 5) were originally constructed as

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**Natural Resources Conservation Service**

*USDA is an equal opportunity provider, employer, and lender.*

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Page 2

U.S. Fish and Wildlife Service

Class C high hazard dams. The proposed action is needed to address public health and safety concerns that USM 4 and 5 do not meet current NRCS or State of Texas dam safety criteria because of downstream development within the breach inundation area. FRS No. 4 and 5 consists of an earthen structure of 100-feet and 71-feet in height with a 21-acre and 30-acre pool. FRS No. 4 and 5 is maintained by the City of San Marcos, Hays County Soil and Water Conservation District, and Upper San Marcos Watershed Reclamation and Flood Control District. It currently does not meet Federal safety standards for a High Hazard dam. Therefore, the project sponsors and USDA-NRCS are preparing this Plan-EA to evaluate alternatives to meet the current performance and safety criteria required for high hazard classification of FRS No. 4 and 5.

Thank you for your timely response and cooperation with this project.

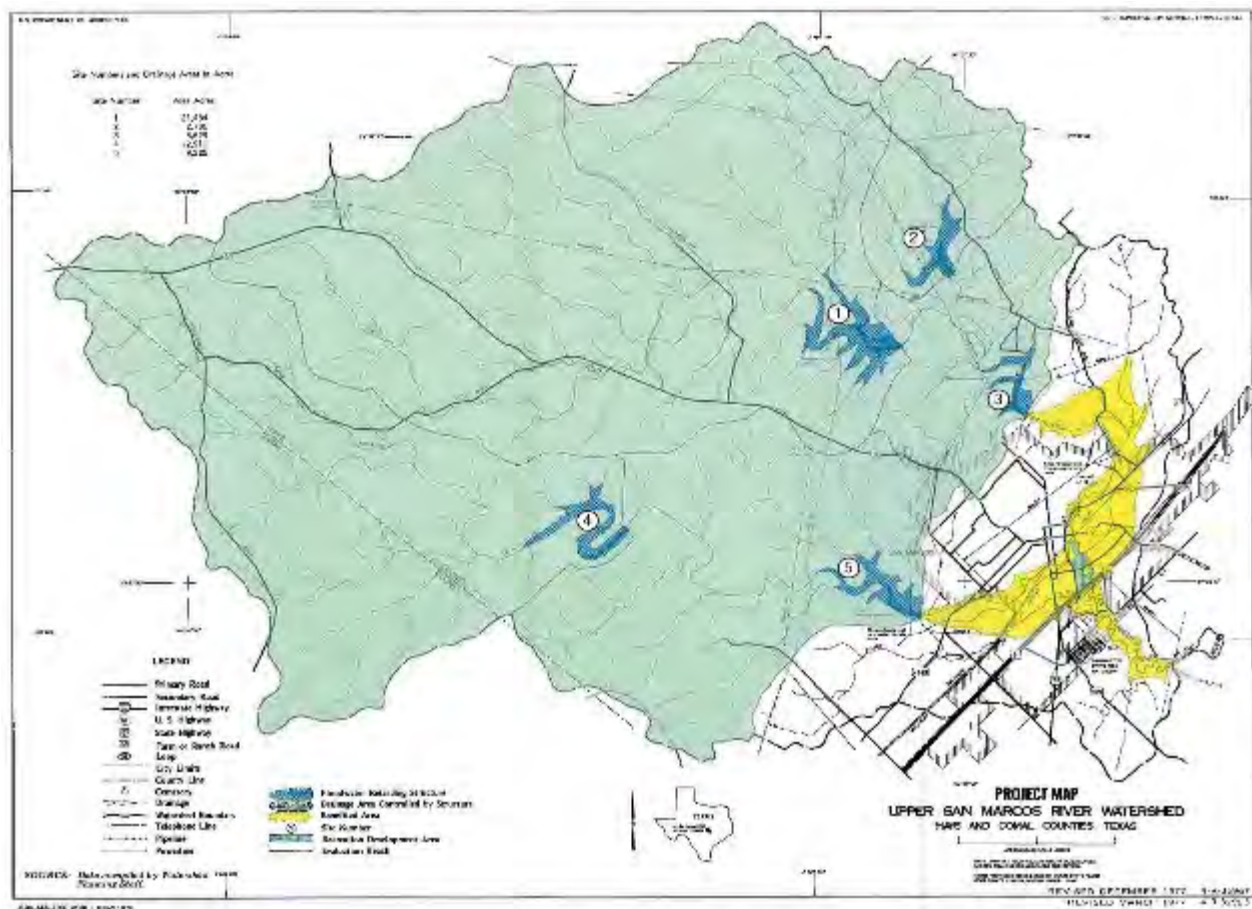
If you have any questions or comments, please contact Shane Ice at [shane.ice@usda.gov](mailto:shane.ice@usda.gov) or at 254-742-9945.

Sincerely,



KRISTY OATES  
State Conservationist

Enclosure  
Project Location Map





August 7, 2023

Randy Moore, Chief  
U.S. Department of Agriculture's Forest Service  
Sydney R. Yates Building  
1400 Independence Ave., SW  
Washington, D.C. 20250-0003

**RE: Agency Scoping Meeting for the Upper San Marcos River Supplemental Watershed Plan and Environmental Document (Plan-ED) for Dam Sites 4 and 5 in Hays County**

Dear Mr. Moore:

The City of San Marcos, Hays County Soil and Water Conservation District (SWCD) No. 351, the Upper San Marcos Watershed Reclamation & Flood Control District (RECL & FCD), and the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) in Texas are pleased to invite you to participate in an **Agency Scoping Meeting** for the *Upper San Marcos River Watershed Project*. The meeting will be held on Tuesday, August 22, 2023, from 10 a.m. to 12 p.m. at San Marcos Activity Center, 501 E. Hopkins Street, San Marcos, Texas.

The meeting will begin with a brief presentation at the San Marcos Activity Center. It will describe the project's schedule, existing conditions, and other information. Representatives from the City, SWCD, RECL & FCD, USDA-NRCS, and the Ad Astra consultant team will be present to listen to comments and answer your questions. We welcome your thoughts on potential project issues, concerns, impacts, and/or benefits. Immediately following the presentation, we will drive to dam site 5. A general map of the area is enclosed for reference.

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Sincerely,



KRISTY OATES  
State Conservationist

Enclosure  
Project Location Map

August 7, 2023

Colonel Jonathan S. Stover  
U.S. Army Corps of Engineers – Fort Worth District  
819 Taylor Street, Room 3A37  
Post Office Box 17300  
Fort Worth, Texas 76102

**RE: Agency Scoping Meeting for the Upper San Marcos River Supplemental  
Watershed Plan and Environmental Document (Plan-ED) for Dam Sites 4 and 5 in  
Hays County**

Dear Mr. Stover:

The City of San Marcos, Hays County Soil and Water Conservation District (SWCD) No. 351, the Upper San Marcos Watershed Reclamation & Flood Control District (RECL & FCD), and the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) in Texas are pleased to invite you to participate in an **Agency Scoping Meeting** for the *Upper San Marcos River Watershed Project*. The meeting will be held on Tuesday, August 22, 2023, from 10 a.m. to 12 p.m. at San Marcos Activity Center, 501 E. Hopkins Street, San Marcos, Texas.

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Sincerely,



KRISTY OATES  
State Conservationist

Enclosure  
Project Location Map

---

August 7, 2023

Texas Parks and Wildlife Department  
4200 Smith School Road  
Austin, Texas 78744

**RE: Agency Scoping Meeting for the Upper San Marcos River Supplemental Watershed Plan and Environmental Document (Plan-ED) for Dam Sites 4 and 5 in Hays County**

The City of San Marcos, Hays County Soil and Water Conservation District (SWCD) No. 351, the Upper San Marcos Watershed Reclamation & Flood Control District (RECL & FCD), and the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) in Texas are pleased to invite you to participate in an **Agency Scoping Meeting** for the *Upper San Marcos River Watershed Project*. The meeting will be held on Tuesday, August 22, 2023, from 10 a.m. to 12 p.m. at San Marcos Activity Center, 501 E. Hopkins Street, San Marcos, Texas.

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Sincerely,



KRISTY OATES  
State Conservationist

Enclosure  
Project Location Map

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August 3, 2023

Texas Historical Commission  
Post Office Box 12276  
Austin, Texas 78711

**RE: Agency Scoping Meeting for the Upper San Marcos River Supplemental Watershed Plan and Environmental Document (Plan-ED) for Dam Sites 4 and 5 in Hays County**

The City of San Marcos, Hays County Soil and Water Conservation District (SWCD) No. 351, the Upper San Marcos Watershed Reclamation & Flood Control District (RECL & FCD), and the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) in Texas are pleased to invite you to participate in an **Agency Scoping Meeting** for the *Upper San Marcos River Watershed Project*. The meeting will be held on Tuesday, August 22, 2023, from 10 a.m. to 12 p.m. at San Marcos Activity Center, 501 E. Hopkins Street, San Marcos, Texas.

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Sincerely,



KRISTY OATES  
State Conservationist

Enclosure  
Project Location Map



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August 7, 2023

Texas Commission on Environmental Quality  
Post Office Box 13087  
Austin, Texas 78711-3087

**RE: Agency Scoping Meeting for the Upper San Marcos River Supplemental Watershed Plan and Environmental Document (Plan-ED) for Dam Sites 4 and 5 in Hays County**

The City of San Marcos, Hays County Soil and Water Conservation District (SWCD) No. 351, the Upper San Marcos Watershed Reclamation & Flood Control District (RECL & FCD), and the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) in Texas are pleased to invite you to participate in an **Agency Scoping Meeting** for the *Upper San Marcos River Watershed Project*. The meeting will be held on Tuesday, August 22, 2023, from 10 a.m. to 12 p.m. at San Marcos Activity Center, 501 E. Hopkins Street, San Marcos, Texas.

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Sincerely,



KRISTY OATES  
State Conservationist

Enclosure  
Project Location Map

---

August 7, 2023

Tony Robinson, Region 6 Administrator  
Federal Emergency Management Agency  
800 N. Loop 288  
Denton, Texas 76209

**RE: Agency Scoping Meeting for the Upper San Marcos River Supplemental Watershed Plan and Environmental Document (Plan-ED) for Dam Sites 4 and 5 in Hays County**

Dear Mr. Robinson:

The City of San Marcos, Hays County Soil and Water Conservation District (SWCD) No. 351, the Upper San Marcos Watershed Reclamation & Flood Control District (RECL & FCD), and the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) in Texas are pleased to invite you to participate in an **Agency Scoping Meeting** for the *Upper San Marcos River Watershed Project*. The meeting will be held on Tuesday, August 22, 2023, from 10 a.m. to 12 p.m. at San Marcos Activity Center, 501 E. Hopkins Street, San Marcos, Texas.

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Tony Robinson  
Page 2

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Sincerely,



KRISTY OATES  
State Conservationist

Enclosure  
Project Location Map

August 4, 2023

Earthea Nance, Regional Administrator  
Office of the Regional Administrator  
Environmental Protection Agency  
1201 Elm Street, Suite 500  
Dallas, Texas 75270

**RE: Agency Scoping Meeting for the Upper San Marcos River Supplemental Watershed Plan and Environmental Document (Plan-ED) for Dam Sites 4 and 5 in Hays County**

Dear Ms. Nance:

The City of San Marcos, Hays County Soil and Water Conservation District (SWCD) No. 351, the Upper San Marcos Watershed Reclamation & Flood Control District (RECL & FCD), and the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) in Texas are pleased to invite you to participate in an **Agency Scoping Meeting** for the *Upper San Marcos River Watershed Project*. The meeting will be held on Tuesday, August 22, 2023, from 10 a.m. to 12 p.m. at San Marcos Activity Center, 501 E. Hopkins Street, San Marcos, Texas.

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KRISTY OATES  
State Conservationist

Enclosure  
Project Location Map

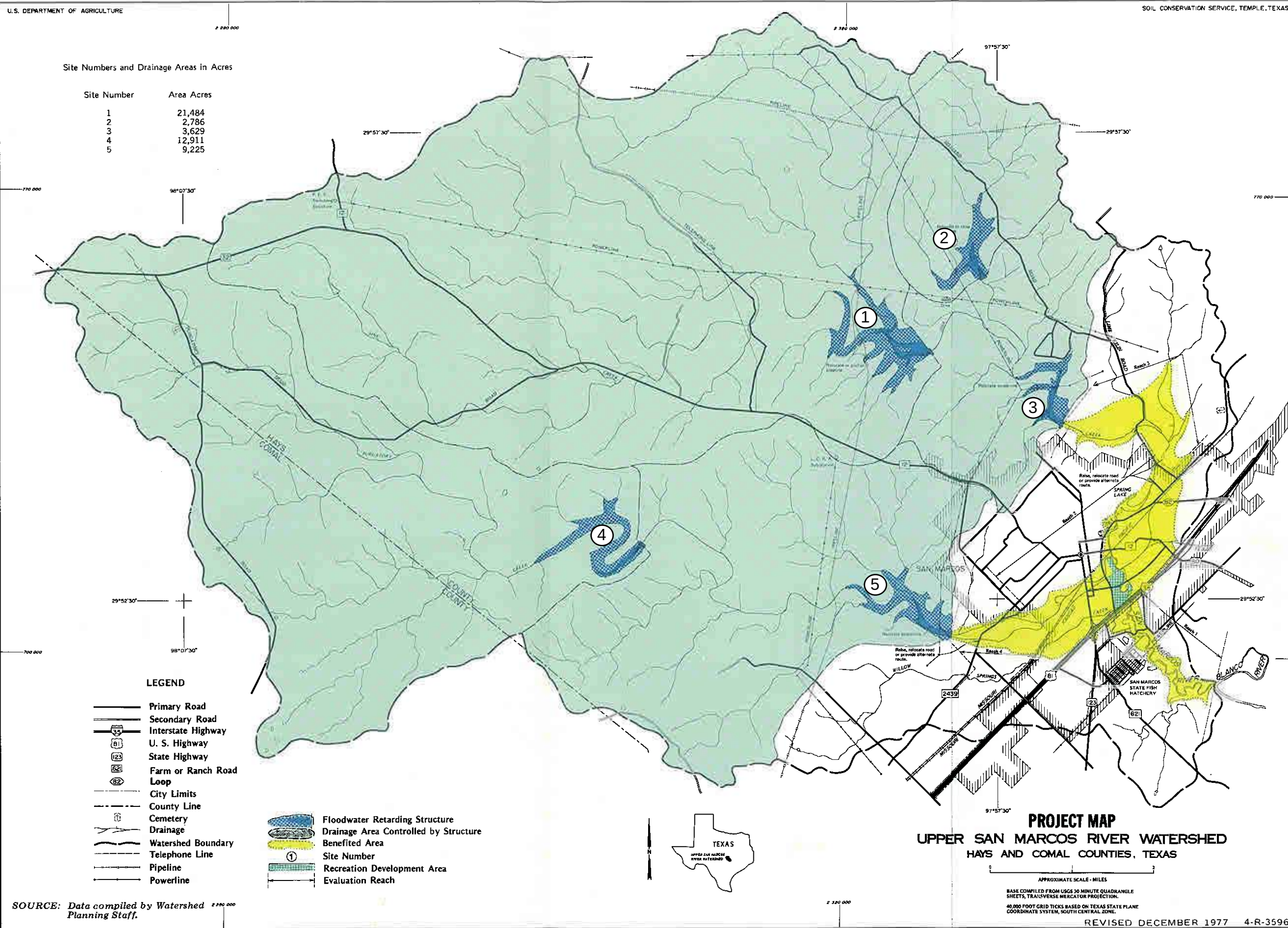
## **Appendix B – Project Map**

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Site Numbers and Drainage Areas in Acres

| Site Number | Area Acres |
|-------------|------------|
| 1           | 21,484     |
| 2           | 2,786      |
| 3           | 3,629      |
| 4           | 12,911     |
| 5           | 9,225      |

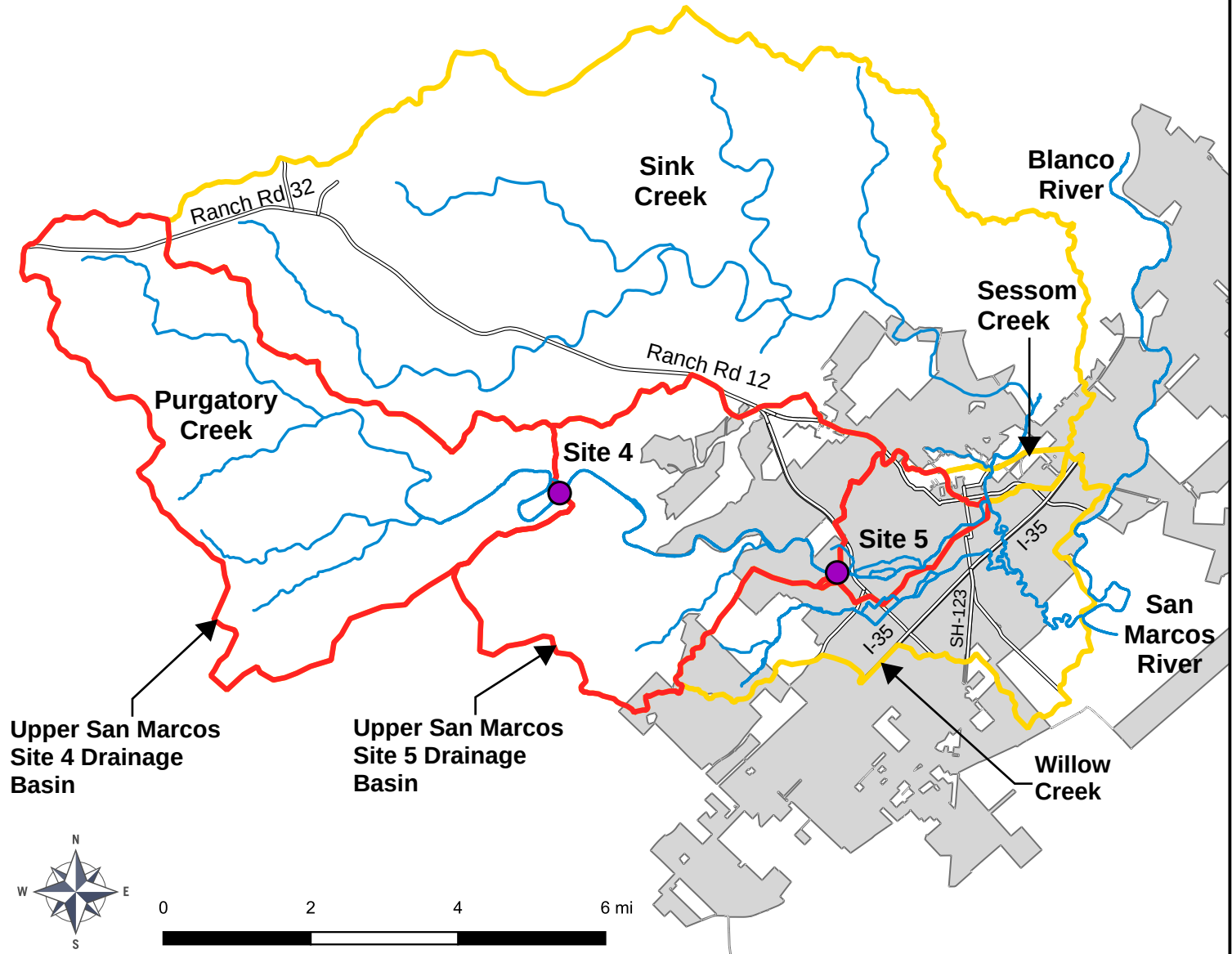
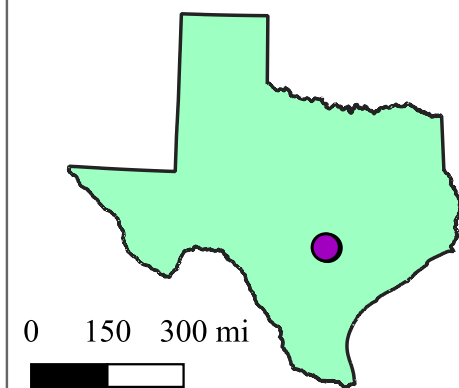
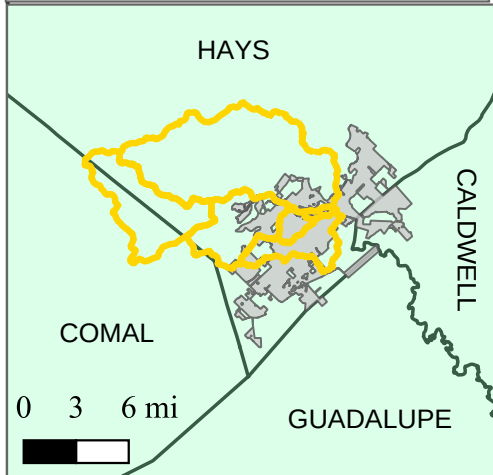


SOURCE: Data compiled by Watershed Planning Staff.

BASE COMPILED FROM USGS 30 MINUTE QUADRANGLE SHEETS, TRANSVERSE MERCATOR PROJECTION. 40,000 FOOT GRID TICKS BASED ON TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE.

# Legend

- Streams
- Purgatory Creek Subbasin
- Other Subbasins
- Roads near Project Area
- San Marcos City Limits
- Texas State Boundary
- County Lines
- Dam Locations



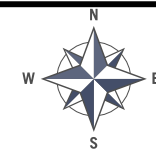
Upper San Marcos  
Site 4 Drainage  
Basin

Upper San Marcos  
Site 5 Drainage  
Basin

0 2 4 6 mi

Upper San Marcos 4-5 Supp WS Plan EA

Project Area Map



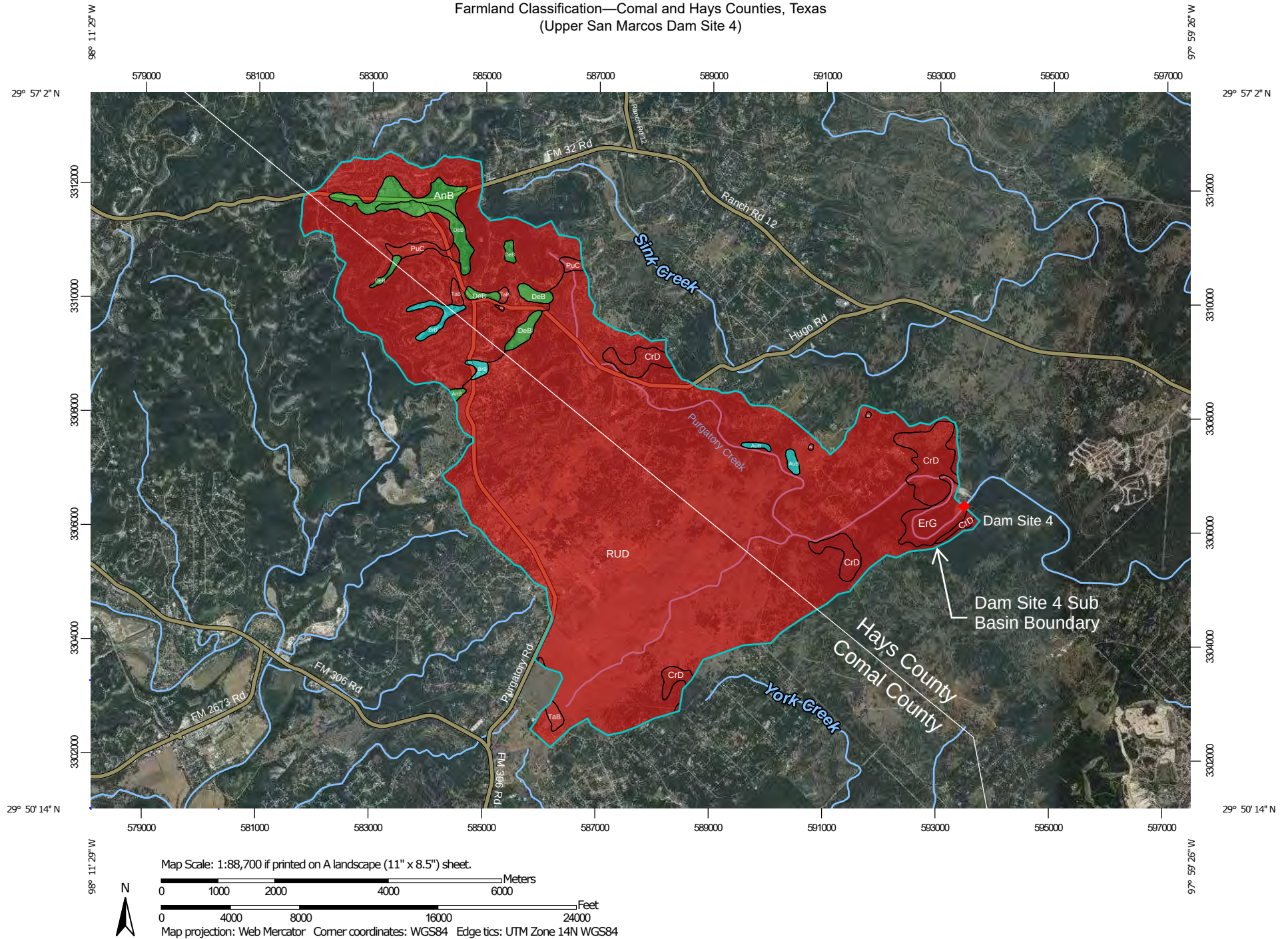
B-2

## **Appendix C – Support Maps**

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# Farmland Classification—Comal and Hays Counties, Texas (Upper San Marcos Dam Site 4)



Farmland Classification—Comal and Hays Counties, Texas  
(Upper San Marcos Dam Site 4)

## MAP LEGEND

### Area of Interest (AOI)

Area of Interest (AOI)

### Soils

#### Soil Rating Polygons

-  Not prime farmland
-  All areas are prime farmland
-  Prime farmland if drained
-  Prime farmland if protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated
-  Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated and drained
-  Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

-  Prime farmland if subsoiled, completely removing the root inhibiting soil layer
-  Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
-  Prime farmland if irrigated and reclaimed of excess salts and sodium
-  Farmland of statewide importance
-  Farmland of statewide importance, if drained
-  Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
-  Farmland of statewide importance, if irrigated

-  Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season
-  Farmland of statewide importance, if irrigated and drained
-  Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season
-  Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer
-  Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60

-  Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium
-  Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season
-  Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season
-  Farmland of statewide importance, if warm enough
-  Farmland of statewide importance, if thawed
-  Farmland of local importance
-  Farmland of local importance, if irrigated

-  Farmland of unique importance
-  Not rated or not available

### Soil Rating Lines

-  Not prime farmland
-  All areas are prime farmland
-  Prime farmland if drained
-  Prime farmland if protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated
-  Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated and drained
-  Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Farmland Classification—Comal and Hays Counties, Texas  
(Upper San Marcos Dam Site 4)

|                                                                                   |                                                                                                                  |                                                                                   |                                                                                                                                       |                                                                                   |                                                                                                                                                            |                                                                                     |                                                                                                                    |                                                                                     |                                                                                                                  |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
|  | Prime farmland if subsoiled, completely removing the root inhibiting soil layer                                  |  | Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season   |  | Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium                                                                    |  | Farmland of unique importance                                                                                      |  | Prime farmland if subsoiled, completely removing the root inhibiting soil layer                                  |
|  | Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60      |  | Farmland of statewide importance, if irrigated and drained                                                                            |  | Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season                         |  | Not rated or not available                                                                                         |  | Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60      |
|  | Prime farmland if irrigated and reclaimed of excess salts and sodium                                             |  | Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season |  | Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season |  | <b>Soil Rating Points</b>                                                                                          |  | Prime farmland if irrigated and reclaimed of excess salts and sodium                                             |
|  | Farmland of statewide importance                                                                                 |                                                                                   |                                                                                                                                       |                                                                                   |                                                                                                                                                            |  | Not prime farmland                                                                                                 |  | Farmland of statewide importance                                                                                 |
|  | Farmland of statewide importance, if drained                                                                     |  | Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer                                    |                                                                                   |                                                                                                                                                            |  | Prime farmland if drained                                                                                          |  | Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60      |
|  | Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season |  | Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60        |  | Farmland of statewide importance, if warm enough                                                                                                           |  | Prime farmland if protected from flooding or not frequently flooded during the growing season                      |  | Prime farmland if irrigated and reclaimed of excess salts and sodium                                             |
|  | Farmland of statewide importance, if irrigated                                                                   |                                                                                   |                                                                                                                                       |  | Farmland of statewide importance, if thawed                                                                                                                |  | Prime farmland if irrigated                                                                                        |  | Farmland of statewide importance, if drained                                                                     |
|                                                                                   |                                                                                                                  |                                                                                   |                                                                                                                                       |  | Farmland of local importance                                                                                                                               |  | Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season   |  | Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season |
|                                                                                   |                                                                                                                  |                                                                                   |                                                                                                                                       |  | Farmland of local importance, if irrigated                                                                                                                 |  | Prime farmland if irrigated and drained                                                                            |  | Farmland of statewide importance, if irrigated                                                                   |
|                                                                                   |                                                                                                                  |                                                                                   |                                                                                                                                       |                                                                                   |                                                                                                                                                            |                                                                                     | Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season |                                                                                     |                                                                                                                  |

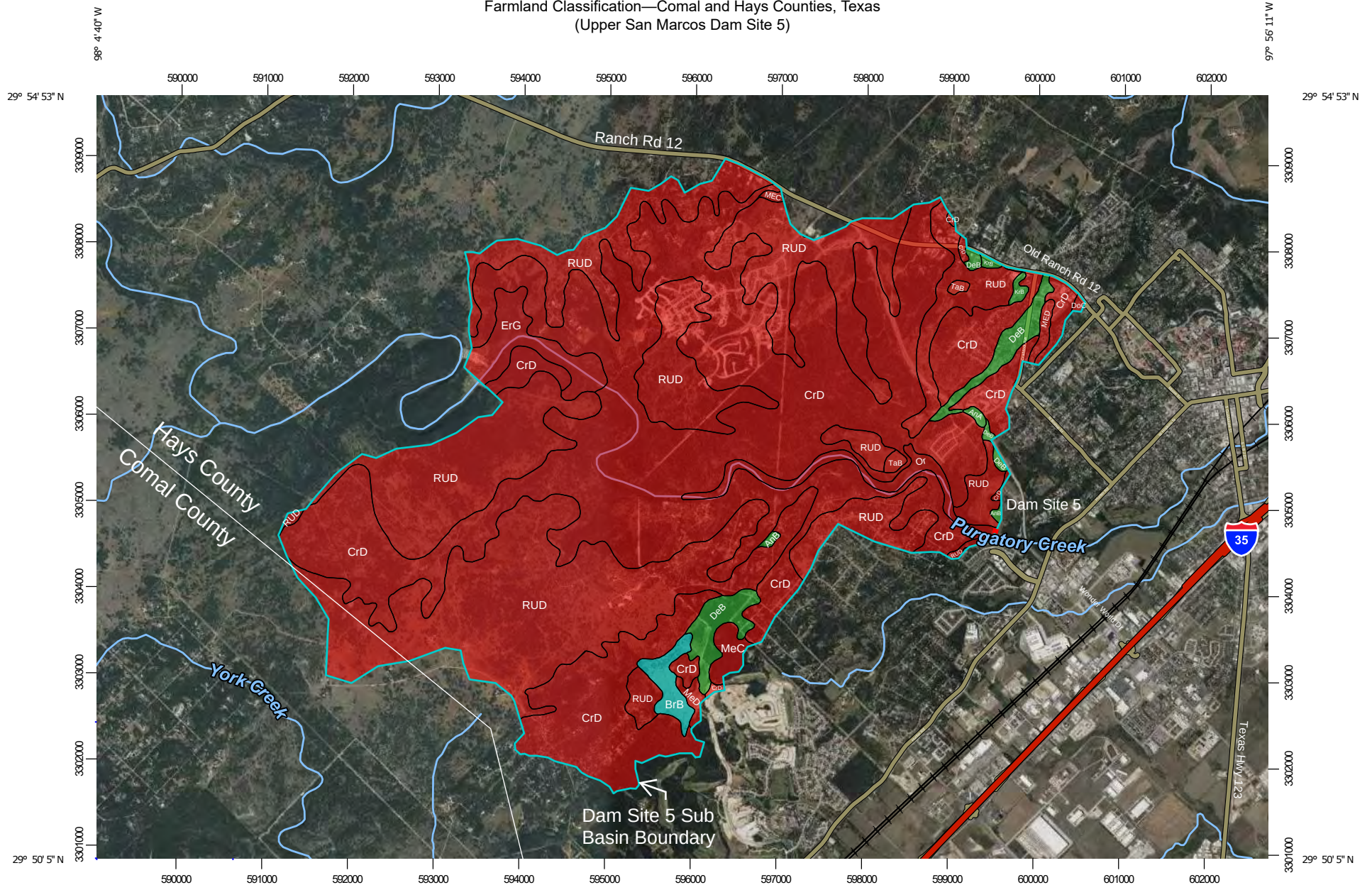


Farmland Classification—Comal and Hays Counties, Texas  
(Upper San Marcos Dam Site 4)

|                                                                                   |                                                                                                                                       |                                                                                   |                                                                                                                                                            |                                                                                   |                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season   |  | Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium                                                                    |  | Farmland of unique importance | <p>The soil surveys that comprise your AOI were mapped at 1:20,000.</p> <p>Please rely on the bar scale on each map sheet for map measurements.</p> <p>Source of Map: Natural Resources Conservation Service<br/>Web Soil Survey URL:<br/>Coordinate System: Web Mercator (EPSG:3857)</p> <p>Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.</p> <p>This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.</p> <p>Soil Survey Area: Comal and Hays Counties, Texas<br/>Survey Area Data: Version 20, Sep 5, 2023</p> <p>Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.</p> <p>Date(s) aerial images were photographed: Jan 11, 2020—Apr 6, 2022</p> <p>The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.</p> |
|  | Farmland of statewide importance, if irrigated and drained                                                                            |  | Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season                         |  | Not rated or not available    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|  | Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season |  | Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season | <b>Water Features</b>                                                             |                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|  | Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer                                    |  | Farmland of statewide importance, if warm enough                                                                                                           |  | Streams and Canals            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|  | Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60        |  | Farmland of statewide importance, if thawed                                                                                                                |  | Rails                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                   |                                                                                                                                       |  | Farmland of local importance                                                                                                                               |  | Interstate Highways           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                   |                                                                                                                                       |  | Farmland of local importance, if irrigated                                                                                                                 |  | US Routes                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                   |                                                                                                                                       |                                                                                   |                                                                                                                                                            |  | Major Roads                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                   |                                                                                                                                       |                                                                                   |                                                                                                                                                            |  | Local Roads                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                   |                                                                                                                                       |                                                                                   |                                                                                                                                                            | <b>Background</b>                                                                 |                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                   |                                                                                                                                       |                                                                                   |                                                                                                                                                            |  | Aerial Photography            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |



# Farmland Classification—Comal and Hays Counties, Texas (Upper San Marcos Dam Site 5)



Map Scale: 1:62,500 if printed on A landscape (11" x 8.5") sheet.

0 500 1000 2000 3000 Meters

0 3000 6000 12000 18000 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84



Natural Resources  
Conservation Service

Farmland Classification—Comal and Hays Counties, Texas  
(Upper San Marcos Dam Site 5)

# MAP LEGEND

## Area of Interest (AOI)

Area of Interest (AOI)

## Soils

### Soil Rating Polygons

-  Not prime farmland
-  All areas are prime farmland
-  Prime farmland if drained
-  Prime farmland if protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated
-  Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated and drained
-  Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

-  Prime farmland if subsoiled, completely removing the root inhibiting soil layer
-  Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
-  Prime farmland if irrigated and reclaimed of excess salts and sodium
-  Farmland of statewide importance
-  Farmland of statewide importance, if drained
-  Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
-  Farmland of statewide importance, if irrigated

-  Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season
-  Farmland of statewide importance, if irrigated and drained
-  Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season
-  Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer
-  Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60

-  Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium
-  Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season
-  Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season
-  Farmland of statewide importance, if warm enough
-  Farmland of statewide importance, if thawed
-  Farmland of local importance
-  Farmland of local importance, if irrigated

-  Farmland of unique importance
-  Not rated or not available

### Soil Rating Lines

-  Not prime farmland
-  All areas are prime farmland
-  Prime farmland if drained
-  Prime farmland if protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated
-  Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated and drained
-  Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Farmland Classification—Comal and Hays Counties, Texas  
(Upper San Marcos Dam Site 5)

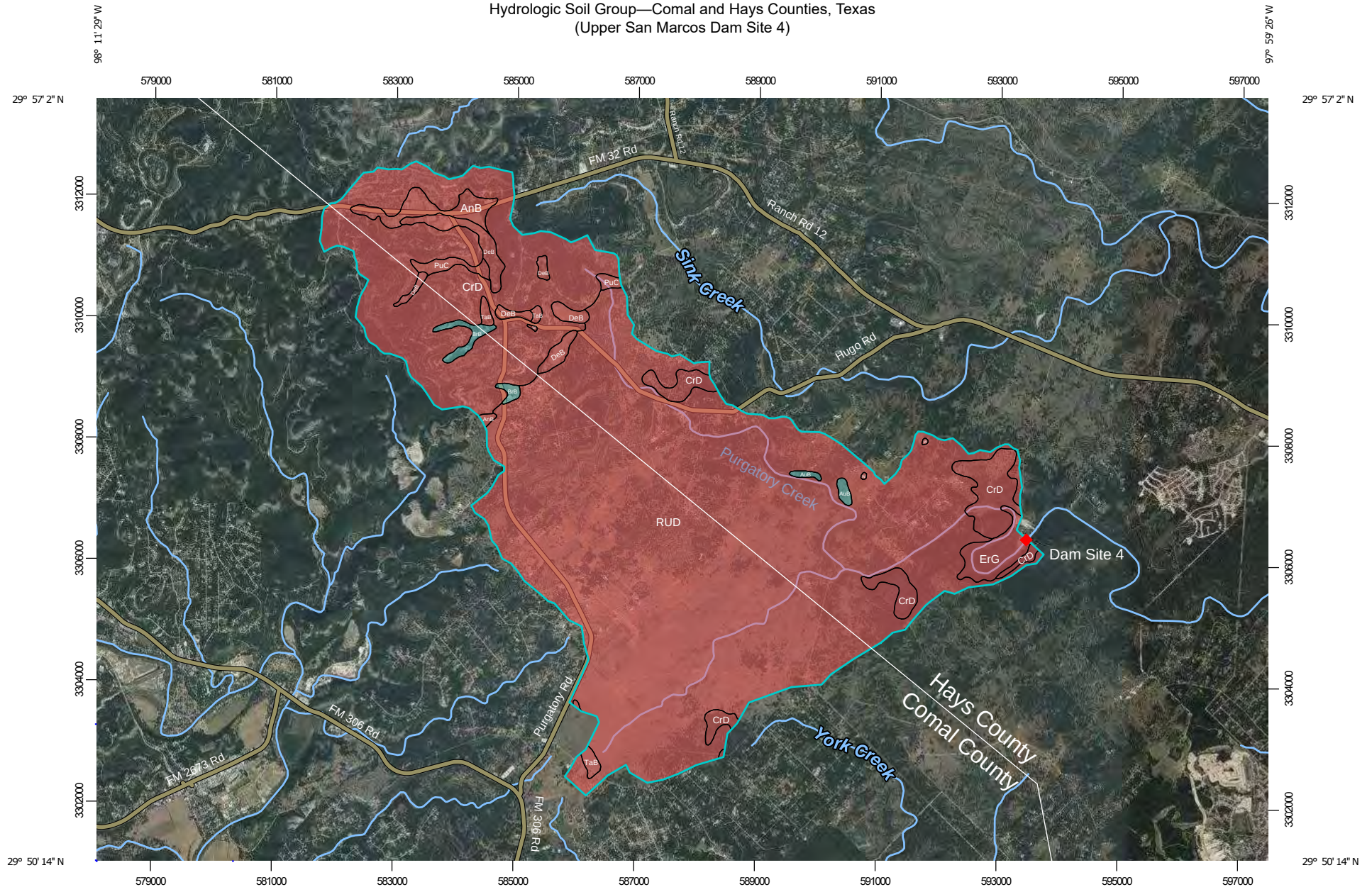
|  |                                                                                                                  |  |                                                                                                                                       |  |                                                                                                                                                            |                           |                                                                                                                  |  |                                                                                                                  |
|--|------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------|
|  | Prime farmland if subsoiled, completely removing the root inhibiting soil layer                                  |  | Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season   |  | Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium                                                                    |                           | Farmland of unique importance                                                                                    |  | Prime farmland if subsoiled, completely removing the root inhibiting soil layer                                  |
|  | Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60      |  | Farmland of statewide importance, if irrigated and drained                                                                            |  | Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season                         | <b>Soil Rating Points</b> |                                                                                                                  |  | Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60      |
|  | Prime farmland if irrigated and reclaimed of excess salts and sodium                                             |  | Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season |  | Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season |                           | Not prime farmland                                                                                               |  | Prime farmland if irrigated and reclaimed of excess salts and sodium                                             |
|  | Farmland of statewide importance                                                                                 |  | Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer                                    |  | Farmland of statewide importance, if warm enough                                                                                                           |                           | Prime farmland if protected from flooding or not frequently flooded during the growing season                    |  | Farmland of statewide importance                                                                                 |
|  | Farmland of statewide importance, if drained                                                                     |  | Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60        |  | Farmland of statewide importance, if thawed                                                                                                                |                           | Prime farmland if irrigated                                                                                      |  | Farmland of statewide importance, if drained                                                                     |
|  | Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season |  |                                                                                                                                       |  | Farmland of local importance                                                                                                                               |                           | Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season |  | Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season |
|  | Farmland of statewide importance, if irrigated                                                                   |  |                                                                                                                                       |  | Farmland of local importance, if irrigated                                                                                                                 |                           | Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season |  | Farmland of statewide importance, if irrigated                                                                   |



Farmland Classification—Comal and Hays Counties, Texas  
(Upper San Marcos Dam Site 5)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p> Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season</p> <p> Farmland of statewide importance, if irrigated and drained</p> <p> Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season</p> <p> Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer</p> <p> Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60</p> | <p> Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium</p> <p> Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season</p> <p> Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season</p> <p> Farmland of statewide importance, if warm enough</p> <p> Farmland of statewide importance, if thawed</p> <p> Farmland of local importance</p> <p> Farmland of local importance, if irrigated</p> | <p> Farmland of unique importance</p> <p> Not rated or not available</p> <p><b>Water Features</b></p> <p> Streams and Canals</p> <p><b>Transportation</b></p> <p> Rails</p> <p> Interstate Highways</p> <p> US Routes</p> <p> Major Roads</p> <p> Local Roads</p> <p><b>Background</b></p> <p> Aerial Photography</p> | <p>The soil surveys that comprise your AOI were mapped at 1:20,000.</p> <p>Please rely on the bar scale on each map sheet for map measurements.</p> <p>Source of Map: Natural Resources Conservation Service<br/>Web Soil Survey URL:<br/>Coordinate System: Web Mercator (EPSG:3857)</p> <p>Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.</p> <p>This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.</p> <p>Soil Survey Area: Comal and Hays Counties, Texas<br/>Survey Area Data: Version 20, Sep 5, 2023</p> <p>Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.</p> <p>Date(s) aerial images were photographed: Nov 15, 2020—Apr 6, 2022</p> <p>The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

# Hydrologic Soil Group—Comal and Hays Counties, Texas (Upper San Marcos Dam Site 4)



Map Scale: 1:88,700 if printed on A landscape (11" x 8.5") sheet.

0 1000 2000 4000 6000 Meters

0 4000 8000 16000 24000 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84



**Natural Resources  
Conservation Service**

Hydrologic Soil Group—Comal and Hays Counties, Texas  
(Upper San Marcos Dam Site 4)

## MAP LEGEND

### Area of Interest (AOI)

Area of Interest (AOI)

### Soils

#### Soil Rating Polygons

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

#### Soil Rating Lines

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

#### Soil Rating Points

-  A
-  A/D
-  B
-  B/D

-  C
-  C/D
-  D
-  Not rated or not available

### Water Features

-  Streams and Canals

### Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

### Background

-  Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Comal and Hays Counties, Texas

Survey Area Data: Version 20, Sep 5, 2023

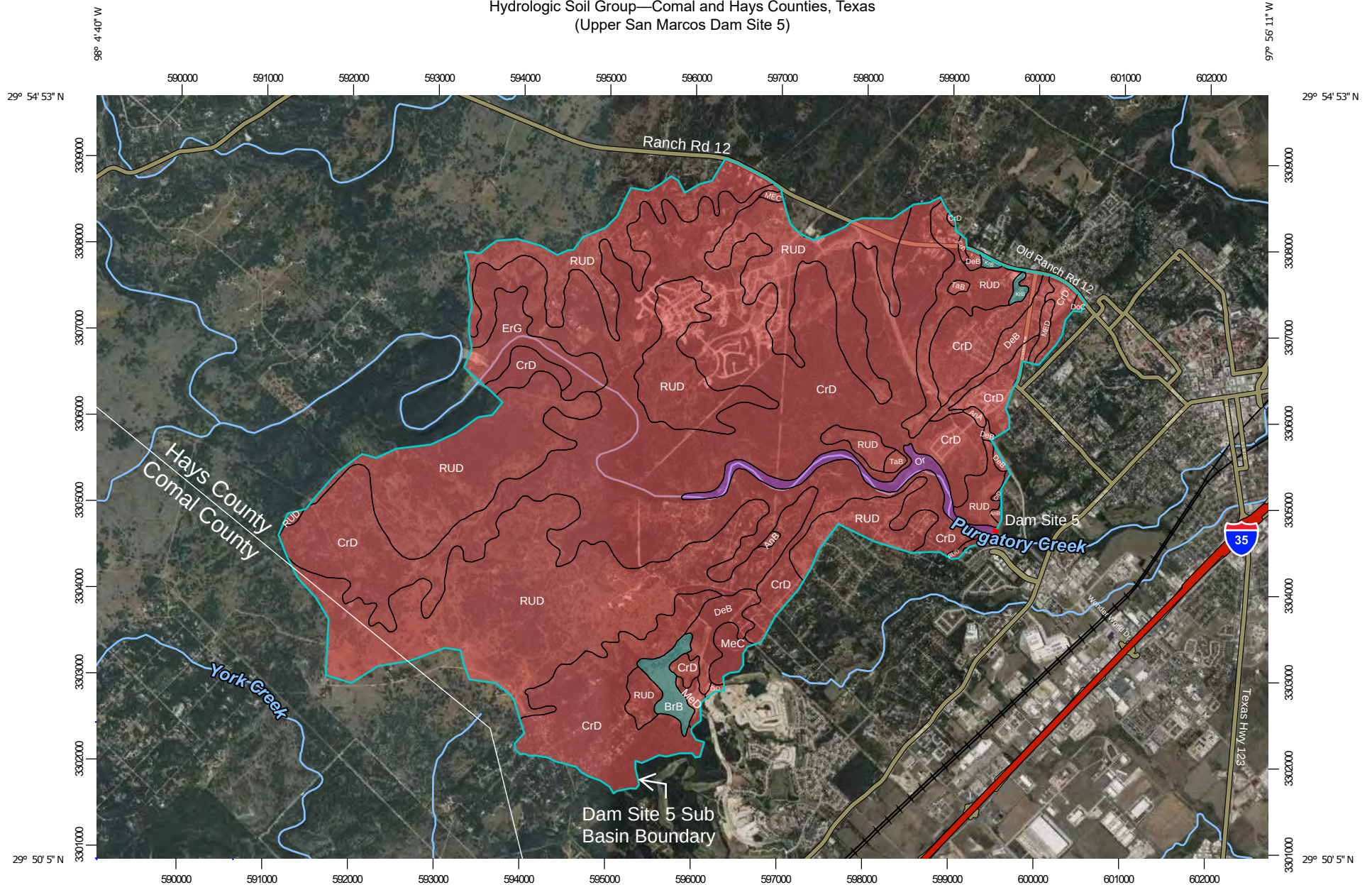
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 11, 2020—Apr 6, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



# Hydrologic Soil Group—Comal and Hays Counties, Texas (Upper San Marcos Dam Site 5)



Map Scale: 1:62,500 if printed on A landscape (11" x 8.5") sheet.

0 500 1000 2000 3000 Meters

0 3000 6000 12000 18000 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84



**Natural Resources  
Conservation Service**

Hydrologic Soil Group—Comal and Hays Counties, Texas  
(Upper San Marcos Dam Site 5)

## MAP LEGEND

### Area of Interest (AOI)

Area of Interest (AOI)

### Soils

#### Soil Rating Polygons

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

#### Soil Rating Lines

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

#### Soil Rating Points

-  A
-  A/D
-  B
-  B/D

-  C
-  C/D
-  D
-  Not rated or not available

### Water Features

-  Streams and Canals

### Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

### Background

-  Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Comal and Hays Counties, Texas

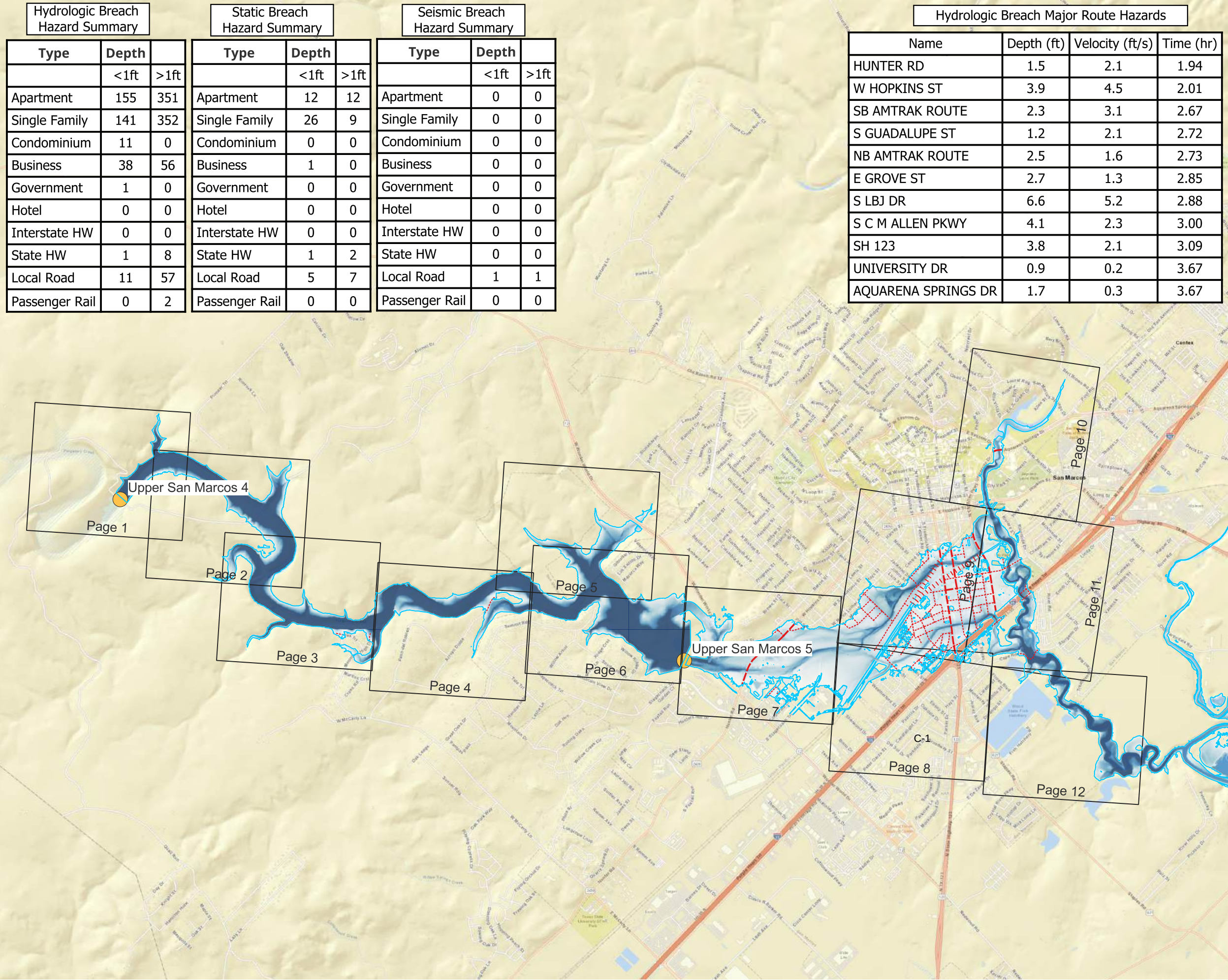
Survey Area Data: Version 20, Sep 5, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 15, 2020—Apr 6, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.





Hydrologic Breach Hazard Summary

| Type           | Depth |      |
|----------------|-------|------|
|                | <1ft  | >1ft |
| Apartment      | 155   | 351  |
| Single Family  | 141   | 352  |
| Condominium    | 11    | 0    |
| Business       | 38    | 56   |
| Government     | 1     | 0    |
| Hotel          | 0     | 0    |
| Interstate HW  | 0     | 0    |
| State HW       | 1     | 8    |
| Local Road     | 11    | 57   |
| Passenger Rail | 0     | 2    |

Static Breach Hazard Summary

| Type           | Depth |      |
|----------------|-------|------|
|                | <1ft  | >1ft |
| Apartment      | 12    | 12   |
| Single Family  | 26    | 9    |
| Condominium    | 0     | 0    |
| Business       | 1     | 0    |
| Government     | 0     | 0    |
| Hotel          | 0     | 0    |
| Interstate HW  | 0     | 0    |
| State HW       | 1     | 2    |
| Local Road     | 5     | 7    |
| Passenger Rail | 0     | 0    |

Seismic Breach Hazard Summary

| Type           | Depth |      |
|----------------|-------|------|
|                | <1ft  | >1ft |
| Apartment      | 0     | 0    |
| Single Family  | 0     | 0    |
| Condominium    | 0     | 0    |
| Business       | 0     | 0    |
| Government     | 0     | 0    |
| Hotel          | 0     | 0    |
| Interstate HW  | 0     | 0    |
| State HW       | 0     | 0    |
| Local Road     | 1     | 1    |
| Passenger Rail | 0     | 0    |

Hydrologic Breach Major Route Hazards

| Name                | Depth (ft) | Velocity (ft/s) | Time (hr) |
|---------------------|------------|-----------------|-----------|
| HUNTER RD           | 1.5        | 2.1             | 1.94      |
| W HOPKINS ST        | 3.9        | 4.5             | 2.01      |
| SB AMTRAK ROUTE     | 2.3        | 3.1             | 2.67      |
| S GUADALUPE ST      | 1.2        | 2.1             | 2.72      |
| NB AMTRAK ROUTE     | 2.5        | 1.6             | 2.73      |
| E GROVE ST          | 2.7        | 1.3             | 2.85      |
| S LBJ DR            | 6.6        | 5.2             | 2.88      |
| S C M ALLEN PKWY    | 4.1        | 2.3             | 3.00      |
| SH 123              | 3.8        | 2.1             | 3.09      |
| UNIVERSITY DR       | 0.9        | 0.2             | 3.67      |
| AQUARENA SPRINGS DR | 1.7        | 0.3             | 3.67      |

Legend

- Pages
- Dam Location
- Inundation Boundary
- Depth (ft)
- 0
- 3
- 6
- 9
- 12
- 15
- Road Hazards
- Local Street
- State Highway
- Passenger Rail



Location Map

0 0.5 1 mi

Site 4 Breach Inundation Maps

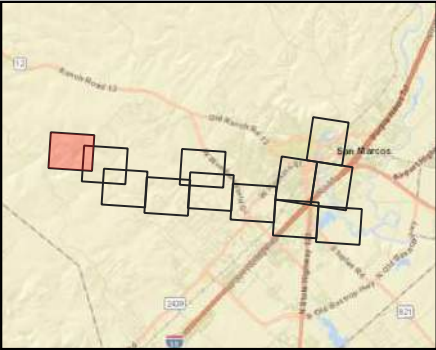
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|---------------------------|------------------------------------------|
| WRS PROJECT NO.           | 2023012                                  |
| DATE CREATED              | October 2023                             |
| DATUM & COORDINATE SYSTEM | NAD83(2011) / Texas South Central (ftUS) |
| FILE NAME                 | USM4_Inundation_Map                      |
| PREPARED BY               | Tyler Benschofer                         |



UPPER SAN MARCOS SITE #4 FLOOD PROTECTION DAM  
BREACH INUNDATION MAP







Location Map

Legend

Dam Location

Inundation Boundary

Depth(ft)

0

3

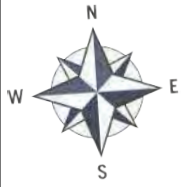
6

9

12

15

|                           |                                          |
|---------------------------|------------------------------------------|
| WRS PROJECT NO.           | 2023003                                  |
| DATE CREATED              | October 2023                             |
| DATUM & COORDINATE SYSTEM | NAD83(2011) / Texas South Central (ITUS) |
| FILE NAME                 | Name: USM4_Inundation_Map                |
| PREPARED BY               | Tyler Benschofer                         |



UPPER SAN MARCOS SITE #4 FLOOD PROTECTION DAM

BREACH INUNDATION MAP



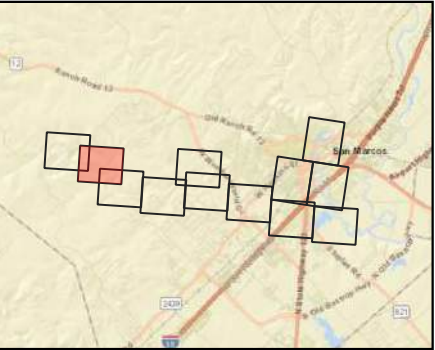
WRS  
WATER RESOURCES SOLUTIONS  
5000 W 95TH STREET  
PRAIRIE VILLAGE, KS 66207

0 400 800 ft



Site 4 Breach Inundation Maps





Location Map

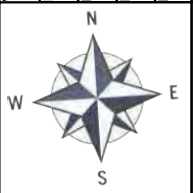
Legend

Inundation Boundary

Depth(ft)

|  |    |
|--|----|
|  | 0  |
|  | 3  |
|  | 6  |
|  | 9  |
|  | 12 |
|  | 15 |

|                           |                                          |
|---------------------------|------------------------------------------|
| WRS PROJECT NO.           | 2023003                                  |
| DATE CREATED              | October 2023                             |
| DATUM & COORDINATE SYSTEM | NAD83(2011) / Texas South Central (ITUS) |
| FILE NAME                 | Name: USM4_Inundation_Map                |
| PREPARED BY               | Tyler Benschofer                         |



UPPER SAN MARCOS SITE #4 FLOOD PROTECTION DAM

BREACH INUNDATION MAP



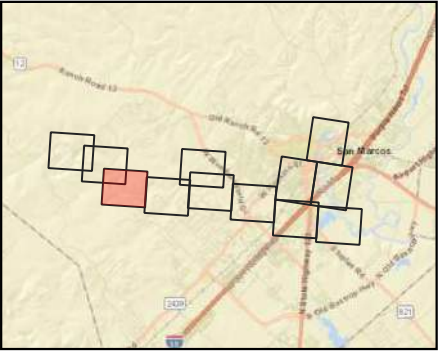
WATER RESOURCES SOLUTIONS  
5000 W 95TH STREET  
PRAIRIE VILLAGE, KS 66207

0 400 800 ft



Site 4 Breach Inundation Maps





Location Map

Legend

Inundation Boundary

Depth(ft)

0

3

6

9

12

15

Road Hazards

Local Street

Hazard Points

Single Family

|                           |                                          |
|---------------------------|------------------------------------------|
| WRS PROJECT NO.           | 2023003                                  |
| DATE CREATED              | October 2023                             |
| DATUM & COORDINATE SYSTEM | NAD83(2011) / Texas South Central (ITUS) |
| FILE NAME                 | Name: USM4_Inundation_Map                |
| PREPARED BY               | Tyler Benschofer                         |



UPPER SAN MARCOS SITE #4 FLOOD PROTECTION DAM

BREACH INUNDATION MAP

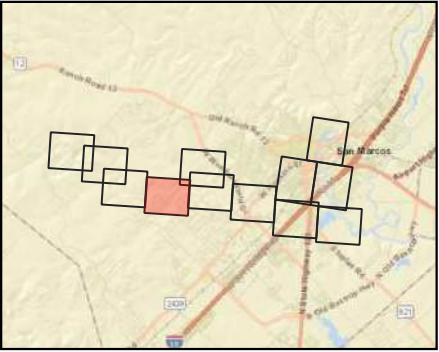
WATER RESOURCES SOLUTIONS  
5000 W 95TH STREET  
PRAIRIE VILLAGE, KS 66207

0 400 800 ft



Site 4 Breach Inundation Maps

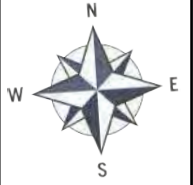




Location Map

- Legend
- Inundation Boundary
  - Depth(ft)
    - 0
    - 3
    - 6
    - 9
    - 12
    - 15
  - Road Hazards
    - Local Street
  - Hazard Points
    - Single Family

|                           |                                          |
|---------------------------|------------------------------------------|
| WRS PROJECT NO.           | 2023003                                  |
| DATE CREATED              | October 2023                             |
| DATUM & COORDINATE SYSTEM | NAD83(2011) / Texas South Central (ITUS) |
| FILE NAME                 | Name: USM4_Inundation_Map                |
| PREPARED BY               | Tyler Benschofer                         |



UPPER SAN MARCOS SITE #4 FLOOD PROTECTION DAM

BREACH INUNDATION MAP



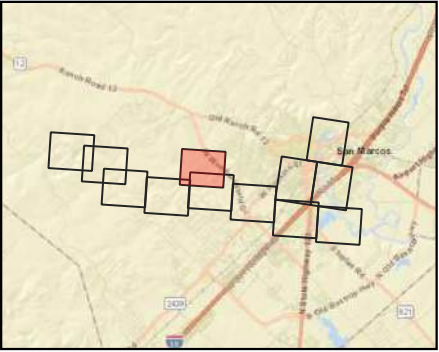
C-17

0 400 800 ft



Site 4 Breach Inundation Maps





Location Map

Legend

Inundation Boundary

Depth(ft)

0

3

6

9

12

15

|                           |                                          |
|---------------------------|------------------------------------------|
| WRS PROJECT NO.           | 2023003                                  |
| DATE CREATED              | October 2023                             |
| DATUM & COORDINATE SYSTEM | NAD83(2011) / Texas South Central (ITUS) |
| FILE NAME                 | Name: USM4_Inundation_Map                |
| PREPARED BY               | Tyler Benschofer                         |



UPPER SAN MARCOS SITE #4 FLOOD PROTECTION DAM

BREACH INUNDATION MAP



WRS  
WATER RESOURCES SOLUTIONS  
5000 W 95TH STREET  
OVERLAND PARK, KS 66207  
PRAIRIE VILLAGE, KS 66207

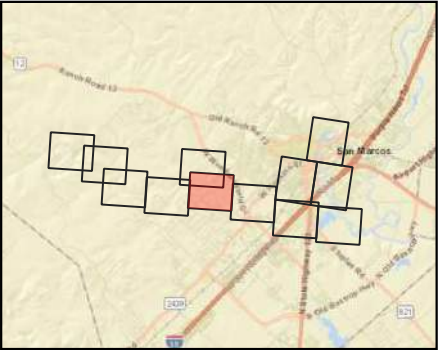
C-18

0 400 800 ft



Site 4 Breach Inundation Maps





Location Map

Legend

Inundation Boundary

Depth(ft)

0

3

6

9

12

15

Hazard Points

Single Family

|                           |                                          |
|---------------------------|------------------------------------------|
| WRS PROJECT NO.           | 2023003                                  |
| DATE CREATED              | October 2023                             |
| DATUM & COORDINATE SYSTEM | NAD83(2011) / Texas South Central (ITUS) |
| FILE NAME                 | Name: USM4_Inundation_Map                |
| PREPARED BY               | Tyler Benschofer                         |



UPPER SAN MARCOS SITE #4 FLOOD PROTECTION DAM

BREACH INUNDATION MAP



WATER RESOURCES SOLUTIONS  
5000 W 95TH STREET  
PRAIRIE VILLAGE, KS 66207

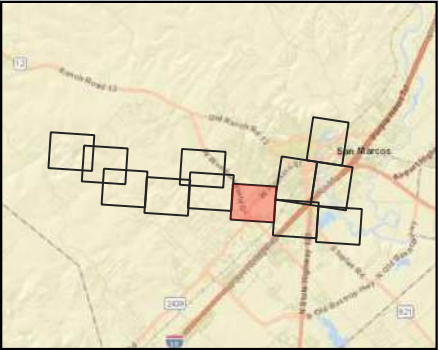
C-19

0 400 800 ft



Site 4 Breach Inundation Maps





Location Map

Legend

Orange circle Dam Location

Blue outline Inundation Boundary

Depth(ft)

0

3

6

9

12

15

Road Hazards

Red dashed line Local Street

Red dashed line State Highway

Hazard Points

Yellow circle Apartment

Green circle Business

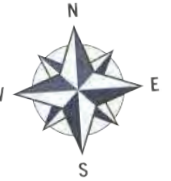
Red circle Condominium

Purple circle Government

Orange circle Single Family

Red circle Major Road Crossing

|                           |                                          |
|---------------------------|------------------------------------------|
| WRS PROJECT NO.           | 2023003                                  |
| DATE CREATED              | October 2023                             |
| DATUM & COORDINATE SYSTEM | NAD83(2011) / Texas South Central (ITUS) |
| FILE NAME                 | Name: USM4_Inundation_Map                |
| PREPARED BY               | Tyler Benschofer                         |



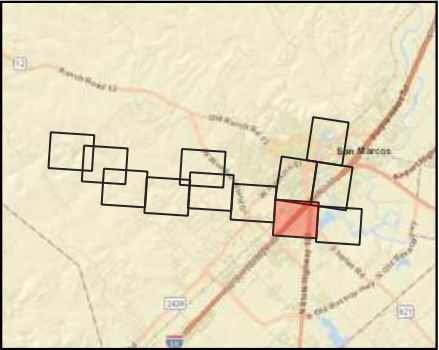
UPPER SAN MARCOS SITE #4 FLOOD PROTECTION DAM

BREACH INUNDATION MAP



C-20





Location Map

Legend

Inundation Boundary

Depth(ft)

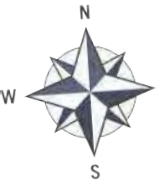


Road Hazards

Local Street  
State Highway

Hazard Points

Apartment  
Single Family



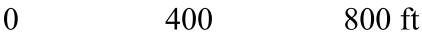
UPPER SAN MARCOS SITE #4 FLOOD PROTECTION DAM

BREACH INUNDATION MAP



WATER RESOURCES SOLUTIONS  
5000 W 95TH STREET  
PRAIRIE VILLAGE, KS 66207

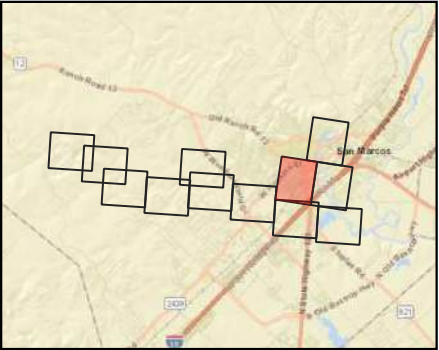
C-21



Site 4 Breach Inundation Maps

|                           |                                          |
|---------------------------|------------------------------------------|
| WRS PROJECT NO.           | 2023003                                  |
| DATE CREATED              | October 2023                             |
| DATUM & COORDINATE SYSTEM | NAD83(2011) / Texas South Central (ITUS) |
| FILE NAME                 | Name: USM4_Inundation_Map                |
| PREPARED BY               | Tyler Benschofer                         |





Location Map

Legend

Inundation Boundary

Depth(ft)

0

3

6

9

12

15

Road Hazards

Local Street

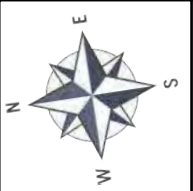
State Highway

Passenger Rail

Hazard Points

ApartmentBusinessSingle FamilyMajor Road CrossingPassneger Rail Crossing

|                           |                                          |
|---------------------------|------------------------------------------|
| WRS PROJECT NO.           | 2023003                                  |
| DATE CREATED              | October 2023                             |
| DATUM & COORDINATE SYSTEM | NAD83(2011) / Texas South Central (ITUS) |
| FILE NAME                 | Name: USM4_Inundation_Map                |
| PREPARED BY               | Tyler Benschofer                         |

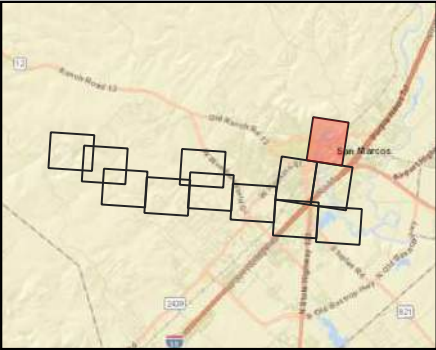


UPPER SAN MARCOS SITE #4 FLOOD PROTECTION DAM

BREACH INUNDATION MAP

WATER RESOURCES SOLUTIONS  
5000 W 95TH STREET  
PRAIRIE VILLAGE, KS 66207





Location Map

Legend

Inundation Boundary

Depth(ft)



Road Hazards

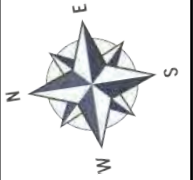
Local Street

State Highway

Hazard Points

Major Road Crossing

|                           |                                          |
|---------------------------|------------------------------------------|
| WRS PROJECT NO.           | 2023003                                  |
| DATE CREATED              | October 2023                             |
| DATUM & COORDINATE SYSTEM | NAD83(2011) / Texas South Central (ITUS) |
| FILE NAME                 | Name: USM4_Inundation_Map                |
| PREPARED BY               | Tyler Benschofer                         |



UPPER SAN MARCOS SITE #4 FLOOD PROTECTION DAM

BREACH INUNDATION MAP



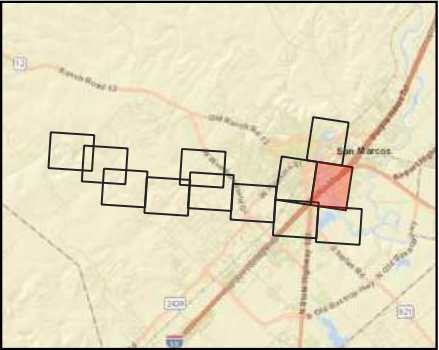
C-23

0 400 800 ft



Site 4 Breach Inundation Maps





Location Map

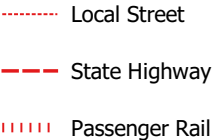
Legend

Inundation Boundary

Depth(ft)



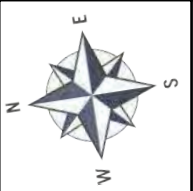
Road Hazards



Hazard Points



|                           |                                          |
|---------------------------|------------------------------------------|
| WRS PROJECT NO.           | 2023003                                  |
| DATE CREATED              | October 2023                             |
| DATUM & COORDINATE SYSTEM | NAD83(2011) / Texas South Central (ITUS) |
| FILE NAME                 | Name: USM4_Inundation_Map                |
| PREPARED BY               | Tyler Benschofer                         |



UPPER SAN MARCOS SITE #4 FLOOD PROTECTION DAM  
BREACH INUNDATION MAP



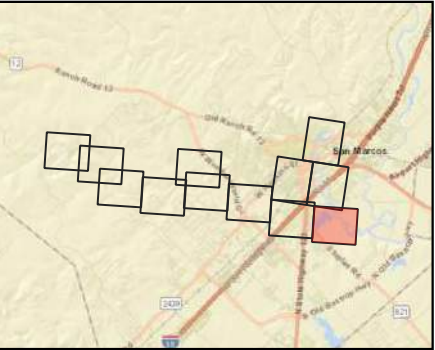
C-24

0 400 800 ft



Site 4 Breach Inundation Maps





Location Map

Legend

Inundation Boundary

Depth(ft)

0

3

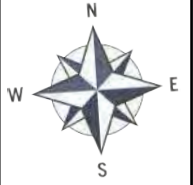
6

9

12

15

|                           |                                          |
|---------------------------|------------------------------------------|
| WRS PROJECT NO.           | 2023003                                  |
| DATE CREATED              | October 2023                             |
| DATUM & COORDINATE SYSTEM | NAD83(2011) / Texas South Central (ITUS) |
| FILE NAME                 | Name: USM4_Inundation_Map                |
| PREPARED BY               | Tyler Benschofer                         |



UPPER SAN MARCOS SITE #4 FLOOD PROTECTION DAM

BREACH INUNDATION MAP

WATER RESOURCES SOLUTIONS  
5000 W 95TH STREET  
PRAIRIE VILLAGE, KS 66207

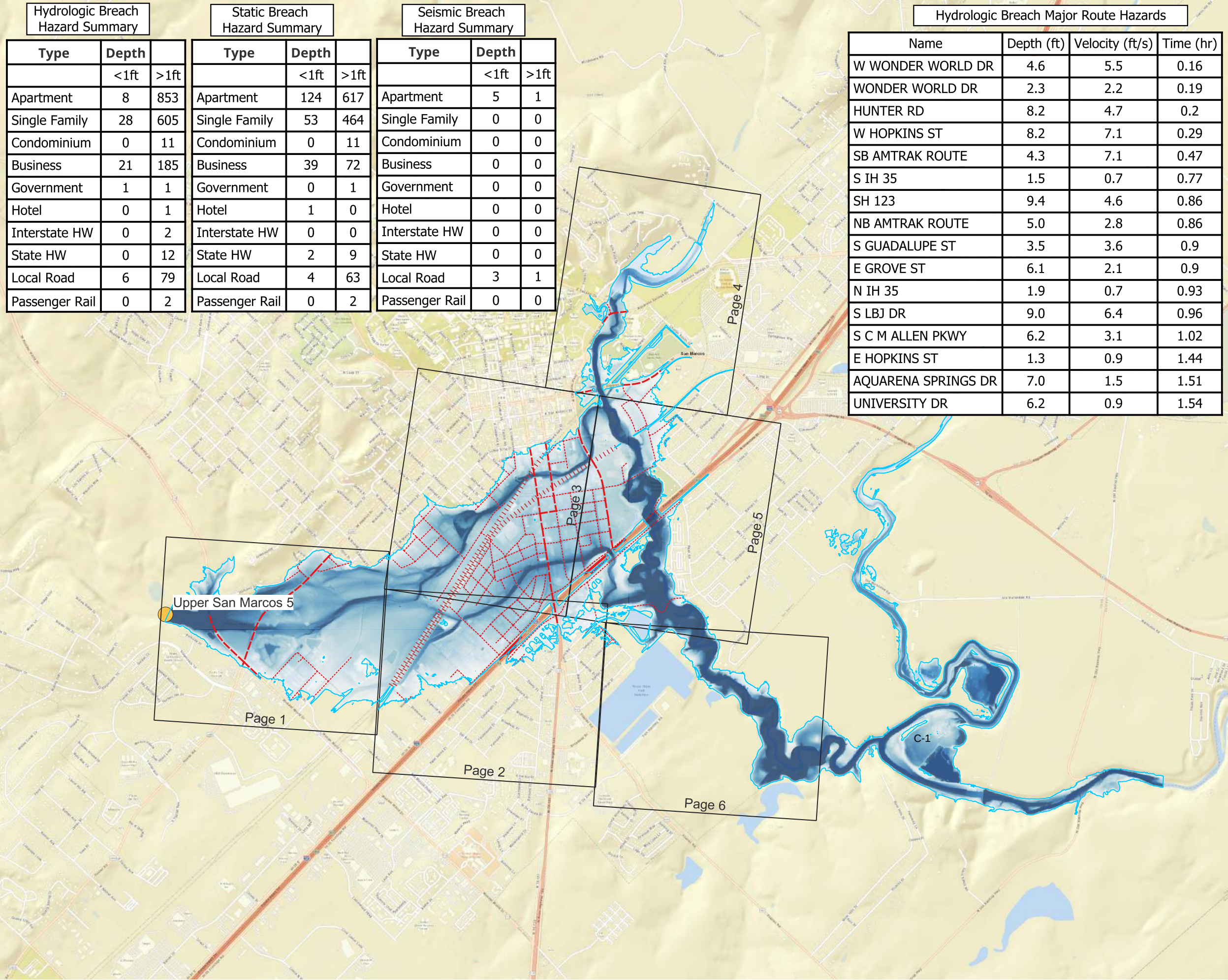
C-25

0 400 800 ft



Site 4 Breach Inundation Maps





Legend

Pages

Dam Location

Inundation Boundary

Depth (ft)

0

3

6

9

12

15

Road Hazards

Interstate

Local Street

State Highway

Passenger Rail

Location Map

02023003

DATE CREATED

October 2023

DATUM & COORDINATE SYSTEM

NAD83(2011) / Texas South Central (ftUS)

FILE NAME

USM5\_Inundation\_Map

PREPARED BY

Tyler Benschofer

UPPER SAN MARCOS SITE #5 FLOOD PROTECTION DAM

WRS

WATER RESOURCES SOLUTIONS

5000 KANSAS STREET

SUITE 200

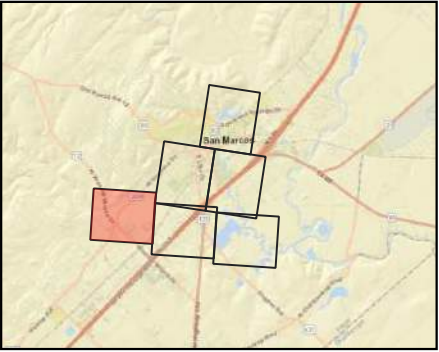
PRAIRIE VILLAGE, KS 66207

C-26

020004000 ft

Site 5 Breach Inundation Maps





Location Map

Legend

● Dam Location

□ Inundation Boundary

Depth(ft)

0

3

6

9

12

15

Road Hazards

--- Local Street

--- State Highway

Hazard Points

● Apartment

● Business

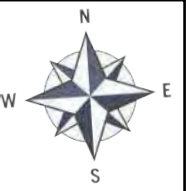
● Condominium

● Government

● Single Family

● Major Road Crossing

|                           |                                          |
|---------------------------|------------------------------------------|
| WRS PROJECT NO.           | 2023003                                  |
| DATE CREATED              | October 2023                             |
| DATUM & COORDINATE SYSTEM | NAD83(2011) / Texas South Central (ITUS) |
| FILE NAME                 | Name: USM5_Inundation_Map                |
| PREPARED BY               | Tyler Benschofer                         |



UPPER SAN MARCOS SITE #5 FLOOD PROTECTION DAM

BREACH INUNDATION MAP



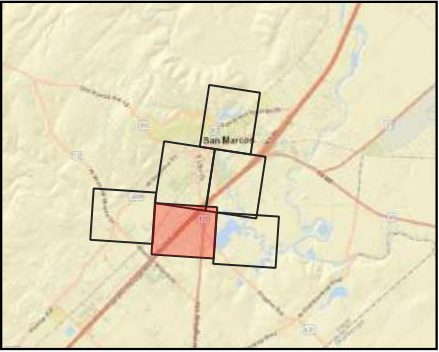
C-27

0 400 800 ft



Site 5 Breach Inundation Maps





Location Map

Legend

Inundation Boundary

Depth(ft)

0

3

6

9

12

15

Road Hazards

Interstate

Local Street

State Highway

Passenger Rail

Hazard Points

Apartment

Business

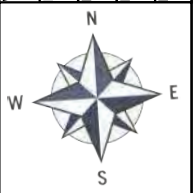
Hotel

Single Family

Interstate Crossing

Passenger Rail Crossing

|                           |                                          |
|---------------------------|------------------------------------------|
| WRS PROJECT NO.           | 2023003                                  |
| DATE CREATED              | October 2023                             |
| DATUM & COORDINATE SYSTEM | NAD83(2011) / Texas South Central (ITUS) |
| FILE NAME                 | Name: USM5_Inundation_Map                |
| PREPARED BY               | Tyler Benschofer                         |

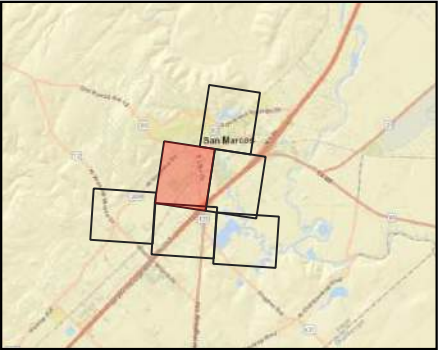


UPPER SAN MARCOS SITE #5 FLOOD PROTECTION DAM

BREACH INUNDATION MAP







Location Map

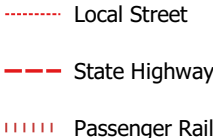
Legend

Inundation Boundary

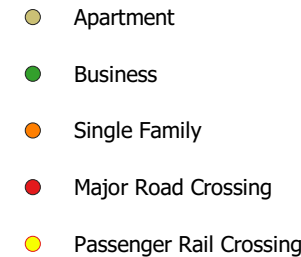
Depth(ft)



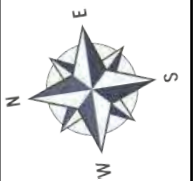
Road Hazards



Hazard Points



|                           |                                          |
|---------------------------|------------------------------------------|
| WRS PROJECT NO.           | 2023003                                  |
| DATE CREATED              | October 2023                             |
| DATUM & COORDINATE SYSTEM | NAD83(2011) / Texas South Central (ITUS) |
| FILE NAME                 | Name: USM5_Inundation_Map                |
| PREPARED BY               | Tyler Benschofer                         |



UPPER SAN MARCOS SITE #5 FLOOD PROTECTION DAM

BREACH INUNDATION MAP



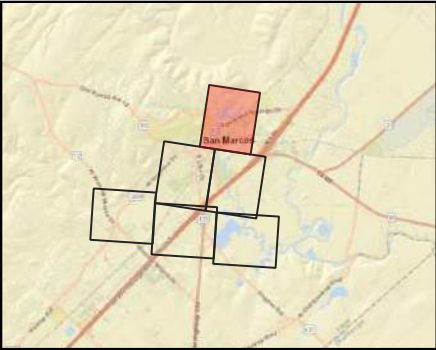
C-29

0 400 800 ft



Site 5 Breach Inundation Maps



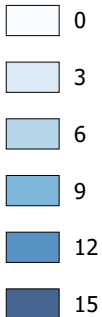


Location Map

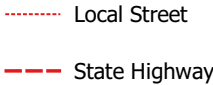
Legend

Inundation Boundary

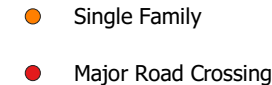
Depth(ft)



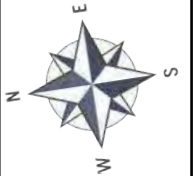
Road Hazards



Hazard Points



|                           |                                          |
|---------------------------|------------------------------------------|
| WRS PROJECT NO.           | 2023003                                  |
| DATE CREATED              | October 2023                             |
| DATUM & COORDINATE SYSTEM | NAD83(2011) / Texas South Central (ITUS) |
| FILE NAME                 | Name: USM5_Inundation_Map                |
| PREPARED BY               | Tyler Benschofer                         |

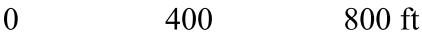


UPPER SAN MARCOS SITE #5 FLOOD PROTECTION DAM

BREACH INUNDATION MAP

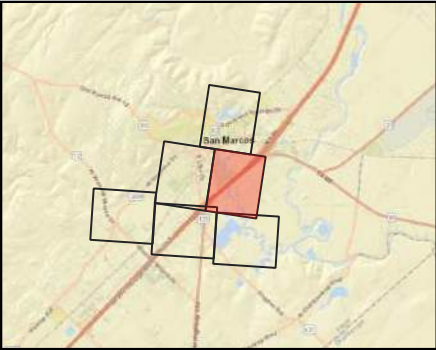


C-30



Site 5 Breach Inundation Maps





Location Map

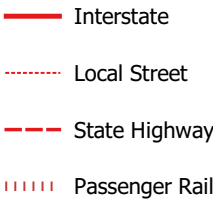
Legend

Inundation Boundary

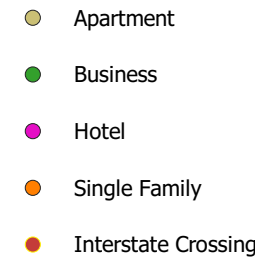
Depth(ft)



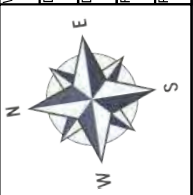
Road Hazards



Hazard Points



|                           |                                          |
|---------------------------|------------------------------------------|
| WRS PROJECT NO.           | 2023003                                  |
| DATE CREATED              | October 2023                             |
| DATUM & COORDINATE SYSTEM | NAD83(2011) / Texas South Central (ITUS) |
| FILE NAME                 | Name: USM5 Inundation Map                |
| PREPARED BY               | Tyler Benschofer                         |



UPPER SAN MARCOS SITE #5 FLOOD PROTECTION DAM  
BREACH INUNDATION MAP



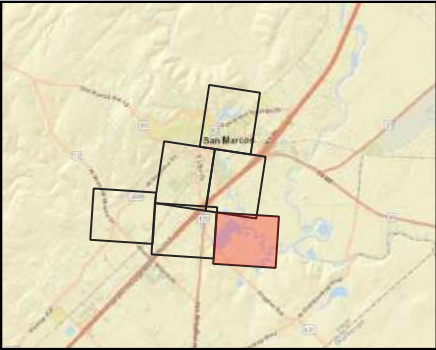
C-31

0 400 800 ft



Site 5 Breach Inundation Maps





Location Map

Legend

Inundation Boundary

Depth(ft)

0

3

6

9

12

15

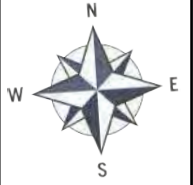
Road Hazards

Local Street

Hazard Points

Business

|                           |                                          |
|---------------------------|------------------------------------------|
| WRS PROJECT NO.           | 2023003                                  |
| DATE CREATED              | October 2023                             |
| DATUM & COORDINATE SYSTEM | NAD83(2011) / Texas South Central (ITUS) |
| FILE NAME                 | Name: USM5_Inundation_Map                |
| PREPARED BY               | Tyler Benschofer                         |



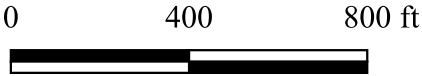
UPPER SAN MARCOS SITE #5 FLOOD PROTECTION DAM

BREACH INUNDATION MAP



WRS  
WATER RESOURCES SOLUTIONS  
5000 W 95TH STREET  
PRAIRIE VILLAGE, KS 66207

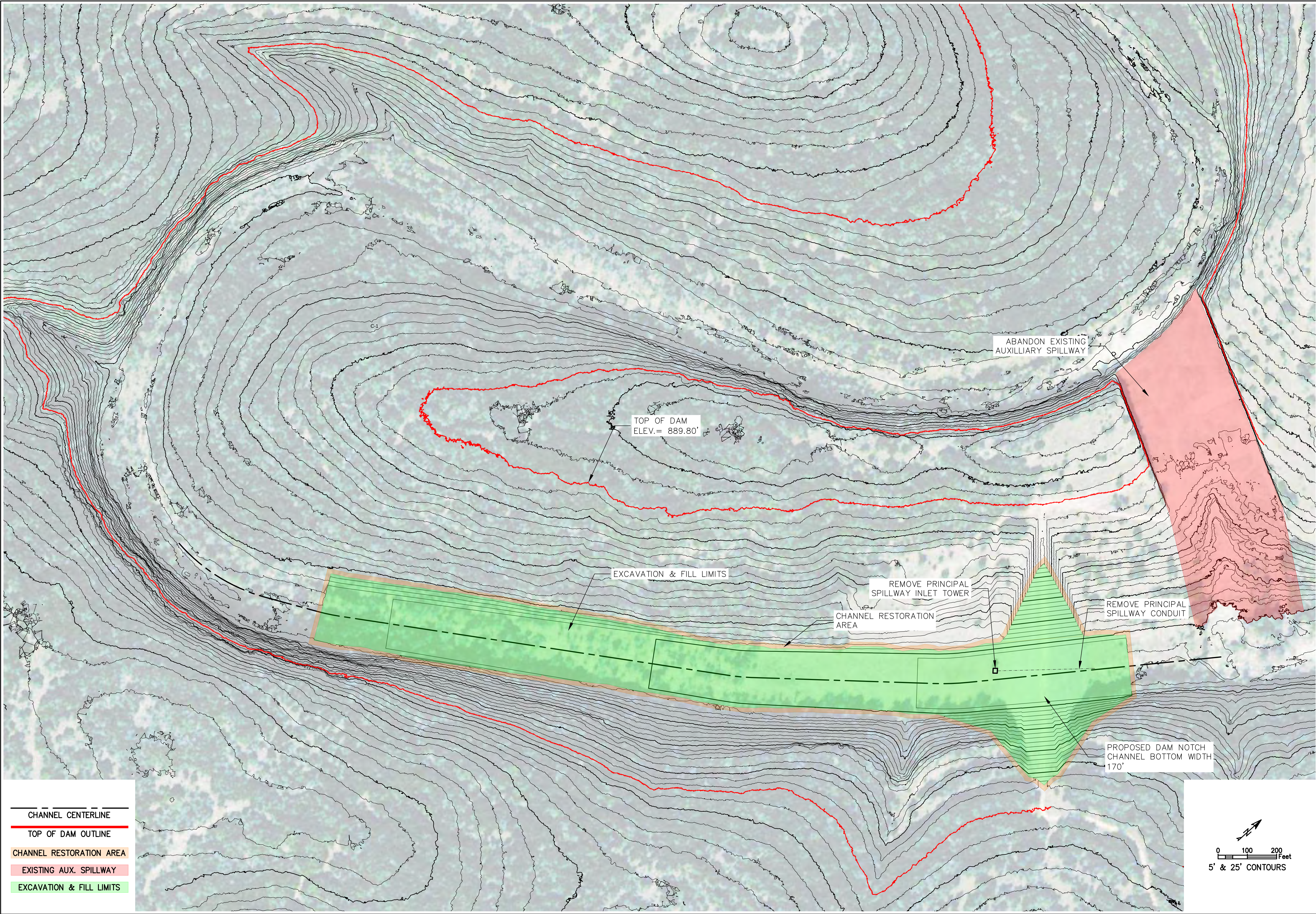
C-32



Site 5 Breach Inundation Maps



ACAD Rel: 24.2s (LWS Tech)  
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Last Saved: 1/26/2024 1:28 PM    Saved By: cdusthimer



CH--

CHANNEL CENTERLINE

---

TOP OF DAM OUTLINE

CH--

CHANNEL RESTORATION AREA

---

EXISTING AUX. SPILLWAY

---

EXCAVATION & FILL LIMITS

United States  
Department of  
Agriculture

**USDA**

Natural Resources  
Conservation Service

ALTERNATIVE NO. 1: DECOMMISSION  
FLOODWATER RETARDING STRUCTURE SITE NO. 4  
UPPER SAN MARCOS RIVER WATERSHED  
SAN MARCOS, TEXAS

E-File Location:  
ALT-1\_Site4Exhibit.dwg

Drawing No.  
TX-000

Sheet 01 of 01

Designed  
MEC

Drawn  
CJD

Revised  
CJD

Approved  
XX

Date  
11-23

12-23

12-23

XX

C-83

Alternative 1 - Site 4 Decommission Dam

C-33





|          |     | Date |
|----------|-----|------|
| Designed | JDD | 9-23 |
| Drawn    | CJD | 9-23 |
| Checked  | CJD | 9-23 |
| Approved | --- | X-XX |

PROJECT MAP  
UPPER SAN MARCOS WATERSHED NO. 4  
HAYS COUNTY, TEXAS



United States  
Department of  
Agriculture



Natural Resources  
Conservation Service

|                                                    |
|----------------------------------------------------|
| File No.<br><i>SanMarcosSTEP4_MEC_03012024.dwg</i> |
| Drawing No.<br>TX-001                              |
| 3/5/24 12:05 PM                                    |
| Sheet 1 of 1                                       |





|          |     |      |
|----------|-----|------|
| Designed | JDD | Date |
| Drawn    | CJD | 9-23 |
| Checked  | CJD | 9-23 |
| Approved | --- | 9-23 |
|          |     | X-XX |

PROJECT MAP

UPPER SAN MARCOS WATERSHED NO. 4  
HAYS COUNTY, TEXAS



United States  
Department of  
Agriculture



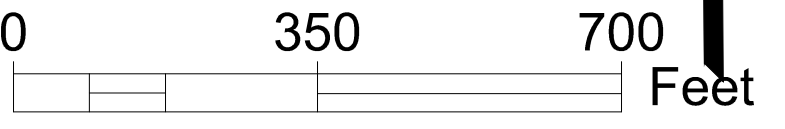
Natural Resources  
Conservation Service

File No.  
*SanMarcosSTEP4\_MEC\_03012024.dwg*

Drawing No.  
TX-001

3/5/24 12:05 PM

Sheet 1 of 1







|          | Date     |
|----------|----------|
| Designed | JDD 9-23 |
| Drawn    | CJD 9-23 |
| Checked  | CJD 9-23 |
| Approved | --- X-XX |

PROJECT MAP  
UPPER SAN MARCOS WATERSHED NO. 4  
HAYS COUNTY, TEXAS



United States  
Department of  
Agriculture



Natural Resources  
Conservation Service

File No.  
*SanMarcosSITE4\_MEC\_03012024.dwg*

Drawing No.  
TX-001

3/5/24 12:05 PM

Sheet 1 of 1





|          | Date     |
|----------|----------|
| Designed | JDD 9-23 |
| Drawn    | CJD 9-23 |
| Checked  | CJD 9-23 |
| Approved | --- X-XX |

PROJECT MAP  
UPPER SAN MARCOS WATERSHED NO. 4  
HAYS COUNTY, TEXAS



United States  
Department of  
Agriculture



Natural Resources  
Conservation Service

File No.  
SanMarcosSITE4\_MEC\_03012024.dwg

Drawing No.  
TX-001

3/5/24 12:05 PM

Sheet 1 of 1



## **Appendix E – Other Supporting Information**

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**TO:** Laurie Brown, LEED AP (Vireo)  
**CC:** Aaron Petty (FNI)  
**FROM:** Wes Wiegrefe, CWB (FNI)  
**SUBJECT:** Ecological Resources Inventory and Analysis  
**DATE:** June 13, 2025  
**PROJECT:** AAC23422 – Upper San Marcos Site 4

---

### Introduction

Freese and Nichols, Inc. (FNI) personnel conducted a pedestrian survey of the proposed Upper San Marcos Site 4 project area on September 6, 2023. The purpose of the survey was to inventory the ecological resources within the proposed project limits of investigation (LOI), including the identification of potential waters of the U.S. that could be regulated by Section 404 of the Clean Water Act and areas that could be potential habitat for federally listed threatened or endangered species. Furthermore, the survey was performed to characterize the soils, floodplains, fish and wildlife habitat, invasive species, and riparian areas identified within the proposed LOI. Figures and site photographs are presented in **Appendices A and B**, respectively.

### Project Description

The Upper San Marcos Site 4 project includes the completion of a Natural Resource Conservation Service (NRCS) Supplemental Watershed Plan-Environmental Document (Plan-ED) for the existing Upper San Marcos Flood Retarding Structure (FRS) No. 4. Hays County Soil and Water Conservation District and NRCS are seeking to complete an authorized plan assessing project alternatives, which would address the reclassification of the FRS to a high-hazard dam. The Plan-ED will describe the existing conditions, develop alternatives, evaluate the economic, social, and environmental impact of the alternatives, and recommend a preferred alternative. The Plan-ED must be prepared in accordance with the National Environmental Policy Act (NEPA).

Two alternatives were assessed that would address the reclassification of Upper San Marcos FRS No. 4 to a high-hazard dam, in addition to one alternative that would include decommissioning the FRS. Alternative 1 would include the conversion of the auxiliary spillway to a roller-compacted concrete (RCC) spillway which would remain at a width of 365 ft, and the raising of the spillway crest by 11.6 ft and the top of dam by 6.4 ft. Alternative 2 would also include the conversion of the auxiliary spillway to a roller-compacted concrete (RCC) spillway which would remain at a width of 365 ft, but would raise of the spillway crest by 6.6 ft and the top of dam by 1.7 ft. The decommissioning alternative would remove the storage function of the FRS by cutting a notch in the existing dam and restoring the existing upstream inundation area.

### Ecological Setting

The project area is located within the Balcones Canyonlands ecoregion of the Edwards Plateau. This ecoregion is located along the Balcones Fault Zone and has historically been dominated by deciduous woodlands characterized by escarpment black cherry (*Prunus serotina* var. *eximia*), Texas mountain laurel (*Sophora secundiflora*), Lacey oak (*Quercus laceyi*), bigtooth maple (*Acer grandidentatum*), Carolina basswood (*Tilia americana* var. *caroliniana*), and plateau live oak (*Quercus fusiformis*). Shrublands in more arid regions are characterized by Ashe juniper (*Juniperus ashei*), sumac (*Rhus* spp.), Texas sotol (*Dasylirion texanum*), sweet acacia (*Vachellia farnesiana*), and honey mesquite (*Prosopis glandulosa*). Wetland and riparian communities are characterized by bald cypress (*Taxodium distichum*), American sycamore (*Platanus occidentalis*), and black willow (*Salix nigra*). High-gradient streams originating from springs in steep-sided canyons bisect the landscape through porous limestone soils (US EPA, 2013).

### Site Conditions

The Upper San Marcos Site 4 project site is located approximately 4.5 miles west of San Marcos in Hayes County, Texas (**Figures 1 and 2**). The site is currently located within an area dominated by rocky, wooded hillslopes partially used for livestock grazing. The existing normal pool elevation impounds Purgatory Creek, a tributary of the San Marcos River. Site photos are attached in **Appendix B**.

Vegetation at the site is consistent with the surrounding area and included tree and shrub species such as: Ashe juniper, poverty weed (*Baccharis neglecta*), catclaw acacia (*Senegalia greggii*), cedar elm (*Ulmus crassifolia*), dwarf palmetto (*sabal minor*), plateau live oak, Shumard oak (*Quercus shumardii*), Texas persimmon (*Diospyros texana*), and sugarberry (*Celtis laevigata*). Herbaceous and vine species, as well as cacti, included: buffalo grass (*Bouteloua dactyloides*), inland sea oats (*Chasmanthium latifolium*), sawtooth greenbrier (*Smilax rotundifolia*), Texas prickly pear (*Opuntia engelmannii*), upright prairie coneflower (*Ratibida columnifera*), and Virginia wildrye (*Elymus virginicus*).

Hays County has a humid subtropical climate with hot summers and mild winters. Average summer temperatures are near 84 °F, and are near 52 °F during the winter. Precipitation is abundant throughout the year, with an approximate yearly average of 37 inches, though thunderstorms are common during the spring and summer months. The county rarely receives snow during the colder months.

Soil series present within the proposed project area include: Comfort-Rock outcrop complex, 1 to 8 percent slopes; Eckrant-Rock outcrop association, 8 to 30 percent slopes; and Rumble-Comfort, rubbly association, 1 to 8 percent slopes. According to the NRCS list of hydric soils, none of the soil series within the proposed project area are classified as hydric (**Figure 3**).

### Waterbodies

The USACE regulates the discharge of dredged and fill material into waters of the U.S. (WOTUS), including wetlands, under Section 404 of the Clean Water Act (Section 404). WOTUS (i.e., jurisdictional waters) include relatively permanent streams that display ordinary high water marks (OHWMs) and a surface downstream



hydrologic connection with traditional navigable waters (TNW) of the U.S., impoundments of such streams, and wetlands directly abutting these jurisdictional waters. The term OHWM means “that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural lines 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” (33 CFR 328.3). Official determination of the presence or absence of WOTUS can only be obtained by requesting an approved jurisdictional determination (AJD) from the USACE.

#### *Open Water Bodies/Impoundments*

One open water body feature was identified in the proposed project area. The Upper San Marcos Site 4 FRS impounds flow along Purgatory Creek (**Photos 1 & 2**). The area below the normal pool elevation of Upper San Marcos Site 4 FRS was dry at the time of the site visit and appears to only hold water temporarily following periods of significant precipitation.

#### *Streams*

One stream was identified in the proposed project area. Purgatory Creek (Stream 1) is a tributary of the San Marcos River and is impounded by the Upper San Marcos Site 4 FRS within the project area (**Photos 3, 4, 5, & 6**). The ephemeral reach of Stream 1 within the project area flows generally east through the LOI and has an average OHWM width of 20 ft. An approximate 1,000 ft reach of Stream 1 mapped by the U.S. Geological Survey’s (USGS) National Hydrography Dataset (NHD) ft within the LOI appears to be an ephemeral swale which does not exhibit bed and banks or an OHWM, and may have been impacted by past agricultural activities (**Photo 7**). Due to the ephemeral nature of Purgatory Creek within the project area it is FNI’s opinion that this reach of the stream would not be considered relatively permanent.

#### *Wetlands*

No wetlands were identified within the proposed project area.

Table 1 summarizes the potential WOTUS within the LOI. See relevant maps (**Figures 4 and 7**) in **Appendix A**, and site photos in **Appendix B**.

**Table 1 – Waterbodies within the Proposed Project Area**

| Feature Name                        | Feature Type     | Potential Jurisdictional Status* | Area in LOI (Acreage) | Length in LOI (Linear Feet) |
|-------------------------------------|------------------|----------------------------------|-----------------------|-----------------------------|
| Purgatory Creek (Stream 1)          | Ephemeral Stream | Non-jurisdictional               | 2.89                  | 6,255                       |
| Upper San Marcos Site 4 Normal Pool | Impoundment      | Non-jurisdictional               | 15.67                 | -                           |

\*Official determination of the presence or absence of WOTUS can only be obtained by requesting an AJD from the USACE.

\*\*An additional 5,300 ft of Stream 1 mapped by NHD has been removed due to potential impacts from agricultural activity.

### **Impact to WOTUS & Section 404**

Purgatory Creek is a tributary of the San Marcos River, which is a perennial tributary of the Guadalupe River, which flows into the Gulf of Mexico. However, because Purgatory Creek and the Upper San Marcos Site 4 Normal Pool are not relatively permanent within the project area, it is FNI's opinion that these features would not be considered WOTUS by the USACE.

The proposed project alternatives would avoid the discharge of dredged or fill materials into WOTUS, and therefore would not require authorization under Section 404. If construction activities were to impact WOTUS, the proposed construction activities would be subject to Section 404 permit regulations and should be designed to meet the terms and conditions of either a nationwide permit or standard individual permit.

### **Water Quality**

The Texas Commission on Environmental Quality (TCEQ) is charged through federal mandate with protecting the quality of waters within Texas. The TCEQ's approach to this mandate includes measuring water quality at locations across the state, determining if the quality in streams, lakes, and creeks is acceptable, and implementing plans to clean up water bodies that are impacted.

The TCEQ Texas Surface Water Quality Standards are rules designed to establish goals for water quality throughout the state and provide a basis for regulatory programs to attain those goals. Water quality standards serve to signal a situation where water quality may be inadequate to meet the use or uses of a particular water body. Five general categories for water use, known as "designated uses", are defined in Texas:

- General
- Aquatic life use
- Recreation
- Public water supply
- Fish consumption

Major surface water bodies in the state have been classified with site-specific designated uses in Title 30, Chapter 307 of the Texas Administrative Code (30 TAC §307), but many smaller water bodies have not been classified and do not have site-specific designated uses. All unclassified surface water bodies without site-specific designated uses are protected by the "general criteria" defined in 30 TAC §307.4.

The TCEQ divides water bodies into "segments" to provide the basic unit for assigning site-specific standards and for applying water quality management programs. Segments can be further divided into "assessment units." All classified water bodies and some smaller unclassified water bodies have been assigned a unique segment identification code (TCEQ Segment ID). However, many water bodies in the state have not been assigned a TCEQ Segment ID.

Because it would be impractical to test every water body for all possible pollutants, assessments of water quality in Texas are performed by evaluating indicators of water quality. Indicators are an indirect measure of the health or



quality of a particular part of the aquatic system. Some indicators, such as the health of fish communities, are tied to specific designated uses, while others, such as nutrients, are not.

#### *Section 303 (d) & 305 (b)*

If the indicator data published in the 2024 Texas Integrated Report of Surface Water Quality (the 2024 Texas Integrated Report) reveal that water quality is inadequate to meet the goals of the water body's designated use, the TCEQ identifies the water body as an impaired water in a section of the 2024 Texas Integrated Report called the 303(d) list. The 303(d) list is required by the federal CWA and is submitted to the U. S. Environmental Protection Agency (EPA) for approval. Water bodies added to the list are subject to a Total Maximum Daily Load (TMDL) assessment, which is an assessment of the root cause of poor water quality. An Implementation Plan (I-Plan) developed by local stakeholders to remediate pollution sources usually accompanies the TMDL (**Appendix C**).

For the purpose of the Upper San Marcos Site 4 project, a water body is impaired if it has been identified, pursuant to the latest TCEQ and EPA approved CWA 303(d) lists or the 2024 Texas Integrated Report for CWA Sections 305(b) and 303(d). Additionally, water bodies with concerns for non-attainment or exceeding screening levels are identified within the Integrated Report and can be useful to evaluate potential sources of impairments.

The TCEQ requires that the classified segment that first receives discharges from the Upper San Marcos Site 4 project limits, either directly or indirectly, be identified. This evaluation has determined stormwater discharges from the Upper San Marcos Site 4 project eventually reach the following classified segment: Upper San Marcos River (Segment 1814).

Segment 1814 is located east of the Upper San Marcos Site 4 project and receives stormwater discharges from the Upper San Marcos Site 4 project indirectly by way of Purgatory Creek. According to the 2024 305(b) list, Segment 1814 fully supports General Use, Recreation Use, Aquatic Life Use, and Domestic Water Supply Use (Texas Integrated Report - Assessment Results for Basin 18 - Guadalupe River, 2024). Segment 1814 is identified on the 2024 Texas 303(d) List of Impaired Waters for Total Dissolved Solids, however Segment 1814 is not subject to TMDL requirements at this time; therefore, the Purgatory Creek-San Marcos River watershed does not have a TMDL to which stormwater discharges contribute. Segment 1814 is subject to the Upper San Marcos River Watershed Protection Plan (WPP), however, the WPP does not have best management practices in place that will affect The Upper San Marcos Site 4 project.

#### *Section 402*

Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) Program, which is administered by the State of Texas through the TPDES. Section 402 requires a permit for sewer and stormwater discharges from developments, construction sites, or other areas of soil disturbance. As mentioned, while Segment 1814 is not subject to TMDLs, construction activities must maintain compliance with the Texas Stormwater General Permit for Construction Activities (TXR150000).

Segment 1814, as well as unclassified/unnamed water bodies that receive stormwater discharges are summarized in Table 2.

**Table 2 – Classified Segment Summary**

| Classified Water Body/Watershed            | Receiving Water Body Name             | Receives Stormwater Directly or Indirectly | 303(d) or 305(b) List | TMDL | Listed Water Quality Concerns |
|--------------------------------------------|---------------------------------------|--------------------------------------------|-----------------------|------|-------------------------------|
| Purgatory Creek-San Marcos River Watershed | Purgatory Creek                       | Directly                                   | None                  | No   | None                          |
|                                            | Upper San Marcos River (Segment 1814) | Indirectly                                 | 305(b)                | No   | None                          |

#### *Edwards Aquifer Contributing Zone*

The Upper San Marcos Site 4 project is located within the Edwards Aquifer Contributing Zone, and must meet all applicable requirements of, and operate according to, 30 TAC §213 (Edwards Aquifer Rule). The operator or operators at the Upper San Marcos Site 4 project must comply with the Edwards Aquifer Rule due to the anticipated construction activities that include “clearing, excavation, or other activities which alter or disturb the topographic or existing stormwater runoff characteristics of a site...” and “any other activities that pose a potential for contaminating stormwater runoff...”. A Contributing Zone Plan must be prepared and submitted for approval by TCEQ prior to commencement of regulated activities.

#### **Clean Air Act**

The Clean Air Act (CAA) regulates air emissions from stationary and mobile sources and authorizes the EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and public welfare and to regulate emissions of hazardous air pollutants. Non-attainment areas are areas considered to have air quality worse than the NAAQS defined in the Clean Air Act. The proposed LOI is currently not within a non-attainment area.

The proposed project is expected to result in only minor, short-term emissions of dust and other particulate matter from construction, and will not significantly increase the emission rate of any regulated air pollutant.

#### **FEMA Floodplains**

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) 48209C0369F and 48209C0370F, the proposed project site would be constructed within the floodplain of Purgatory Creek (**Figure 5**). As such, the local floodplain administrator should be contacted prior to construction for the proposed project to acquire floodplain-related authorizations, if needed.



### Threatened and Endangered Species

The proposed project LOI was surveyed for potential habitat of both federal and state listed threatened and endangered species. Table 3 lists federal and state listed species, which may be located in Hays County.

**Table 3. Federally Listed Species  
of Potential Occurrence in Hays County, Texas<sup>1</sup>**

| Common Name                  | Scientific Name <sup>2</sup>          | Federal Status <sup>2</sup> | State Status <sup>2</sup> | Effects Determination |
|------------------------------|---------------------------------------|-----------------------------|---------------------------|-----------------------|
| Tricolored Bat               | <i>Perimyotis subflavus</i>           | PE                          | -                         | May Effect            |
| Golden-cheeked Warbler       | <i>Setophaga chrysoparia</i>          | E                           | E                         | May Effect            |
| Interior Least Tern          | <i>Sternula antillarum athalassos</i> | -                           | E                         | No Effect             |
| Piping Plover                | <i>Charadrius melodus</i>             | T                           | T                         | No Effect             |
| Rufa Red Knot                | <i>Calidris canutus rufa</i>          | T                           | T                         | No Effect             |
| White-faced Ibis             | <i>Plegadis chihi</i>                 | -                           | T                         | No Effect             |
| Whooping Crane               | <i>Grus americana</i>                 | E                           | E                         | No Effect             |
| Wood Stork                   | <i>Mycteria americana</i>             | -                           | T                         | No Effect             |
| Cagle's Map Turtle           | <i>Graptemys caglei</i>               | -                           | T                         | No Effect             |
| Texas Horned Lizard          | <i>Phrynosoma cornutum</i>            | -                           | T                         | May Effect            |
| Austin Blind Salamander      | <i>Eurycea waterlooensis</i>          | E                           | E                         | No Effect             |
| San Marcos Salamander        | <i>Eurycea nana</i>                   | T                           | T                         | No Effect             |
| Barton Springs Salamander    | <i>Eurycea sosorum</i>                | E*                          | E                         | No Effect             |
| Blanco Blind Salamander      | <i>Eurycea robusta</i>                | -                           | T                         | No Effect             |
| Texas Blind Salamander       | <i>Eurycea rathbuni</i>               | E                           | E                         | No Effect             |
| Texas Salamander             | <i>Eurycea neotenes</i>               | -                           | T                         | No Effect             |
| Texas Troglitic Water Slater | <i>Lirceolus smithii</i>              | -                           | T                         | No Effect             |
| Fountain Darter              | <i>Etheostoma fonticola</i>           | E                           | E                         | No Effect             |
| Headwater Catfish            | <i>Ictalurus lupus</i>                | -                           | T                         | No Effect             |
| Guadalupe Darter             | <i>Percina apristis</i>               | -                           | T                         | No Effect             |
| Balcones Spike               | <i>Fusconaia iheringi</i>             | E*                          | E                         | No Effect             |
| False Spike                  | <i>Fusconaia mitchelli</i>            | E*                          | E                         | No Effect             |
| Guadalupe Fatmucket          | <i>Lampsilis bergmanni</i>            | E                           | T                         | No Effect             |
| Guadalupe Orb                | <i>Cyclonaias necki</i>               | E                           | E                         | No Effect             |
| Texas Fatmucket              | <i>Lampsilis bracteata</i>            | E*                          | T                         | No Effect             |
| Texas Fawnsfoot              | <i>Truncilla macrodon</i>             | T*                          | T                         | No Effect             |
| Texas Pimpleback             | <i>Cyclonaias petrina</i>             | E*                          | E                         | No Effect             |
| Comal Springs Dryopid Beetle | <i>Stygoparnus comalensis</i>         | E                           | E                         | No Effect             |
| Comal Springs Riffle Beetle  | <i>Heterelmis comalensis</i>          | E                           | E                         | No Effect             |
| Monarch Butterfly            | <i>Danaus plexippus</i>               | PT                          | -                         | May Effect            |

| Common Name          | Scientific Name <sup>2</sup> | Federal Status <sup>2</sup> | State Status <sup>2</sup> | Effects Determination |
|----------------------|------------------------------|-----------------------------|---------------------------|-----------------------|
| Peck's Cave Amphipod | <i>Stygobromus pecki</i>     | E                           | E                         | No Effect             |
| Texas Wild-rice      | <i>Zizania texana</i>        | E                           | E                         | No Effect             |

<sup>1</sup> According to TPWD (2025) and USFWS (2025).

<sup>2</sup> E = Endangered; T = Threatened; PE = Proposed Endangered; PT = Proposed Threatened; C = Candidate; E\* = Endangered based on RTEST but not present in IPaC Report; T\* = Threatened based on RTEST but not present in IPaC Report

### Federally Listed Species

According to the U.S. Fish and Wildlife Service's (USFWS) Information for Planning and Consultation (IPaC) resource list received on June 13, 2025 (**Appendix D**), the following species are listed as threatened, endangered, or candidate under the Endangered Species Act (ESA), and may occur in the project area located within Hays County, Texas:

The tricolored bat (*Perimyotis subflavus*) is a species proposed for federal listing as endangered in Hays County. Tricolored bats roost in deciduous hardwood forests, pine trees, eastern red cedar (*Juniperus virginiana*), Spanish moss (*Tillandsia usneoides*), and human structures such as barns, beneath porch roofs, bridges, and concrete bunkers during the spring, summer, and fall. They prefer mature deciduous hardwood forests which provide more structural diversity for roosting sites. Winter hibernacula in the southern U.S. frequently include road-associated culverts and other human structures; caves and tree cavities may also be used. While no individuals were identified during the pedestrian survey, preferred summer habitat for this species was identified within the project area (**Appendix A, Figure 6; Appendix B, Photo 8**). Therefore, alternatives which would impact trees within the proposed project area (Decommissioning, Alternative 1, and Alternative 2) may affect the tricolored bat.

The golden-cheeked warbler (*Setophaga chrysoparia*) is federally listed as endangered in Hays County. Golden cheeked warblers breed in oak (*Quercus* spp.) and Ashe juniper woodlands along hillslopes and require Ashe juniper bark to construct their nests. While no individuals were identified during the pedestrian survey, preferred breeding habitat for this species was identified within the LOI (**Appendix A, Figure 6; Appendix B, Photo 9**). Therefore, alternatives that would impact oak and Ashe juniper woodlands within the project area (Decommissioning, Alternative 1, and Alternative 2) may affect the golden-cheeked warbler.

The piping plover (*Charadrius melodus*) is federally listed as threatened in Hays County. In the interior U.S., piping plovers nest on the unvegetated shorelines of alkaline lakes, reservoirs, or river sandbars. Additionally, the piping plover is currently designated within the area as only needing impact considerations for wind energy projects. No shorelines/sandbars, which may serve as nesting habitat were identified within the proposed project area. Therefore, no alternatives may affect the piping plover.

The rufa red knot (*Calidris canutus rufa*) is federally listed as threatened in Hays County. In the interior U.S., rufa red knots use saline lakes, and possibly large wetlands and riverine sandbars as stopover habitat. Additionally, the rufa red knot is currently designated within the area as only needing impact considerations for wind energy



projects. No potential stopover habitats were identified within the proposed project area. Therefore, no alternatives may affect the rufo red knot.

The whooping crane (*Grus americana*) is federally listed as endangered in Hays County. Whooping cranes winter in Canada and breed on the Texas Gulf Coast, utilizing sparsely-vegetated, shallow wetlands and flooded fields in rolling terrain away from human activity during migration. No potential stopover habitats were identified within the proposed project area. Therefore, no alternatives may affect the whooping crane.

The Austin blind salamander (*Eurycea waterlooensis*) is federally listed as endangered in Hays County. Austin blind salamanders inhabit high quality waters maintained by groundwater sources from the Barton Springs Segment of the Edwards Aquifer, and are typically found in subterranean habitats within caves or underground areas. The project area is not one of the four Barton Springs outlets where the salamanders have been identified, and no caves exhibiting groundwater were identified within the project area. Therefore, no alternatives may affect the Austin blind salamander.

The San Marcos salamander (*Eurycea nana*) is federally listed as threatened in Hays County. San Marcos salamanders inhabit thermally stable, spring-fed streams with velocities around one centimeter per second, that contain cobble, gravel, and boulder substrates with coverage from *Amblystegium* moss and filamentous algae. The project area is not within or adjacent to the San Marcos Springs to which the salamander is endemic, and no streams that constitute habitat for the San Marcos salamander were identified in the project area. Therefore, no alternatives may affect the San Marcos salamander.

The Texas blind salamander (*Eurycea rathbuni*) is federally listed as endangered in Hays County. Texas blind salamanders inhabit water-filled subterranean caverns of the Edwards Aquifer in San Marcos, Texas. Additionally, the Texas blind salamander is currently designated within the area as only needing impact considerations for projects which would adversely affect the water quality and quantity of the Edwards Aquifer and surface waters, which contribute to the Edwards Aquifer. No caves which constitute habitat for the salamander were identified within the project area. Streams within the project area may contribute to recharge of the Edwards Aquifer, however the proposed project, which only temporarily impounds flows of the stream during flood events, would not adversely affect the water quality or quantity of these surface waters. Therefore, no alternatives may affect the Texas blind salamander.

The Fountain Darter (*Etheostima fonticola*) is federally listed as endangered in Hays County. Fountain Darters inhabit clean, undisturbed stream bottoms with constant temperatures, adequate flows, and a mix of submergent plants such as algae, mosses, and vascular plants. No streams that constitute habitat for the Fountain Darter were identified in the project area. Therefore, no alternatives may affect the Fountain Darter.

The Guadalupe Fatmucket (*Lampsilis bergmanni*) is federally listed as endangered in Hays County. Guadalupe Fatmucket inhabit small, flowing streams and rivers with mud, sand, and gravel substrates. No streams that

constitute habitat for the Guadalupe Fatmucket were identified in the project area. Therefore, no alternatives may affect the Guadalupe Fatmucket.

The Guadalupe Orb (*Cyclonaias necki*) is federally listed as endangered in Hays County. Guadalupe Orbs inhabit riffles and runs of moderately sized rivers to depths of 3.3 feet with mud, silt, gravel, or cobble substrates. No streams that constitute habitat for the Guadalupe Orb were identified in the project area. Therefore, no alternatives may affect the Guadalupe Orb.

The Comal Springs dryopid beetle (*Stygoparnus comalensis*) is federally listed as endangered in Hays County. Comal Springs Dryopid Beetles inhabit both gravel and cobble dominated surface waters with aquatic vegetation and subterranean spaces associated with springs issuing from the Edwards Aquifer. The project area is not within or adjacent to the Comal or Fern Bank Springs where the beetle has been identified, and no streams or caves that constitute habitat for the beetle were identified in the project area. Therefore, no alternatives may affect the Comal Springs dryopid beetle.

The Comal Springs riffle beetle (*Heterelmis comalensis*) is federally listed as endangered in Hays County. Comal Springs Riffle Beetles inhabit gravel dominated riffles associated with springs issuing from the Edwards Aquifer. The project area is not within or adjacent to the Comal or San Marcos Springs where the beetle has been identified, and no streams that constitute habitat for the beetle were identified in the project area. Therefore, no alternatives may affect the Comal Springs riffle beetle.

The monarch butterfly (*Danaus plexippus*) is a species proposed for federal listing as threatened in Hays County. Monarch butterflies undergo long-distance migrations throughout North America and lay their eggs on obligate milkweed host plants in a variety of forested and grassland habitats. Native grasslands which could support milkweed are located within the project area. Therefore, alternatives that would impact native grasslands within the project area (Decommissioning, Alternative 1, and Alternative 2) may affect the monarch butterfly.

The Peck's cave amphipod (*Stygobromus pecki*) is federally listed as endangered in Hays County. Peck's cave amphipod inhabits water-filled subterranean caverns and springs of the Edwards Aquifer in San Marcos, Texas. The project area is not within or adjacent to San Marcos Springs where the amphipod has been identified, and no streams that constitute habitat for the amphipod were identified in the project area. Therefore, no alternatives may affect the Peck's cave amphipod.

Texas wild-rice (*Zizania texana*) is federally listed as endangered in Hays County. Texas wild-rice is a submergent aquatic perennial grass that stands at depths up to 3.3 feet and requires clear, thermally constant, flowing water. Texas wild-rice is only found in the San Marcos River and prefers spring-fed gravel and sand substrates overlying clay. The project area is not within or adjacent to the San Marcos River, and no streams that constitute habitat for Texas wild-rice were identified in the project area. Therefore, no alternatives may affect Texas wild-rice.



### *State Listed Species*

The Texas Parks and Wildlife Department's (TPWD) List of Rare, Threatened, and Endangered Species of Texas (RTEST) by County designated species that are federally and state listed as threatened and endangered, as well as rare species which are not listed as threatened or endangered (**Appendix D**). The following abbreviated list includes state listed threatened or endangered species included in the RTEST that may occur within Hays County, Texas:

The interior least tern (*Sternula antillarum athalassos*) is state listed as endangered within Hays County. Interior least terns nest and stop over along sand and gravel bars within large, braided streams and man-made structures, such as inland beaches, wastewater treatment plants, and gravel mines in the interior U. S. No potential stopover or nesting habitats were identified within the proposed project area. Therefore, no alternatives may affect the interior least tern.

The white-faced ibis (*Plegadis chihi*) is state listed as threatened within Hays County. White-faced ibis winter in the northern Great Plains and breed on the Texas Gulf Coast, utilizing freshwater marshes, sloughs, and irrigated rice fields, as well as brackish and saltwater habitats, as stop-over habitat during migration. No potential stopover habitats were identified within the proposed project area. Therefore, no alternatives may affect the white-faced ibis.

The wood stork (*Mycteria americana*) is state listed as threatened within Hays County. Wood storks forage in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water in Texas during the non-breeding season, roosting in tall snags and sometime in heronries with other wading birds. No roosting or foraging habitats for the wood stork were identified in the project area. Therefore, no alternatives may affect the wood stork.

The Cagle's map turtle (*Graptemys caglei*) is state listed as threatened within Hays County. Cagle's map turtles inhabit swift to moderately flowing streams with gravel or cobble substrates connected by silt or mud bottomed pools, and nest on gently sloping sand banks. No streams that constitute habitat for the turtle were identified within the project area. Therefore, no alternatives may affect the Cagle's map turtle.

The Texas horned lizard (*Phrynosoma cornutum*) is state listed as threatened within Hays County. Texas horned lizards use open, sandy to rocky habitats with sparse vegetation, including grassland, prairie, cactus, scattered brush, or scrubby trees. While no individuals were identified during the pedestrian survey, preferred habitat for this species was identified contiguously across the proposed project area. Therefore, alternatives that would impact brush, trees, or grasslands within the project area (Decommissioning, Alternative 1, and Alternative 2) may affect the Texas horned lizard.

The Texas salamander (*Eurycea neotenes*) is state listed as threatened within Hays County. Texas salamanders inhabit streams maintained by groundwater sources from the Edwards Aquifer, and can be found in both surface

and subterranean habitats within caves or underground areas. No streams or caves that constitute habitat for the Texas salamander were identified in the project area. Therefore, no alternatives may affect the Texas salamander.

The Barton Springs salamander (*Eurycea sosorum*) is state and federally listed as endangered in Hays County, but was not listed in the USFWS IPAC for the project area. Barton Springs salamanders inhabit streams maintained by groundwater sources from the Barton Springs Segment of the Edwards Aquifer, and can be found in both surface and subterranean habitats within caves or underground areas. The project area is not one of the four Barton Springs outlets where the salamanders have been identified, and no surface waters or caves exhibiting groundwater were identified within the project area. Therefore, no alternatives may affect the Barton Springs salamander.

The Blanco blind salamander (*Eurycea robusta*) is state listed as threatened in Hays County. The Blanco blind salamander is thought to inhabit water-filled subterranean caverns of the Edwards Aquifer near the Blanco River in San Marcos, Texas. Blanco blind salamanders were identified in 1951, and no other individuals have been identified since. No streams or caves that constitute habitat for the Blanco blind salamander were identified in the project area. Therefore, no alternatives may affect the Blanco blind salamander.

The Texas troglobitic water slater (*Lirceolus smithii*) is state listed as threatened in Hays County. The Texas troglobitic water slater is an obligate inhabitant of subterranean caves with groundwater sources from the Edwards Aquifer. No caves that constitute habitat for the Texas troglobitic water slater were identified in the project area. Therefore, no alternatives may affect the Texas troglobitic water slater.

The Guadalupe Darter (*Percina apristis*) is state listed as threatened in Hays County. The Guadalupe Darter inhabits stream riffles with moderately turbid water and boulder substrate. No streams that constitute habitat for the Guadalupe Darter were identified in the project area. Therefore, no alternatives may affect the Guadalupe Darter.

The Headwater Catfish (*Ictalurus lupus*) is state listed as threatened in Hays County. Headwater Catfish inhabit riffles, runs, and pools of sandy to rocky creeks, rivers, and associated springs. No streams that constitute habitat for the Headwater Catfish were identified in the project area. Therefore, no alternatives may affect the Headwater Catfish.

The Balcones Spike (*Fusconaia iheringi*) is state and federally listed as endangered in Hays County, but was not listed in the USFWS IPAC for the project area. Balcones Spike inhabit flowing streams and rivers with sand, gravel, and cobble substrate riffles and runs. No streams that constitute habitat for the Balcones Spike were identified in the project area. Therefore, no alternatives may affect the Balcones Spike.

The False Spike (*Fusconaia mitchelli*) is state and federally listed as endangered in Hays County, but was not listed in the USFWS IPAC for the project area. False Spike inhabit flowing streams and rivers with sand, gravel, and cobble substrate riffles and runs. No streams that constitute habitat for the False Spike were identified in the project area. Therefore, no alternatives may affect the False Spike.



The Texas Fatmucket (*Lampsilis bracteata*) is state listed as threatened and federally listing as endangered in Hays County, but was not listed in the USFWS IPAC for the project area. Texas Fatmucket inhabits flowing streams and rivers with mud, sand, and gravel substrates. No streams that constitute habitat for the Texas Fatmucket were identified in the project area. Therefore, no alternatives may affect the Texas fatmucket.

The Texas Fawnsfoot (*Truncilla macrodon*) is state and federally listing as threatened in Hays County, but was not listed in the USFWS IPAC for the project area. Texas Fawnsfoot inhabit flowing medium to large streams and rivers with mud, sand, and gravel substrates. No streams that constitute habitat for the Texas Fawnsfoot were identified in the project area. Therefore, no alternatives may affect the Texas fawnsfoot.

The Texas Pimpleback (*Cyclonaias petrina*) is state and federally listing as endangered in Hays County, but was not listed in the USFWS IPAC for the project area. Texas Pimpleback inhabit flowing medium to large streams and rivers with riffle and run habitats of gravel and bedrock substrates. No streams that constitute habitat for the Texas Pimpleback were identified in the project area. Therefore, no alternatives may affect the Texas Pimpleback.

#### **Migratory Birds and Bald and Golden Eagle Protection**

The Migratory Bird Treaty Act (MBTA) of 1918 prohibits the “take” (e.g., pursue, hunt, shoot, wound, kill, trap, capture, or collect) or possession of migratory birds, as well as the parts, nest, or eggs of migratory birds. The following migratory birds were observed during the site visit: black vulture (*Coragyps atatus*), blue-gray gnatcatcher (*Polioptila caerulea*), canyon wren (*Catherpes mexicanus*), downy woodpecker (*Picoides pubescens*), northern cardinal (*Cardinalis cardinalis*), red-shouldered hawk (*Buteo lineatus*), tufted titmouse (*Baeolophus bicolor*), turkey vulture (*Cathartes aura*), white-eyed vireo (*Vireo griseus*), white-wing dove (*Zenaida asiatica*), and yellow warbler (*Setophaga petechia*).

No migratory bird nests were observed during the survey, but migratory birds are likely to nest within the project area or the immediate vicinity. According to US Department of the Interior Memorandums 37050 and 37085, “incidental take”, which includes the take or kill of migratory birds that results from, but is not the purpose of an activity, is not included as “take” under the MBTA. However, according to Chapter 64 of the Texas Parks and Wildlife Code, no person may destroy or take the nest, eggs, or young of birds within the State of Texas. Two common avoidance practices to reduce the potential for the “incidental take” of migratory birds are (1) clearing or grading of the site during the non-breeding season, or (2) conducting migratory bird nest surveys shortly before project construction.

Coordination with the USFWS would be required by the Bald and Golden Eagle Protection Act of 1940 if proposed project activities would “take” or disturb a protected eagle or their nest. It is generally not considered disturbance if construction activities occur greater than 660 feet from a protected nest. Bald and golden eagles or their nests were not observed during the pedestrian survey and are unlikely to use the LOI due to the absence of permanent water features nearby.

### Amphibian and Reptile Community

No amphibians were observed during the site visit. Amphibians found in Hays County include: American bullfrog (*Lithobates catesbeianus*), barking frog (*Eleutherodactylus augusti*), Blanchard's cricket frog (*Acris blanchardi*), cliff chirping frog (*Eleutherodactylus marnockii*), Cope's gray treefrog (*Hyla chrysoscelis*), couch's spadefoot toad (*Scaphiopus couchii*), gray treefrog (*Hyla versicolor*), green treefrog (*Hyla cinerea*), green toad (*Bufo debilis*), Gulf Coast toad (*Bufo nebulifer*), fern bank salamander (*Eurycea pterophila*), Rio Grande leopard frog (*Lithobates berlandieri*), small-mouthed salamander (*Ambystoma texanum*), southern leopard frog (*Lithobates sphenoccephala*), spotted chorus frog (*Pseudacris clarkii*), Strecker's chorus frog (*Pseudacris streckeri*), Texas salamander (*Eurycea neotenes*), Texas toad (*Bufo speciosus*), western narrow-mouthed toad (*Gastrophryne olivacea*), Woodhouse's toad (*Anaxyrus woodhousii*), and western slimy salamander (*Plethodon albagula*).

The Texas spiny lizard (*Sceloporus olivaceus*) was the only reptile observed during the site visit. Other reptiles found in Hays County include: black-necked gartersnake (*Thamnophis cyrtopsis*), checkered gartersnake (*Thamnophis marcianus*), coachwhip (*Masticophis flagellum*), common box turtle (*Terrapene carolina*), common kingsnake (*Lampropeltis getula*), common snapping turtle (*Chelydra serpentina*), common spotted whiptail (*Cnemidophorus gularis*), copperhead (*Agkistrodon contortrix*), cottonmouth (*Agkistrodon piscivorus*), Dekay's brownsnake (*Storeria dekayi*), diamondback watersnake (*Nerodia rhombifer*), eastern collared lizard (*Crotaphytus collaris*), eastern hog-nosed snake (*Heterodon platirhinos*), eastern mud turtle (*Kinosternon subrubrum*), eastern musk turtle (*Sternotherus odoratus*), eastern racer (*Coluber constrictor*), flat-headed snake (*Tantilla gracilis*), four-lined skink (*Eumeces tetragrammus*), glossy snake (*Arizona elegans*), gophersnake (*Pituophis catenifer*), greater earless lizard (*Cophosaurus texanus*), Great Plains ratsnake (*Elaphe emoryi*), green anole (*Anolis carolinensis*), lined snake (*Tropidoclonion lineatum*), little brown skink (*Scincella lateralis*), long-nosed snake (*Rhinocheilus lecontei*), milksnake (*Lampropeltis triangulum*), ornate box turtle (*Terrapene ornate*), plain-bellied watersnake (*Nerodia erythrogaster*), pond slider (*Trachemys scripta*), prairie kingsnake (*Lampropeltis calligaster*), prairie lizard (*Sceloporus consobrinus*), ring-necked snake (*Diadophis punctatus*), rough earthsnake (*Virginia striatulata*), rough greensnake (*Opheodrys aestivus*), six-lined racerunner (*Aspidoscelis sexlineatus*), slender glass lizard (*Ophisaurus attenuates*), spiny softshell (*Apalone spinifera*), spot-tailed earless lizard (*Holbrookia lacerate*), Texas alligator lizard (*Gerrhonotus infernalis*), Texas cooter (*Pseudemys texana*), Texas coralsnake (*Micrurus tener*), Texas map turtle (*Graptemys versa*), Texas ratsnake (*Elaphe obsoleta*), Texas threadsnake (*Leptotyphlops dulcis*), western diamondback rattlesnake (*Crotalus atrox*), western groundsnake (*Sonora semiannulata*), western ribbonsnake (*Thamnophis Proximus*), and yellow mud turtle (*Kinosternon flavescens*).

### Terrestrial Vertebrate Community

White-tailed deer (*Odocoileus virginianus*) and wild hogs (*Sus scrofa*) were the only terrestrial vertebrates observed during the site visit. Other terrestrial vertebrates found in Hays County include: American badger (*Taxidea taxus*), American beaver (*Castor canadensis*), American mink (*Mustela vison*), black-tailed jackrabbit (*Lepus californicus*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), deer mouse (*Peromyscus maniculatus*), eastern cottontail (*Sylvilagus floridanus*), eastern fox squirrel (*Sciurus niger*), eastern gray squirrel (*Sciurus carolinensis*), eastern mole (*Scalopus aquaticus*), eastern woodrat (*Neotoma floridana*), eastern spotted skunk (*Spilogale putorius*), fulvous harvest mouse (*Reithrodontomys fulvescens*), gray fox (*Urocyon cinereoargenteus*), hispid



cotton rat (*Sigmodon hispidus*), hispid pocket mouse (*Chaetodipus hispidus*), hog-nosed skunk (*Conepatus leuconotus*), long-tailed weasel (*Mustela frenata*), least shrew (*Cryptotis parva*), Mexican ground squirrel (*Spermophilus mexicanus*), mountain lion (*Puma concolor*), nine-banded armadillo (*Dasypus novemcinctus*), northern pygmy mouse (*Baiomys taylori*), nutria (*Myocastor coypus*), raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), ringtail (*Bassariscus astutus*), rock squirrel (*Spermophilus variegatus*), southern plains woodrat (*Neotoma micropus*), striped skunk (*Mephitis mephitis*), swamp rabbit (*Sylvilagus aquaticus*), Texas mouse (*Peromyscus attwateri*), white-ankled mouse (*Peromyscus pectoralis*), white-footed mouse (*Peromyscus leucopus*), and Virginia opossum (*Didelphis virginiana*).

### Fish Habitat

No fish species were observed during the site visit. Fish found within Hays County include: Bigscale Logperch (*Percina maculata*), Black Bullhead (*Ameiurus melas*), Black Crappie (*Pomoxis nigromaculatus*), Blackstripe Topminnow (*Fundulus notatus*), Blacktail Shiner (*Cyprinella venusta*), Blue Catfish (*Ictalurus furcatus*), Bluegill (*Lepomis macrochirus*), Bullhead Minnow (*Pimephales vigilax*), Burrhead Chub (*Macrhybopsis marconis*), Central Stoneroller (*Camptostoma anomalum*), Channel Catfish (*Ictalurus punctatus*), Common Carp (*Cyprinus carpio*), Dusky Darter (*Percina sciera*), Fathead Minnow (*Pimephales promelas*), Flathead Catfish (*Pylodictis olivaris*), Freshwater Drum (*Aplodinotus grunniens*), Gizzard Shad (*Dorosoma cepedianum*), Golden Shiner (*Notemigonus crysoleucas*), Grass Carp (*Ctenopharyngodon idella*), Green Sunfish (*Lepomis cyanellus*), Gray Redhorse (*Moxostoma congestum*), Guadalupe Bass (*Micropterus treculii*), Guadalupe Roundnose Minnow (*Dionda nigrotaeniata*), Largemouth Bass (*Micropterus salmoides*), Largespring Gambusia (*Gambusia geiseri*), Longear Sunfish (*Lepomis megalotis*), Longnose Gar (*Lepisosteus osseus*), Mexican Tetra (*Astyanax mexicanus*), Mimic Shiner (*Notropis volucellus*), Orangethroat Darter (*Etheostoma spectabile*), Red Shiner (*Cyprinella lutrensis*), Redbreast Sunfish (*Lepomis auritus*), Redear Sunfish (*Lepomis microlophus*), Redspotted Sunfish (*Lepomis miniatus*), Rio Grande Cichlid (*Herichthys cyanoguttatus*), River Carpsucker (*Carpionodes carpio*), Smallmouth Buffalo (*Ictiobus bubalus*), Spotted Gar (*Lepisosteus oculatus*), Tadpole Madtom (*Noturus gyrinus*), Texas Logperch (*Percina carbonaria*), Texas Shiner (*Notropis amabilis*), Warmouth (*Lepomis gulosus*), Western Mosquitofish (*Gambusia affinis*), White Bass (*Morone chrysops*), White Crappie (*Pomoxis annularis*), and Yellow Bullhead (*Ameiurus natalis*). The proposed project area is inland and not located in or adjacent to areas designated as Essential Fish Habitat.

### Invasive Species

Wild hogs (*Sus scrofa*) were the only invasive animal identified in the LOI. No evidence of invasive plants, fungi, or microbial organisms were observed during the site visit. If excavated fill from the project area is not removed, but is used on-site for project related earthwork, construction of the proposed project would not contribute to the spread of vegetative invasive species within the project area.

### Riparian Areas

Riparian areas adjacent to Stream 1 are located within the project LOI. These areas contribute to floodplain function, streambank stability and integrity, nutrient cycling, pollutant filtering, sediment retention, and biological diversity of these habitats. NRCS policy requires project alternatives to maintain or improve water quality benefits

of riparian areas as a result of project construction. If preferred alternatives do not maintain or improve water quality benefits, the NRCS must discontinue assistance on those portions of the plan impacting riparian areas.

### **Natural Areas**

No recorded designations of Federal, non-federal, or private natural areas were observed within the limits of the LOI.

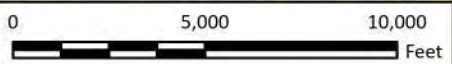
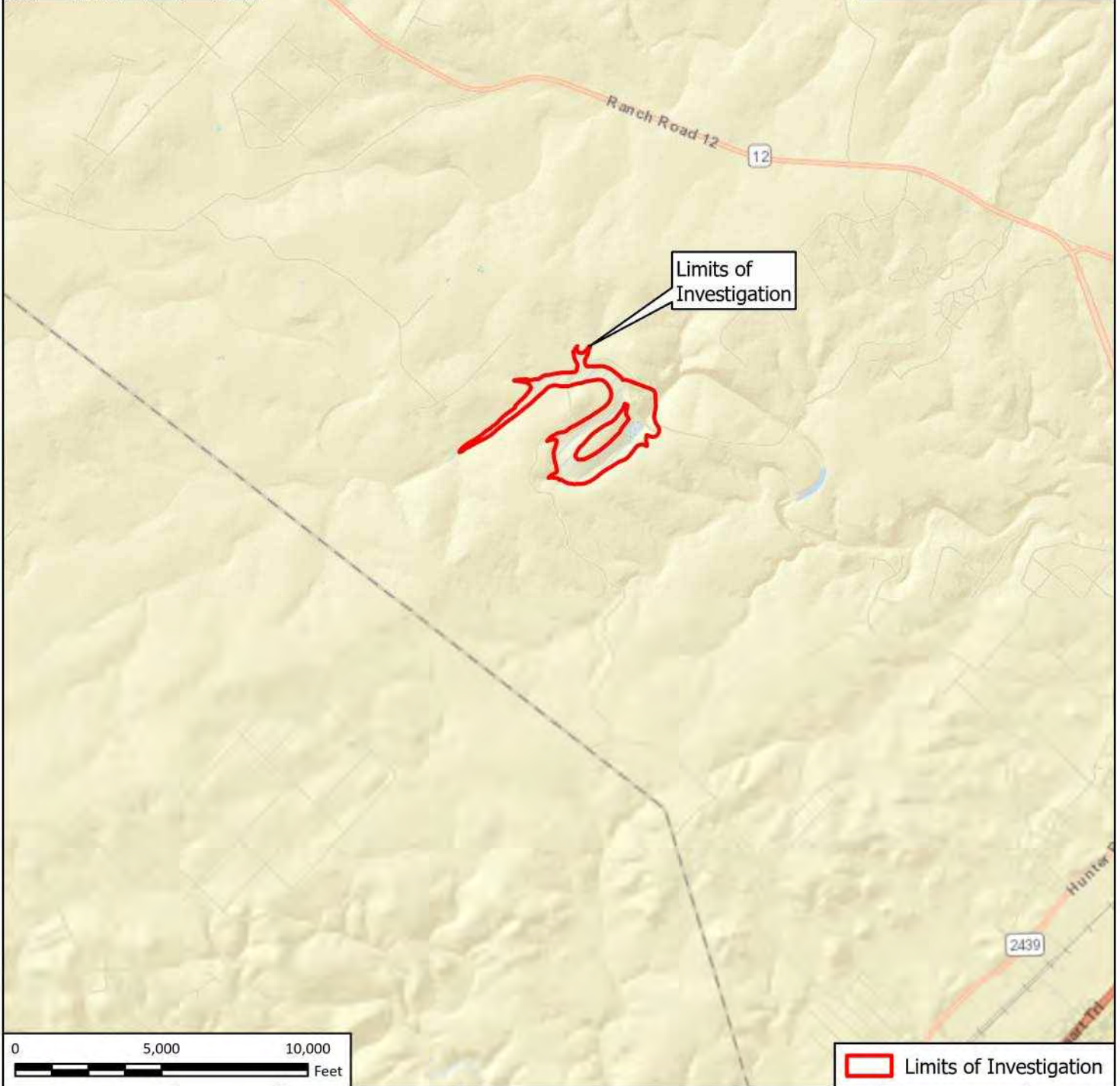
### **References**

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## **Appendix A**

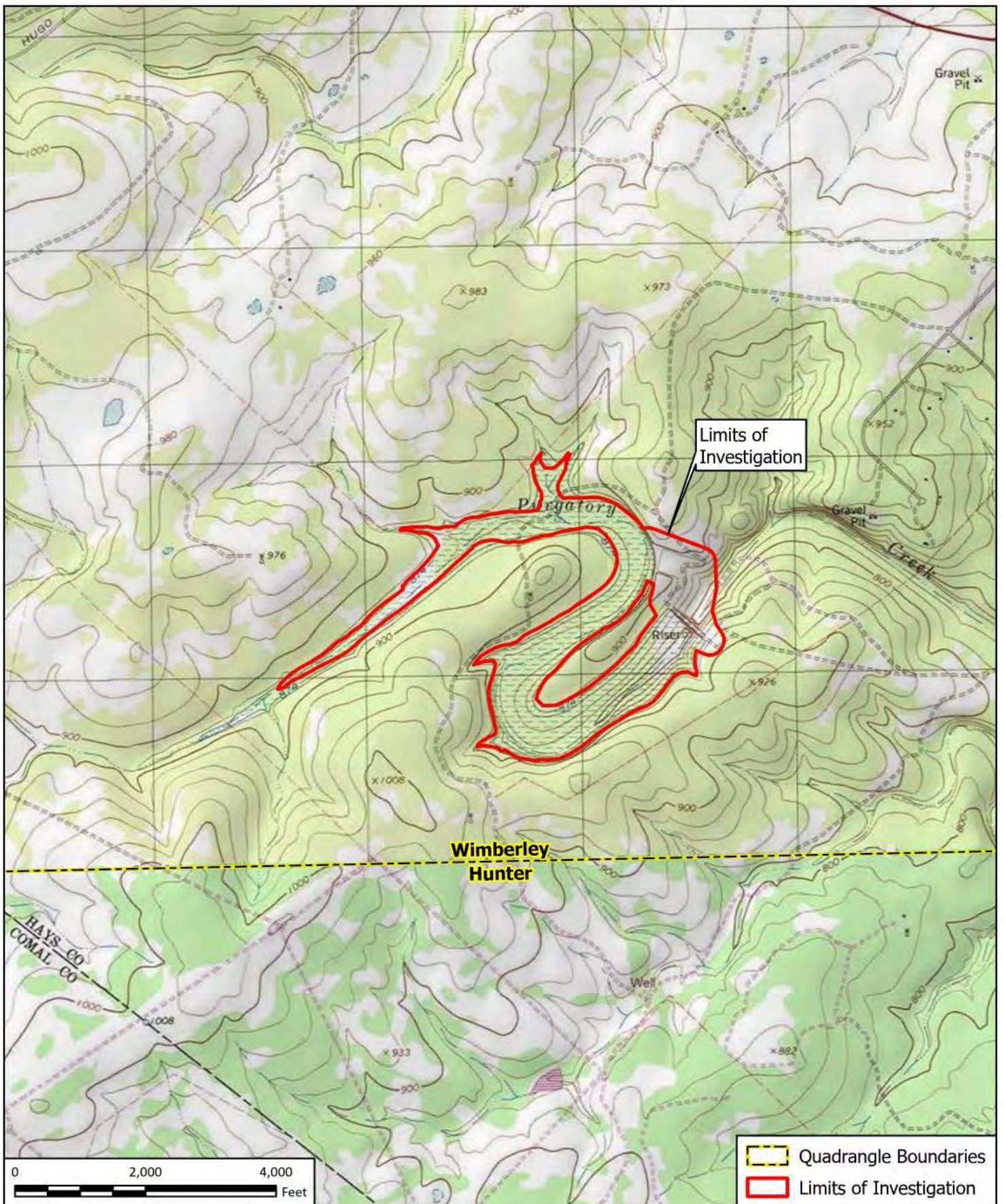
### **Figures**



Limits of Investigation

|                                                                                                                                                                                        |  |                                                                      |  |                               |                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------|--|-------------------------------|------------------------------------------------------------------------------------------------------|
| <p><b>FREES AND NICHOLS</b><br/>         FREES AND NICHOLS, INC<br/>         801 Cherry Street, Suite 2800<br/>         Fort Worth, TX 76102<br/>         Phone - (817) 735 - 7300</p> |  | AD ASTRA COLLABORATIVE                                               |  | FN JOB NO<br>AAC23422         | <div style="font-size: 2em; font-weight: bold;">1</div> <div style="font-weight: bold;">FIGURE</div> |
|                                                                                                                                                                                        |  | SWP EA - Upper San Marcos Site 4                                     |  | FILE NAME<br>ES_Memo_USM4.mxd |                                                                                                      |
|                                                                                                                                                                                        |  | <div style="font-size: 1.5em; font-weight: bold;">Overview Map</div> |  | DATE<br>10/25/2023            |                                                                                                      |
|                                                                                                                                                                                        |  |                                                                      |  | DESIGNED<br>MK                |                                                                                                      |
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 801 Cherry Street, Suite 2800  
 Fort Worth, TX 76102  
 Phone - (817) 735 - 7300



AD ASTRA COLLABORATIVE

**SWP EA - Upper San Marcos Site 4**

**USGS Topographic Map**

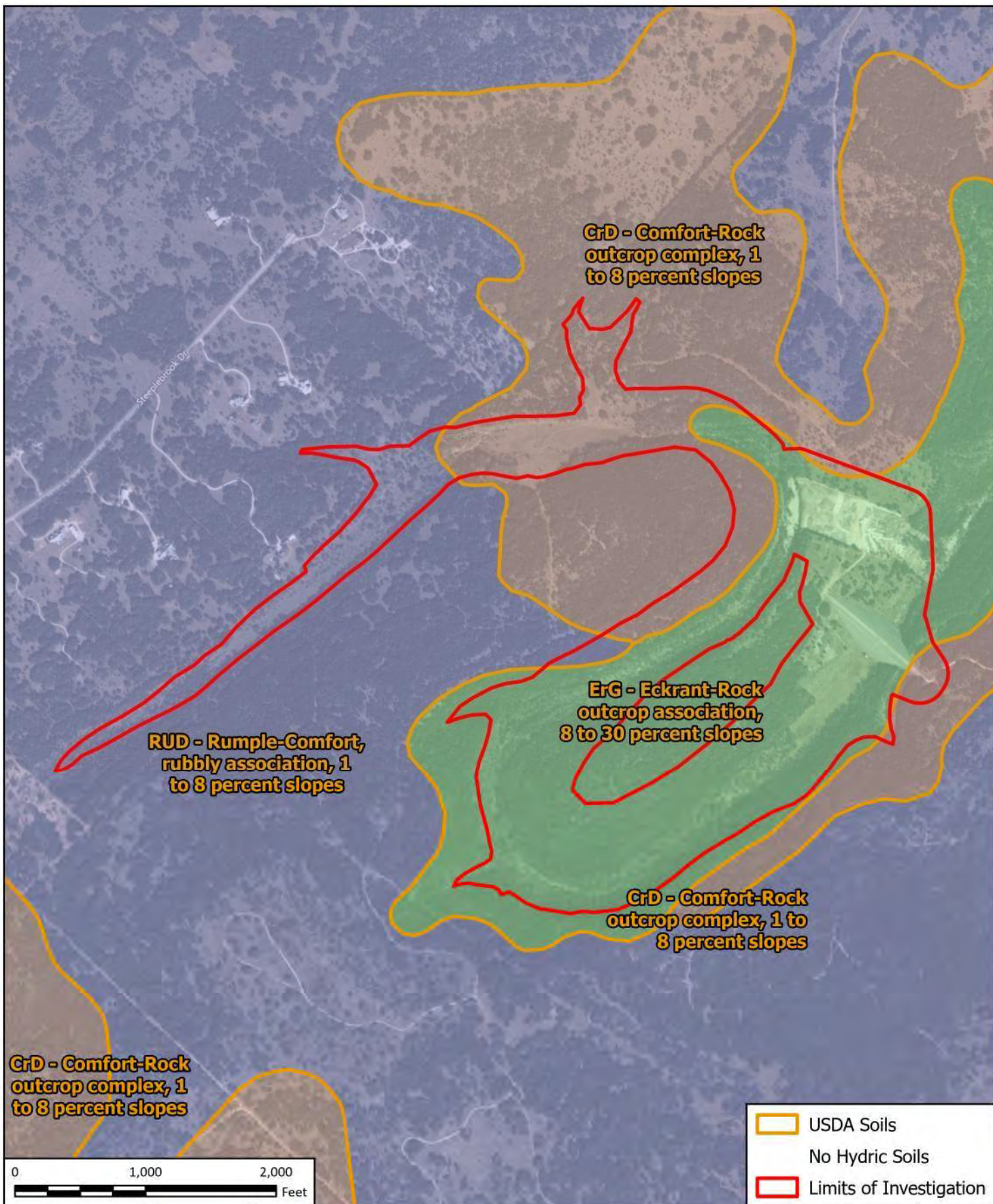
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| FN JOB NO | AAC23422         |
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**2**

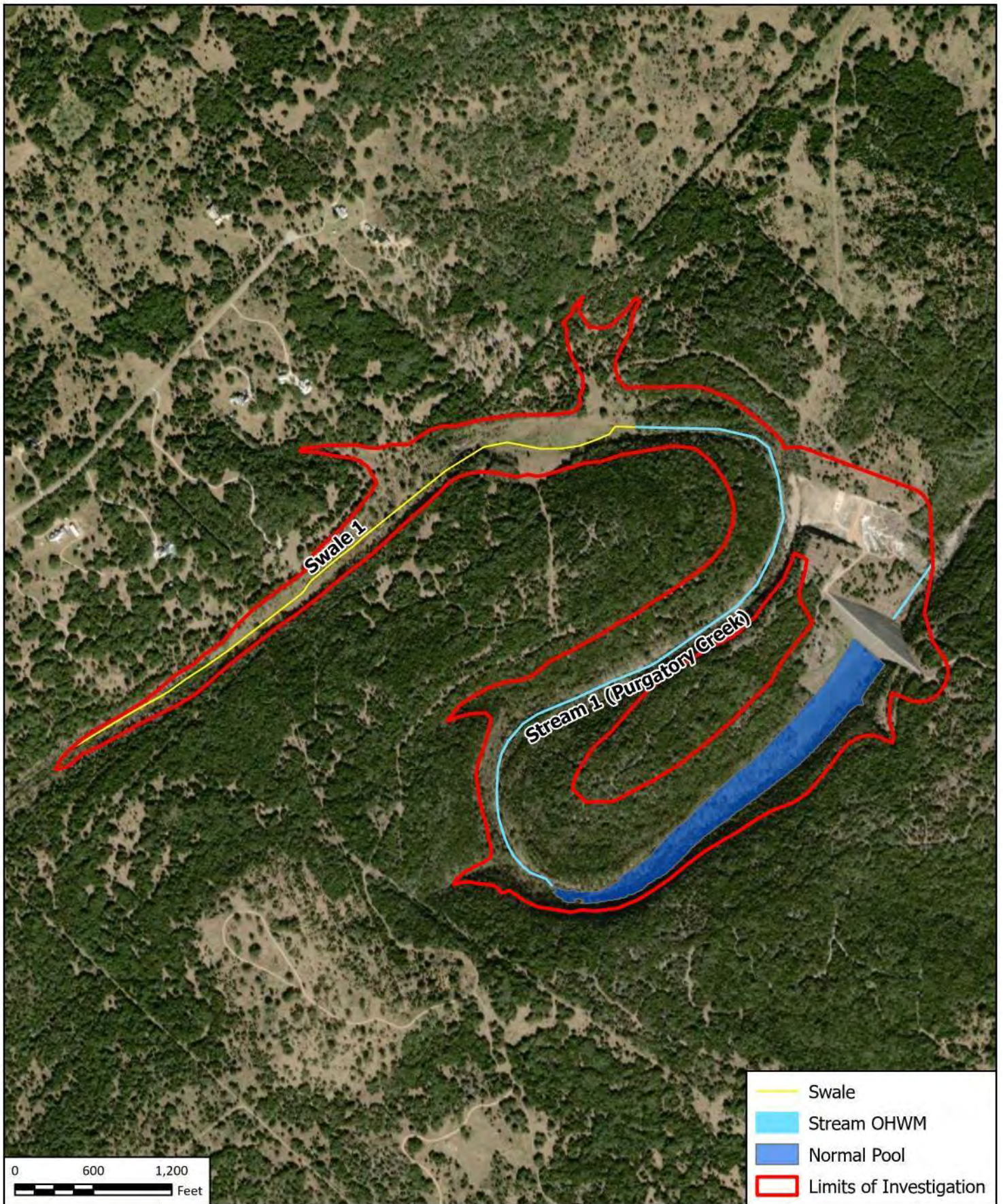
**FIGURE**





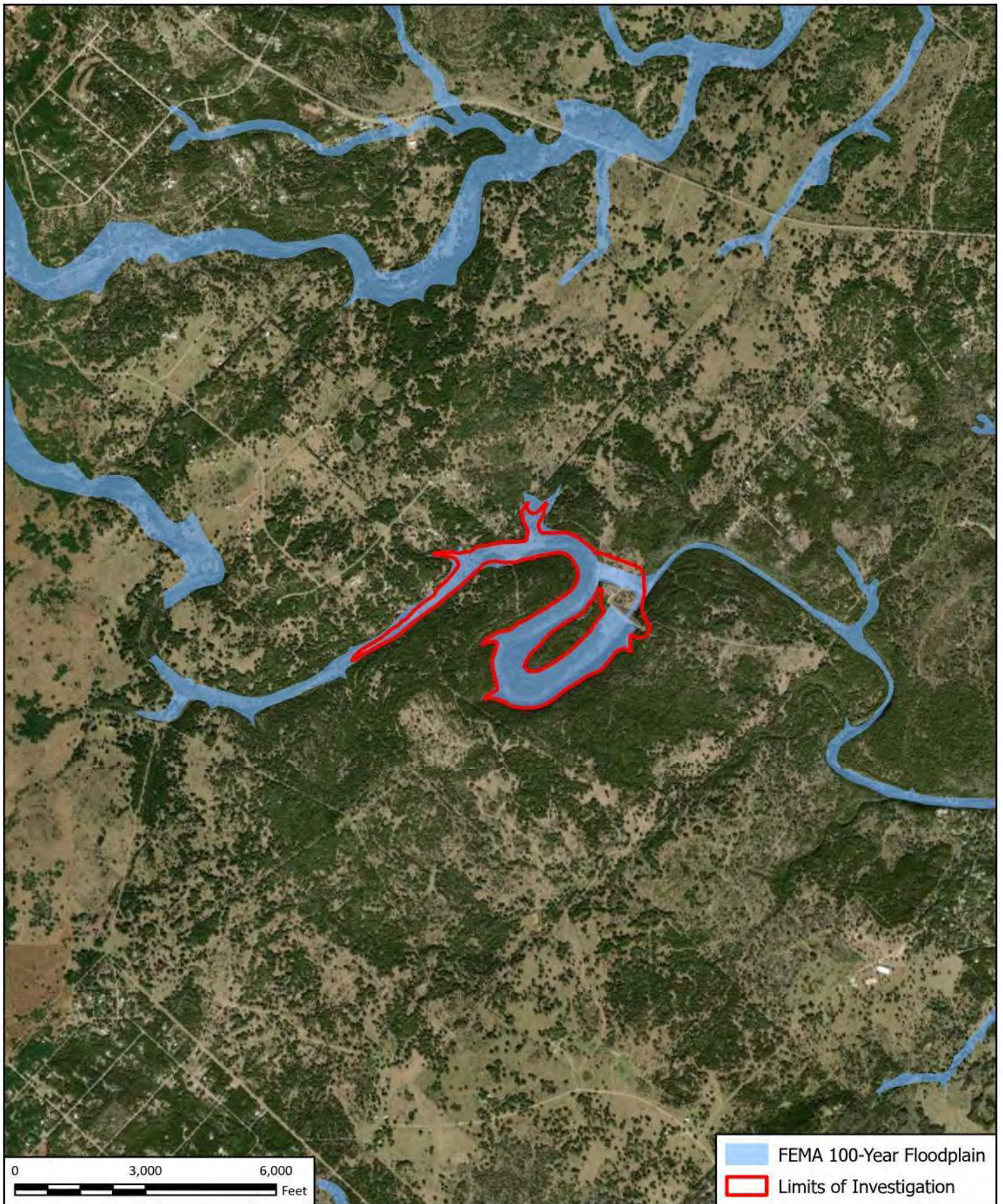
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| <br><b>FREES AND NICHOLS</b><br>FREES AND NICHOLS, INC.<br>801 Cherry Street, Suite 2800<br>Fort Worth, TX 76102<br>Phone - (817) 735 - 7300 |  | AD ASTRA COLLABORATIVE                  |  | FN JOB NO<br>AAC23422         | <b>3</b><br><br><b>FIGURE</b> |
|                                                                                                                                              |  | <b>SWP EA - Upper San Marcos Site 4</b> |  | FILE NAME<br>ES_Memo_USM4.mxd |                               |
|                                                                                                                                              |  | <b>USDA Soils Map</b>                   |  | DATE<br>10/25/2023            |                               |
|                                                                                                                                              |  |                                         |  | DESIGNED<br>MK                |                               |
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| <br><b>FREASE AND NICHOLS, INC.</b><br>801 Cherry Street, Suite 2800<br>Fort Worth, TX 76102<br>Phone - (817) 735 - 7300 |  | AD ASTRA COLLABORATIVE<br><b>SWP EA - Upper San Marcos Site 4</b>       |  | FN JOB NO<br>AAC23422         | <div style="font-size: 2em; font-weight: bold;">4</div><br><br><b>FIGURE</b> |
|                                                                                                                                                                                                            |                                                                                     | <div style="font-size: 1.5em; font-weight: bold;">Waterbodies Map</div> |  | FILE NAME<br>ES_Memo_USM4.mxd |                                                                              |
|                                                                                                                                                                                                            |                                                                                     |                                                                         |  | DATE<br>10/25/2023            |                                                                              |
|                                                                                                                                                                                                            |                                                                                     |                                                                         |  | DESIGNED<br>MK                |                                                                              |
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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------|--------------------------------------|
|  <p><b>FREESE AND NICHOLS, INC.</b><br/>801 Cherry Street, Suite 2800<br/>Fort Worth, TX 76102<br/>Phone - (817) 735 - 7300</p> |  | <p>AD ASTRA COLLABORATIVE</p> <p><b>SWP EA - Upper San Marcos Site 4</b></p> <p><b>FEMA 100-Yr. Floodplain Map</b></p> |  | <p>FN JOB NO</p> <p>AAC23422</p>         | <p><b>5</b></p> <p><b>FIGURE</b></p> |
|                                                                                                                                                                                                                   |                                                                                     |                                                                                                                        |  | <p>FILE NAME</p> <p>ES_Memo_USM4.mxd</p> |                                      |
|                                                                                                                                                                                                                   |                                                                                     |                                                                                                                        |  | <p>DATE</p> <p>10/25/2023</p>            |                                      |
|                                                                                                                                                                                                                   |                                                                                     |                                                                                                                        |  | <p>DESIGNED</p> <p>MK</p>                |                                      |
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AD ASTRA COLLABORATIVE

**SWP EA - Upper San Marcos Site 4**

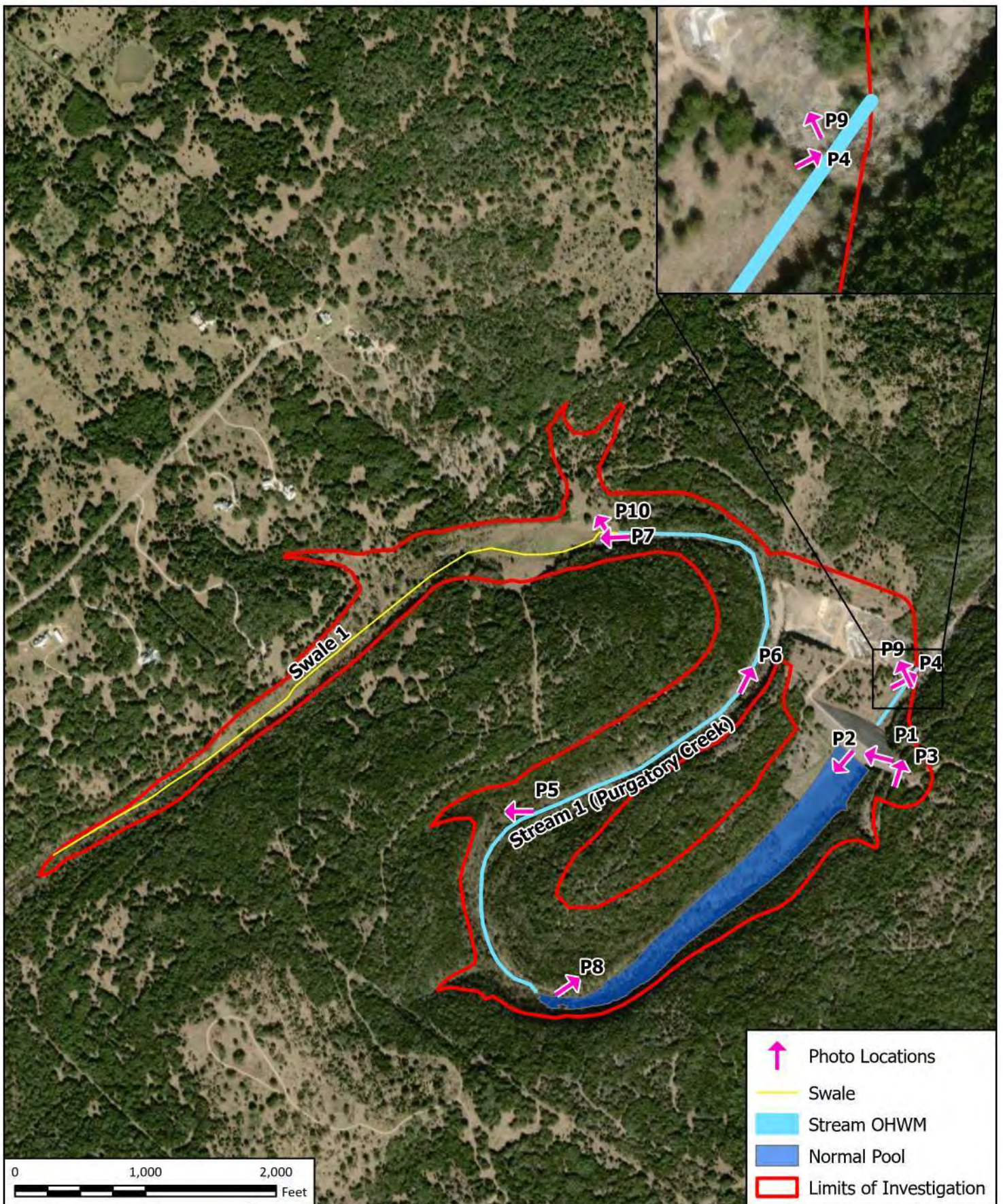
**Endangered Species Map**

|           |                  |
|-----------|------------------|
| FN JOB NO | AAC23422         |
| FILE NAME | ES_Memo_USM4.mxd |
| DATE      | 10/25/2023       |
| DESIGNED  | MK               |
| DRAFTED   | MK               |

**6**

**FIGURE**





|                                                                                                                                                                                                                  |                                                                                     |                                  |  |           |                  |                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------|--|-----------|------------------|--------------------------------|
|  <p><b>FREASE AND NICHOLS, INC</b><br/>801 Cherry Street, Suite 2800<br/>Fort Worth, TX 76102<br/>Phone - (817) 735 - 7300</p> |  | AD ASTRA COLLABORATIVE           |  | FN JOB NO | AAC23422         | <div>7</div> <div>FIGURE</div> |
|                                                                                                                                                                                                                  |                                                                                     | SWP EA - Upper San Marcos Site 4 |  | FILE NAME | ES_Memo_USM4.mxd |                                |
|                                                                                                                                                                                                                  |                                                                                     | Photo Map                        |  | DATE      | 10/25/2023       |                                |
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## **Appendix B**

### **Site Photographs**



Photo 1. View looking west towards the normal pool from the existing dam crest of the Upper San Marcos Site 4 FRS.



Photo 2. View looking southwest within the Upper San Marcos Site 4 FRS normal pool.





Photo 3. View looking north (downstream) at Purgatory Creek and the principal spillway outfall of the Upper San Marcos Site 4 FRS.



Photo 4. View looking northeast (downstream) along the vegetated channel of Purgatory Creek north of the Upper San Marcos Site 4 FRS.





Photo 5. View looking west (downstream) along the vegetated channel of Purgatory Creek west of the normal pool of the Upper San Marcos Site 4 FRS.



Photo 6. View looking northeast (upstream) along the vegetated channel of Purgatory Creek northwest of the normal pool of the Upper San Marcos Site 4 FRS.





Photo 7. View looking west along an ephemeral swale.



Photo 8. View looking northeast at woodlands within the LOI with mature deciduous hardwood trees, which may be potential habitat for the tricolored bat.





Photo 9. View looking northwest at the auxiliary spillway of the Upper San Marcos Site 4 FRS and adjacent Ashe juniper, which may be potential habitat for golden-cheeked warblers.



Photo 10. View looking north at sparsely vegetated, rocky habitats with cactus and scrubby trees, which may be potential habitat for Texas horned lizards.



**Appendix C**  
**Texas Integrated Report – Assessment Results for Basin 18 –**  
**Guadalupe River, 2024 Pg. 25-26**

[illegible]

|                                |                                                 |                     |         |          |         |         |         |         |         |         |         |                            |         |         |         |         |
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| Ganc't!! Ute                   | Dissolved SCILDS-                               | Stfattt             | 1W1115  | 11/10/22 | 50      | 2SBJ    | 0       | AD      | rs      | N       | FS      | ICEQCal1154                | 5       |         |         |         |
|                                |                                                 | C11D1nn             | 1201M5  | 11/30/22 | 30      | 2109    | 0       | AD      | rs      | N       | FS      |                            |         |         |         |         |
|                                |                                                 | TOUll d&cv111 -ldft | 120T15  | 11130/22 | 100     | 403.13  | 1       | AD      | NS      | N       | NS      | Tfihl tllll, ■ ■ ■ ■ li,wa | 5       |         |         |         |
| J=tubk W11nr Supply Use        | Stf'faco WBlef tu-I criterill fot: PWS ai;erage | nm>kJC-             | 1201115 | 11/10/22 | 1       | 4       | J       | CH      | 1       | 0       | NA      | N                          | NAT     | 1       |         |         |
|                                |                                                 | Nltzrne             | 1211115 | 11/10/22 | 1       | 10      |         | 1.24    | 1       | 0       | AO      | FS                         | N       | FS1     | 1       |         |



**Appendix D**  
**USFWS IPaC &**  
**TPWD Rare, Threatened, and**  
**Endangered Species of Texas by County**



# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Austin Ecological Services Field Office

1505 Ferguson Lane

Austin, TX 78754-4501

Phone: (512) 937-7371



In Reply Refer To:

06/13/2025 13:41:39 UTC

Project Code: 2023-0126808

Project Name: Upper San Marcos Site 4

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seqA).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seqA), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological



evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at <https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf>.

**Migratory Birds.** In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 CFR Sec. 10.12 and 16 USC Sec. 668(a)). For more information regarding these Acts, see <https://www.fws.gov/program/migratory-bird-permit/what-we-do>.

It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see <https://www.fws.gov/library/collections/threats-birds>.

In addition to MBTA and BGEPA, Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds," obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <https://www.fws.gov/partner/council-conservation-migratory-birds>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s)

- Official Species List

## OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to 'request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action'.

This species list is provided by:

Austin Ecological Services Field Office  
1505 Ferguson Lane  
Austin, TX 78754-4501  
(512) 937-7371



## PROJECT SUMMARY

Project Code1 2023-01 26808

Project Name1 Upper San Marcos Site 4

Project Type1 Dam - Maintenance/Modification

Project Description1 Hays County Soil and Water Conservation District and the NRCS propose rehabilitating the Upper San Marcos 4 Flood Retarding Structure to meet NRCS specifications of a high hazard dam.

Project Location1

The approximate location of the project can be viewed in Google Maps1 [https://](https://www.google.com/maps/@29.88572615,-98.03217633981333,14z)

[www.google.com/maps/@29.88572615,-98.03217633981333,14z](https://www.google.com/maps/@29.88572615,-98.03217633981333,14z)



Counties1 Hays County, Texas

## ENDANGERED SPEC&ES ACT SPEC&ES

There is a total of 16 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 3 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries<sup>1</sup>, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

- 
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.



## MAMMALS

| NAME                                                                                                                                                                                                                                      | STATUS                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <p>Tricolored Bat <i>Permyotis subellipticus</i></p> <p>No critical habitat has been designated for this species.</p> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/M05M5">https://ecos.fws.gov/ecp/species/M05M5</a></p> | <p>Proposed</p> <p>Endangered</p> |

## BIRDS

| NAME                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | STATUS            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <p>Golden-cheeked Warbler <i>Setophaga chrysopara</i></p> <p>No critical habitat has been designated for this species.</p> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/33">https://ecos.fws.gov/ecp/species/33</a></p>                                                                                                                                                                                                                                                                                                                                          | <p>Endangered</p> |
| <p>Piping Plover <i>Charadrius dominicus</i></p> <p>Population: Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered.</p> <p>There is final critical habitat for this species. Your location does not overlap the critical habitat.</p> <p>This species only needs to be considered under the following conditions:</p> <ul style="list-style-type: none"> <li>Wind Energy Projects</li> </ul> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/6039">https://ecos.fws.gov/ecp/species/6039</a></p> | <p>Threatened</p> |
| <p>Rufa Red Knot <i>Calidris canutus rufa</i></p> <p>There is proposed critical habitat for this species. Your location does not overlap the critical habitat.</p> <p>This species only needs to be considered under the following conditions:</p> <ul style="list-style-type: none"> <li>Wind Energy Projects</li> </ul> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/M864">https://ecos.fws.gov/ecp/species/M864</a></p>                                                                                                                                       | <p>Threatened</p> |
| <p>Whooping Crane <i>Grus americana</i></p> <p>Population: Wherever found, except where listed as an experimental population</p> <p>There is final critical habitat for this species. Your location does not overlap the critical habitat.</p> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/758">https://ecos.fws.gov/ecp/species/758</a></p>                                                                                                                                                                                                                    | <p>Endangered</p> |

## AMPHIBIANS

| NAME                                                                                                                                                                                                                                                                                                                                                | STATUS            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <p>Austin Blind Salamander <i>Eurycea waterlooensis</i></p> <p>There is final critical habitat for this species. Your location does not overlap the critical habitat.</p> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/5737">https://ecos.fws.gov/ecp/species/5737</a></p>                                                         | <p>Endangered</p> |
| <p>San Marcos Salamander <i>Eurycea nana</i></p> <p>There is final critical habitat for this species. Your location does not overlap the critical habitat.</p> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/6374">https://ecos.fws.gov/ecp/species/6374</a></p>                                                                    | <p>Threatened</p> |
| <p>Texas Blind Salamander <i>Eurycea rathbunae</i></p> <p>No critical habitat has been designated for this species.</p> <p>This species only needs to be considered under the following conditions:</p> <ul style="list-style-type: none"> <li>Effects to water quality and quantity in the Edwards Aquifer and to surface waters in the</li> </ul> | <p>Endangered</p> |

| NAME                                                                                                       | STATUS |
|------------------------------------------------------------------------------------------------------------|--------|
| Species profile, <a href="https://ecos.fws.gov/ecp/species/5130">https://ecos.fws.gov/ecp/species/5130</a> |        |

## FISHES

| NAME                                                                                                                                                                                                                 | STATUS     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Fountain Darter <i>Etheostoma fonticola</i>                                                                                                                                                                          | Endangered |
| There is final critical habitat for this species. Your location does not overlap the critical habitat.<br>Species profile, <a href="https://ecos.fws.gov/ecp/species/5858">https://ecos.fws.gov/ecp/species/5858</a> |            |

## CLAMS

| NAME                                                                                                                                                                                                                                  | STATUS     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Guadalupe Fatmucket <i>Lampsilis bergmanni</i>                                                                                                                                                                                        | Endangered |
| There is final critical habitat for this species. Your location does not overlap the critical habitat.<br>Species profile, <a href="https://ecos.fws.gov/ecp/species/10783">https://ecos.fws.gov/ecp/species/10783</a>                |            |
| Guadalupe Orb <i>Cycloa necki</i>                                                                                                                                                                                                     | Endangered |
| Population,<br>There is final critical habitat for this species. Your location does not overlap the critical habitat.<br>Species profile, <a href="https://ecos.fws.gov/ecp/species/10781">https://ecos.fws.gov/ecp/species/10781</a> |            |

## INSECTS

| NAME                                                                                                                                                                                                                    | STATUS                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Comal Springs Dryopid Beetle <i>Stygoparnus comaiensis</i>                                                                                                                                                              | Endangered             |
| There is final critical habitat for this species. Your location does not overlap the critical habitat.<br>Species profile, <a href="https://ecos.fws.gov/ecp/species/7175">https://ecos.fws.gov/ecp/species/7175</a>    |                        |
| Comal Springs Riffle Beetle <i>Heterelmis comaiensis</i>                                                                                                                                                                | Endangered             |
| There is final critical habitat for this species. Your location does not overlap the critical habitat.<br>Species profile, <a href="https://ecos.fws.gov/ecp/species/3403">https://ecos.fws.gov/ecp/species/3403</a>    |                        |
| Monarch Butterfly <i>Danaus plexippus</i>                                                                                                                                                                               | Proposed<br>Threatened |
| There is proposed critical habitat for this species. Your location does not overlap the critical habitat.<br>Species profile, <a href="https://ecos.fws.gov/ecp/species/9743">https://ecos.fws.gov/ecp/species/9743</a> |                        |

## CRUSTACEANS

| NAME                                                                                                                                                                                                                 | STATUS     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Peck's Cave Amphipod <i>Stygobromus</i> (= <i>Stygonectes</i> ) <i>pecki</i>                                                                                                                                         | Endangered |
| There is final critical habitat for this species. Your location does not overlap the critical habitat.<br>Species profile, <a href="https://ecos.fws.gov/ecp/species/8575">https://ecos.fws.gov/ecp/species/8575</a> |            |

## FLOWERING PLANTS

| NAME | STATUS |
|------|--------|
|------|--------|



NAME

STATUS

There is final critical habitat for this species. Your location does not overlap the critical habitat.

Species profile: <https://ecos.fws.gov/ecp/species/805>

## CRCITCCAL HABCITAITS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

**PAC USER CONTACT INFORMATION**

Agency. Private Entity  
Name. Wesley Wiegrefe  
Address. 801 Cherry Street  
Address Line 2. Suite 2800  
City. Fort Worth  
State. TX  
Zip. 76102  
Email wes.wiegrefe@freeseP.com  
Phone. 8177357514

**LEAD AGENCY CONTACT INFORMATION**

Lead Agency. Natural Resources Conservation Service



Last Update: 1/15/2025

## HAYS COUNTY

### AMPHIBIANS

|                                                                                                                         |                             |                  |  |
|-------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------------|--|
| <b>Barton Springs salamander</b>                                                                                        | <i>Eurycea sosorum</i>      |                  |  |
| Aquatic; springs, streams and caves with rocky or cobble beds.                                                          |                             |                  |  |
| Federal Status: E                                                                                                       | State Status: E             | SGCN: Y          |  |
| Endemic: Y                                                                                                              | Global Rank: G1             | State Rank: S1   |  |
| <b>Blanco blind salamander</b>                                                                                          | <i>Eurycea robusta</i>      |                  |  |
| Aquatic and subterranean; streams and caves.                                                                            |                             |                  |  |
| Federal Status:                                                                                                         | State Status: T             | SGCN: Y          |  |
| Endemic: Y                                                                                                              | Global Rank: G1             | State Rank: S1   |  |
| <b>Blanco River Springs salamander</b>                                                                                  | <i>Eurycea pterophila</i>   |                  |  |
| Aquatic; springs, streams and caves with rocky or cobble beds.                                                          |                             |                  |  |
| Federal Status:                                                                                                         | State Status:               | SGCN: Y          |  |
| Endemic: Y                                                                                                              | Global Rank: G3             | State Rank: S3   |  |
| <b>Pedernales River Springs salamander</b>                                                                              | <i>Eurycea sp. 6</i>        |                  |  |
| Aquatic; springs, streams and caves with rocky or cobble beds.                                                          |                             |                  |  |
| Federal Status:                                                                                                         | State Status:               | SGCN: N          |  |
| Endemic: Y                                                                                                              | Global Rank: G1             | State Rank: S1S2 |  |
| <b>San Marcos salamander</b>                                                                                            | <i>Eurycea nana</i>         |                  |  |
| Aquatic; springs and associated water.                                                                                  |                             |                  |  |
| Federal Status: T                                                                                                       | State Status: T             | SGCN: Y          |  |
| Endemic: Y                                                                                                              | Global Rank: G1             | State Rank: S1   |  |
| <b>Strecker's chorus frog</b>                                                                                           | <i>Pseudacris streckeri</i> |                  |  |
| Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates. |                             |                  |  |
| Federal Status:                                                                                                         | State Status:               | SGCN: Y          |  |
| Endemic: N                                                                                                              | Global Rank: G5             | State Rank: S3   |  |
| <b>Texas blind salamander</b>                                                                                           | <i>Eurycea rathbuni</i>     |                  |  |
| Aquatic and subterranean; streams and caves.                                                                            |                             |                  |  |
| Federal Status: E                                                                                                       | State Status: E             | SGCN: Y          |  |
| Endemic: Y                                                                                                              | Global Rank: G1             | State Rank: S1   |  |

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## HAYS COUNTY

### AMPHIBIANS

**Texas salamander**

*Eurycea neotenes*

Aquatic; springs, streams and caves with rocky or cobble beds.

Federal Status:

State Status: T

SGCN: Y

Endemic: Y

Global Rank: G1G2

State Rank: S1S2

**Woodhouse's toad**

*Anaxyrus woodhousii*

Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied.

Federal Status:

State Status:

SGCN: Y

Endemic: N

Global Rank: G5

State Rank: S5

### ARACHNIDS

**No accepted common name**

*Texella diplospina*

Habitat description is not available at this time.

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G1G2

State Rank: S1

**No accepted common name**

*Texella grubbsi*

Habitat description is not available at this time.

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G1G2

State Rank: S1

**No accepted common name**

*Texella mulaiki*

Habitat description is not available at this time.

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G2G3

State Rank: S1

**No accepted common name**

*Texella renkesae*

Habitat description is not available at this time.

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G1G2

State Rank: S1

**No accepted common name**

*Tartarocreagris grubbsi*

Habitat description is not available at this time.

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G1G2

State Rank: S1

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## HAYS COUNTY

### ARACHNIDS

**No accepted common name** *Cicurina ezelli*

Habitat description is not available at this time.

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G1G2 | State Rank: S1 |

**No accepted common name** *Cicurina russelli*

Habitat description is not available at this time.

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G1G2 | State Rank: S1 |

**No accepted common name** *Cicurina ubicki*

Habitat description is not available at this time.

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G1G2 | State Rank: S1 |

### BIRDS

**bald eagle** *Haliaeetus leucocephalus*

Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds

|                 |                 |                     |
|-----------------|-----------------|---------------------|
| Federal Status: | State Status:   | SGCN: N             |
| Endemic: N      | Global Rank: G5 | State Rank: S3B,S3N |

**Bank Swallow** *Riparia riparia*

Bank Swallows live in low areas along rivers, streams, ocean coasts, and reservoirs. Their territories usually include vertical cliffs or banks where they nest in colonies of 10 to 2,000 nests. Though in the past Bank Swallows were most commonly found around natural bluffs or eroding streamside banks, they now often nest in human-made sites, such as sand and gravel quarries or road cuts. They forage in open areas and avoid places with tree cover.

|                 |                 |                     |
|-----------------|-----------------|---------------------|
| Federal Status: | State Status:   | SGCN: Y             |
| Endemic: N      | Global Rank: G5 | State Rank: S2B,S4N |

**black-capped vireo** *Vireo atricapilla*

Oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G5 | State Rank: S3B |

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## HAYS COUNTY

### BIRDS

#### **Brewer's Blackbird**

*Euphagus cyanocephalus*

Shrubby and bushy areas (especially near water), riparian woodland, aspen parklands, cultivated lands, marshes, and around human habitation; in migration and winter also in pastures and fields (AOU 1983).

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G5 | State Rank: S5 |

#### **Brown Pelican**

*Pelecanus occidentalis*

Largely coastal and near shore areas, where it roosts and nests on islands and spoil banks. Feeds in lagunas and shallow seaward waters.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: N         |
| Endemic: N      | Global Rank: G4 | State Rank: S3B |

#### **Cactus Wren**

*Campylorhynchus brunneicapillus*

Desert (especially with cholla cactus or yucca), mesquite, arid scrub, coastal sage scrub, and in trees in towns in arid regions (Tropical to Subtropical zones) (AOU 1983). Nests in OPUNTIA cactus, or in twiggy, thorny, trees and shrubs, sometimes in buildings. Nest may be relined and used as a winter roost.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G5 | State Rank: S4B |

#### **chestnut-collared longspur**

*Calcarius ornatus*

Occurs in open shortgrass settings especially in patches with some bare ground. Also occurs in grain sorghum fields and Conservation Reserve Program lands

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G5 | State Rank: S3 |

#### **Common Nighthawk**

*Chordeiles minor*

Common Nighthawks nest in both rural and urban habitats including coastal sand dunes and beaches, logged forest, recently burned forest, woodland clearings, prairies, plains, sagebrush, grasslands, open forests, and rock outcrops. They also nest on flat gravel rooftops, though less often as gravel roofs are being replaced by smooth, rubberized roofs that provide an unsuitable surface.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G5 | State Rank: S4B |

#### **Franklin's gull**

*Leucophaeus pipixcan*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G5 | State Rank: S2N |

#### **golden-cheeked warbler**

*Setophaga chrysoparia*

#### **DISCLAIMER**

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## HAYS COUNTY

### BIRDS

Ashe juniper in mixed stands with various oaks (*Quercus* spp.). Edges of cedar brakes. Dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer.

|                   |                 |                   |
|-------------------|-----------------|-------------------|
| Federal Status: E | State Status: E | SGCN: Y           |
| Endemic: N        | Global Rank: G2 | State Rank: S2S3B |

#### **interior least tern** *Sternula antillarum athalassos*

Sand beaches, flats, bays, inlets, lagoons, islands. Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony

|                 |                    |                 |
|-----------------|--------------------|-----------------|
| Federal Status: | State Status: E    | SGCN: N         |
| Endemic: N      | Global Rank: G4T3Q | State Rank: S1B |

#### **lark bunting** *Calamospiza melanocorys*

Overall, it's a generalist in most short grassland settings including ones with some brushy component plus certain agricultural lands that include grain sorghum. Short grasses include sideoats and blue gramas, sand dropseed, prairie junegrass (*Koeleria*), buffalograss also with patches of bluestem and other mid-grass species. This bunting will frequent smaller patches of grasses or disturbed patches of grasses including rural yards. It also uses weedy fields surrounding playas. This species avoids urban areas and cotton fields.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G5 | State Rank: S4B |

#### **Least Tern** *Sternula antillarum*

Sand beaches, flats, bays, inlets, lagoons, islands, river sandbars and flat gravel rooftops in urban areas.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G4 | State Rank: S2B |

#### **Loggerhead Shrike** *Lanius ludovicianus*

Loggerhead Shrikes inhabit open country with short vegetation and well-spaced shrubs or low trees, particularly those with spines or thorns. They frequent agricultural fields, pastures, old orchards, riparian areas, desert scrublands, savannas, prairies, golf courses, and cemeteries. Loggerhead Shrikes are often seen along mowed roadsides with access to fence lines and utility poles.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G4 | State Rank: S4B |

#### **Mottled Duck** *Anas fulvigula*

Estuaries, ponds, lakes, secondary bays.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G4 | State Rank: S4B |

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## HAYS COUNTY

### BIRDS

**mountain plover** *Charadrius montanus*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G3 | State Rank: S2 |

**Northern Bobwhite** *Colinus virginianus*

Inhabits a wide variety of vegetation types, particularly early successional stages. Occurs in croplands, grasslands, pastures, fallow fields, grass-brush rangelands, open pinelands, open mixed pine-hardwood forests, and habitat mosaics (Brennan 1999).

|                 |                   |                 |
|-----------------|-------------------|-----------------|
| Federal Status: | State Status:     | SGCN: Y         |
| Endemic: N      | Global Rank: G4G5 | State Rank: S4B |

**piping plover** *Charadrius melodus*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance.

|                   |                 |                 |
|-------------------|-----------------|-----------------|
| Federal Status: T | State Status: T | SGCN: Y         |
| Endemic: N        | Global Rank: G3 | State Rank: S2N |

**Pyrrhuloxia** *Cardinalis sinuatus*

Pyrrhuloxias live in upland deserts, mesquite savannas, riparian (streamside) woodlands, desert scrublands, farm fields with hedgerows, and residential areas with nearby mesquite. When not breeding, some Pyrrhuloxias wander into urban habitats, mesquite-hackberry habitats, and riparian habitats with Arizona sycamore and cottonwood.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G5 | State Rank: S4B |

**Sanderling** *Calidris alba*

Nonbreeding: primarily sandy beaches, less frequently on mud flats and shores of lakes or rivers (AOU 1983) also on exposed reefs (Pratt et al. 1987). Sleeps/loafs on upper beach or on salt pond dike.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G5 | State Rank: S5 |

**Snowy Plover** *Charadrius nivosus*

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## HAYS COUNTY

### BIRDS

Algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. An optimal site characteristic would be large in size. The size of populations appear to be roughly proportional to the total area of suitable habitat used. Formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G3 | State Rank: S3B |

**Sprague's pipit** *Anthus spragueii*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat during migration and in winter consists of pastures and weedy fields (AOU 1983), including grasslands with dense herbaceous vegetation or grassy agricultural fields.

|                 |                   |                 |
|-----------------|-------------------|-----------------|
| Federal Status: | State Status:     | SGCN: Y         |
| Endemic: N      | Global Rank: G3G4 | State Rank: S3N |

**western burrowing owl** *Athene cunicularia hypugaea*

Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: N        |
| Endemic: N      | Global Rank: G4T4 | State Rank: S2 |

**white-faced ibis** *Plegadis chihi*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status: T | SGCN: N         |
| Endemic: N      | Global Rank: G5 | State Rank: S4B |

**whooping crane** *Grus americana*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties.

|                   |                 |                   |
|-------------------|-----------------|-------------------|
| Federal Status: E | State Status: E | SGCN: Y           |
| Endemic: N        | Global Rank: G1 | State Rank: S1S2N |

**Willet** *Tringa semipalmata*

Marshes, tidal mudflats, beaches, lake margins, mangroves, tidal channels, river mouths, coastal lagoons, sandy or rocky shores, and, less frequently, open grassland (AOU 1983, Stiles and Skutch 1989).

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G5 | State Rank: S5B |

**Wilson's Warbler** *Cardellina pusilla*

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## HAYS COUNTY

### BIRDS

Wilson's warblers key in on forests and scrubby areas along streams to fatten up during migration. During the nonbreeding season they use many types of habitats from lowland thickets near streams to high-elevation cloud forests in Mexico and Central America.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G5 | State Rank: S4 |

#### wood stork *Mycteria americana*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers to nest in large tracts of baldcypress (*Taxodium distichum*) or red mangrove (*Rhizophora mangle*); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960.

|                 |                 |                     |
|-----------------|-----------------|---------------------|
| Federal Status: | State Status: T | SGCN: Y             |
| Endemic: N      | Global Rank: G4 | State Rank: SHB,S3N |

#### yellow-billed cuckoo *Coccyzus americanus*

In Texas, the populations of concern are found breeding in riparian areas in the Trans Pecos (know as part of the Western Distinct Population Segment). It is the Western DPS that is on the U.S. ESA threatened list and includes the Texas counties Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio. Riparian woodlands below 6,000' in elevation consisting of cottonwoods and willows are prime habitat. This species is a long-distant migrant that summers in Texas, but winters mainly in South America. Breeding birds of the Trans Pecos populations typically arrive on their breeding grounds possibly in late April but the peak arrival time is in May. Threats to preferred habitat include hydrologic changes that don't promote the regeneration of cottonwoods and willows, plus livestock browsing and trampling of sapling trees in sensitive riparian areas.

|                   |                 |                   |
|-------------------|-----------------|-------------------|
| Federal Status: T | State Status:   | SGCN: Y           |
| Endemic: N        | Global Rank: G5 | State Rank: S4S5B |

### CRUSTACEANS

#### Balcones Cave amphipod *Stygobromus balconis*

Subaquatic, subterranean obligate amphipod

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G2G3 | State Rank: S2 |

#### Bifurcated Cave Amphipod *Stygobromus bifurcatus*

Habitat description is not available at this time.

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G3G4 | State Rank: S3 |

#### Ezell's Cave amphipod *Stygobromus flagellatus*

Known only from artesian wells

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G2G3 | State Rank: S3 |

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## HAYS COUNTY

### CRUSTACEANS

**No accepted common name** *Palaemonetes texanus*

Collected in Comal and Hays counties (Middel Guadalupe and San Marcos watersheds).

|                 |                   |                 |
|-----------------|-------------------|-----------------|
| Federal Status: | State Status:     | SGCN: Y         |
| Endemic: Y      | Global Rank: G1G2 | State Rank: S1? |

**No accepted common name** *Artesia subterranea*

Habitat description is not available at this time.

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G1G2 | State Rank: S2 |

**No accepted common name** *Texiweckelia texensis*

Habitat description is not available at this time.

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G2G3 | State Rank: S2 |

**Purgatory Cave shrimp** *Calathaemon holthuisi*

Last known collection was in San Marcos, Hays Co. (Ezell's Cave) (Reddell 1994).

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G1G2 | State Rank: S1 |

**Texas troglobitic water slater** *Lirceolus smithii*

Subaquatic, subterranean obligate, aquifer.

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status: T   | SGCN: Y        |
| Endemic: Y      | Global Rank: G1G2 | State Rank: S1 |

### FISH

**american eel** *Anguilla rostrata*

Originally found in all river systems from the Red River to the Rio Grande. Aquatic habtiats include large rivers, streams, tributaries, coastal watersheds, estuaries, bays, and oceans. Spawns in Sargasso Sea, larva move to coastal waters, metamorphose, and begin upstream movements. Females tend to move further upstream than males (who are often found in brackish estuaries). American Eel are habitat generalists and may be found in a broad range of habitat conditions including slow- and fast-flowing waters over many substrate types. Extirpation in upstream drainages attributed to reservoirs that impede upstream migration.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G4 | State Rank: S4 |

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## HAYS COUNTY

### FISH

**fountain darter** *Etheostoma fonticola*

Known only from the spring-fed San Marcos and Comal rivers in dense beds of aquatic plants growing close to bottom; may be found in slow- and fast-flowing habitats.

|                   |                 |                |
|-------------------|-----------------|----------------|
| Federal Status: E | State Status: E | SGCN: Y        |
| Endemic: Y        | Global Rank: G1 | State Rank: S1 |

**Guadalupe bass** *Micropterus treculii*

Endemic to the streams of the northern and eastern Edwards Plateau including portions of the Brazos, Colorado, Guadalupe, and San Antonio basins; species also found outside of the Edwards Plateau streams in decreased abundance, primarily in the lower Colorado River; two introduced populations have been established in the Nueces River system. A pure population was re-established in a portion of the Blanco River in 2014. Species prefers lentic environments but commonly taken in flowing water; numerous smaller fish occur in rapids, many times near eddies; large individuals found mainly in riffle tail races; usually found in spring-fed streams having clear water and relatively consistent temperatures.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G3 | State Rank: S3 |

**Guadalupe darter** *Percina apristis*

Endemic to the Guadalupe River Basin; Found in riffles; most common under or around 25-30 cm boulders in the main current; seems to prefer moderately turbid water.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status: T | SGCN: Y        |
| Endemic: Y      | Global Rank: G4 | State Rank: S2 |

**Guadalupe roundnose minnow** *Dionda flavipinnis*

Endemic to Guadalupe and southern Colorado drainages; primarily restricted to clear spring-fed waters that have slight temperature variations.

|                 |                  |                 |
|-----------------|------------------|-----------------|
| Federal Status: | State Status:    | SGCN: Y         |
| Endemic:        | Global Rank: GNR | State Rank: SNR |

**headwater catfish** *Ictalurus lupus*

Originally throughout streams of the Edwards Plateau and the Rio Grande basin, currently limited to Rio Grande drainage, including Pecos River basin; springs, and sandy and rocky riffles, runs, and pools of clear creeks and small rivers.

|                 |                 |                  |
|-----------------|-----------------|------------------|
| Federal Status: | State Status: T | SGCN: Y          |
| Endemic: N      | Global Rank: G3 | State Rank: S1S2 |

**ironcolor shiner** *Notropis chalybaeus*

Found only in northeastern streams from the Sabine to the Red River with the exception of an isolated population found in the San Marcos River headwaters. Found primarily in acidic, tannin-stained, non-turbid, sluggish Coastal Plain streams and rivers of low to moderate gradient. Occurs in aggregation, often at the upstream ends of pools, with a moderate to sluggish current and sand, mud, silt or detritus substrates. Usually associated with aquatic vegetation.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G4 | State Rank: S3 |

**Nueces roundnose minnow** *Dionda texensis*

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## HAYS COUNTY

### FISH

Endemic to the headwaters of the Nueces River; habitat unknown but likely similar to Devils River Minnow (Often found in association with spring outflows over gravel-cobble substrate and adjacent to aquatic macrophytes; may inhabit a microhabitat associated with the interface between spring runs and the river).

|                 |                  |                 |
|-----------------|------------------|-----------------|
| Federal Status: | State Status:    | SGCN: Y         |
| Endemic:        | Global Rank: GNR | State Rank: SNR |

#### **Texas shiner** *Notropis amabilis*

In Texas, it is found primarily in Edwards Plateau streams from the San Gabriel River in the east to the Pecos River in the west. Typical habitat includes rocky or sandy runs, as well as pools.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G4 | State Rank: S4 |

### INSECTS

#### **American bumblebee** *Bombus pensylvanicus*

Habitat description is not available at this time.

|                 |                   |                 |
|-----------------|-------------------|-----------------|
| Federal Status: | State Status:     | SGCN: Y         |
| Endemic:        | Global Rank: G3G4 | State Rank: SNR |

#### **Comal Springs diving beetle** *Comaldessus stygius*

Known only from the outflows at Comal Springs; aquatic; diving beetles generally inhabit the water column

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G1 | State Rank: S1 |

#### **Comal Springs dryopid beetle** *Stygoparnus comalensis*

Dryopids usually cling to objects in a stream; dryopids are sometimes found crawling on stream bottoms or along shores; adults may leave the stream and fly about, especially at night; most dryopid larvae are vermiform and live in soil or decaying wood

|                   |                   |                |
|-------------------|-------------------|----------------|
| Federal Status: E | State Status: E   | SGCN: Y        |
| Endemic: Y        | Global Rank: G1G2 | State Rank: S1 |

#### **Comal Springs riffle beetle** *Heterelmis comalensis*

Comal and San Marcos Springs

|                   |                 |                |
|-------------------|-----------------|----------------|
| Federal Status: E | State Status: E | SGCN: Y        |
| Endemic:          | Global Rank: G1 | State Rank: S1 |

#### **Edwards Aquifer diving beetle** *Haideoporus texanus*

Habitat poorly known; known from an artesian well in Hays County

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G1G2 | State Rank: S1 |

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## HAYS COUNTY

### INSECTS

**migratory monarch butterfly**      *Danaus plexippus plexippus*

Habitat description is not available at this time.

Federal Status: C

State Status:

SGCN: Y

Endemic:

Global Rank: G4T3

State Rank: SNR

**No accepted common name**      *Procloeon distinctum*

Mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G1G3Q

State Rank: S2?

**No accepted common name**      *Plauditus texanus*

Larvae are associated with small to medium limestone cobble and macrophytes in shallow riffles of clear, cool, alkaline streams (P. McCafferty, personal communication, December 2003).

Federal Status:

State Status:

SGCN: Y

Endemic: N

Global Rank: G2G3

State Rank: S1?

**No accepted common name**      *Rhadine austinica*

Habitat description is not available at this time.

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G1G2

State Rank: S2

**No accepted common name**      *Rhadine insolita*

Habitat description is not available at this time.

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G1G2

State Rank: S1

**No accepted common name**      *Batrisodes grubbsi*

Habitat description is not available at this time.

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G1G2

State Rank: S1

**No accepted common name**      *Ochrotrichia capitana*

Habitat description is not available at this time.

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G1G3

State Rank: S2?

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## HAYS COUNTY

### INSECTS

**No accepted common name** *Neotrichia juani*

Specimens were collected from perennial and ephemeral rivers, and small spring-fed streams (Harris and Tiemann 1993).

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic:        | Global Rank: G1 | State Rank: S1 |

**No accepted common name** *Xiphocentron messapus*

Habitat description is not available at this time.

|                 |                   |                 |
|-----------------|-------------------|-----------------|
| Federal Status: | State Status:     | SGCN: Y         |
| Endemic: Y      | Global Rank: G1G3 | State Rank: S2? |

**San Marcos saddle-case caddisfly** *Protoptila arca*

Known from an artesian well in Hays County; locally very abundant; swift, well-oxygenated warm water about 1-2 m deep; larvae and pupal cases abundant on rocks

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G1 | State Rank: S1 |

**Texas austrotinodes caddisfly** *Austrotinodes texensis*

Appears endemic to the karst springs and spring runs of the Edwards Plateau region; flow in type locality swift but may drop significantly during periods of little drought; substrate coarse and ranges from cobble and gravel to limestone bedrock; many limestone outcroppings also found along the streams

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G2 | State Rank: S2 |

### MAMMALS

**big free-tailed bat** *Nyctinomops macrotis*

Habitat data sparse but records indicate that species prefers to roost in crevices and cracks in high canyon walls, but will use buildings, as well; reproduction data sparse, gives birth to single offspring late June-early July; females gather in nursery colonies; winter habits undetermined, but may hibernate in the Trans-Pecos; opportunistic insectivore

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G5 | State Rank: S3 |

**cave myotis bat** *Myotis velifer*

Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (*Hirundo pyrrhonota*) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore.

|                 |                   |                  |
|-----------------|-------------------|------------------|
| Federal Status: | State Status:     | SGCN: Y          |
| Endemic: N      | Global Rank: G4G5 | State Rank: S2S3 |

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## HAYS COUNTY

### MAMMALS

#### **eastern spotted skunk** *Spilogale putorius*

Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges & woodlands. Prefer wooded, brushy areas & tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available.

|                 |                 |                  |
|-----------------|-----------------|------------------|
| Federal Status: | State Status:   | SGCN: Y          |
| Endemic: N      | Global Rank: G4 | State Rank: S1S3 |

#### **hoary bat** *Lasiurus cinereus*

Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways.

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: N      | Global Rank: G3G4 | State Rank: S3 |

#### **mountain lion** *Puma concolor*

Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains & riparian zones.

|                 |                 |                  |
|-----------------|-----------------|------------------|
| Federal Status: | State Status:   | SGCN: Y          |
| Endemic: N      | Global Rank: G5 | State Rank: S2S3 |

#### **plains spotted skunk** *Spilogale interrupta*

Generalist; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie

|                 |                 |                  |
|-----------------|-----------------|------------------|
| Federal Status: | State Status:   | SGCN: Y          |
| Endemic: N      | Global Rank: G3 | State Rank: S1S3 |

#### **Seminole bat** *Lasiurus seminolus*

Pine-oak and long-leaf pine in east Texas. Habitats include pine, mixed pine-hardwood, and hardwood forests of uplands and bottomlands, particularly pine-dominated forests, including mature pine and pine-hardwood corridors in managed pine forest landscapes (Menzel et al. 1998, 1999, 2000; Carter et al. 2004; Marks and Marks 2006; Perry and Thill 2007; Perry et al. 2007; Hein et al. 2008; Ammerman et al. 2012).

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G5 | State Rank: S3 |

#### **tricolored bat** *Perimyotis subflavus*

Forest, woodland and riparian areas are important. Caves are very important to this species.

|                    |                   |                |
|--------------------|-------------------|----------------|
| Federal Status: PE | State Status:     | SGCN: Y        |
| Endemic: N         | Global Rank: G3G4 | State Rank: S2 |

### MOLLUSKS

#### **Balcones spike** *Fusconaia iheringi*

Habitat not yet described.

|                   |                 |         |
|-------------------|-----------------|---------|
| Federal Status: E | State Status: E | SGCN: Y |
|-------------------|-----------------|---------|

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## HAYS COUNTY

### MOLLUSKS

Endemic: Y                      Global Rank: G1                      State Rank: SNR

**Edwards Plateau liptooth**                      *Millerelix gracilis*

Habitat description is not available at this time.

Federal Status:                      State Status:                      SGCN: Y  
Endemic:                      Global Rank: G2G3                      State Rank: S3

**false spike**                      *Fusconaia mitchelli*

Occurs in small streams to medium-size rivers in habitats such as riffles and runs with flowing water. Is often found in stable substrates of sand, gravel, and cobble (Howells 2010; Randklev et al. 2012; Sowards et al. 2013; Tsakiris and Randklev 2016). [Mussels of Texas 2019]

Federal Status: E                      State Status: E                      SGCN: Y  
Endemic: N                      Global Rank: G1                      State Rank: S1

**Glossy Wolfsnail**                      *Euglandina texasiana*

Habitat description is not available at this time.

Federal Status:                      State Status:                      SGCN: Y  
Endemic:                      Global Rank: G1G2                      State Rank: S3

**Guadalupe fatmucket**                      *Lampsilis bergmanni*

Reported to occur in slow to moderate current in sand, mud, and gravel substrates among large cobble, boulders, bedrock ledges, horizontal cracks in bedrock slabs, and macrophyte beds. Has also been observed inhabiting the roots of cypress trees and vegetation along steep banks. Reported in lakes at Kerrville, Texas, which suggests it may occasionally persist in some impoundment conditions (Robert G. Howells, personal communication). (Mussels of Texas, 2020)

Federal Status: E                      State Status: T                      SGCN: Y  
Endemic: Y                      Global Rank: G1                      State Rank: SNR

**Guadalupe orb**                      *Cyclonaias necki*

Species' distribution is limited to the Guadalupe River basin. Occurs in both mainstem and tributary habitats. Often found in substrates composed of sand, gravel, and cobble, including mud-silt or gravel-filled cracks in bedrock slabs. Considered intolerant of reservoirs, but are known to occur in them (Howells 2010m; Randklev et al. 2017b). [Mussels of Texas 2020]

Federal Status: E                      State Status: E                      SGCN: Y  
Endemic: Y                      Global Rank: G1                      State Rank: S2

**Mapleleaf**                      *Quadrula quadrula*

Reported from streams to rivers, lakes, and reservoirs. In riverine habitats, it may be found in main-channel habitats such as riffles or runs in sand, gravel, and cobble substrates with moderate to swift currents. May also be found in nearshore habitats such as banks and backwaters to include pools in sand or mud substrates with little to no flow. (Williams et al. 2008; Howells 2016; Haag and Cicerello 2016).

Federal Status:                      State Status:                      SGCN: Y  
Endemic: N                      Global Rank: G5                      State Rank: S3

**No accepted common name**                      *Phreatodrobia conica*

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## HAYS COUNTY

### MOLLUSKS

Habitat description is not available at this time.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G1 | State Rank: S2 |

**No accepted common name** *Phreatodrobia micra*

Habitat description is not available at this time.

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G2G3 | State Rank: S2 |

**No accepted common name** *Phreatodrobia plana*

Habitat description is not available at this time.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G2 | State Rank: S2 |

**No accepted common name** *Phreatodrobia punctata*

Habitat description is not available at this time.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G2 | State Rank: S1 |

**No accepted common name** *Phreatodrobia rotunda*

Habitat description is not available at this time.

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G1G2 | State Rank: S2 |

**Pimpleback** *Cyclonaias pustulosa*

Occurs in small streams to large rivers in habitats including riffles and runs with flowing water, also found in nearshore habitats such as banks and backwaters or pools. Can occur in reservoirs but varies based by population. Is often found in substrates comprising of sand, gravel, and cobble but also mud and silt (Howells et al. 1996; Williams et al. 2008; Watters et al. 2009).

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G5 | State Rank: SNR |

**Pistolgrip** *Tritogonia verrucosa*

Reported from streams to rivers, lakes, and reservoirs, but considered less tolerant of impoundment (Haag and Cicerello 2016). Can occur in a variety of habitat types but most often found in main channel habitats such as riffles and runs with moderate current and sand, gravel, or cobble substrates (Howells et al. 1996; Williams et al. 2008).

|                 |                   |                  |
|-----------------|-------------------|------------------|
| Federal Status: | State Status:     | SGCN: Y          |
| Endemic: N      | Global Rank: G4G5 | State Rank: S3S4 |

**Texas fatmucket** *Lampsilis bracteata*

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## HAYS COUNTY

### MOLLUSKS

Reported to occur in slow to moderate current in sand, mud, and gravel substrates among large cobble, boulders, bedrock ledges, horizontal cracks in bedrock slabs, and macrophyte beds. Has also been observed inhabiting the roots of cypress trees and vegetation along steep banks. Past authorities have reported this species intolerant of reservoir conditions but recent surveys suggest it may persist in some impoundment conditions (Howells 2010c; Randklev et al. 2017b). [Mussel of Texas 2019]

|                   |                 |                |
|-------------------|-----------------|----------------|
| Federal Status: E | State Status: T | SGCN: Y        |
| Endemic: Y        | Global Rank: G1 | State Rank: S1 |

#### **Texas fawnsfoot** *Truncilla macrodon*

Occurs in large rivers but may also be found in medium-sized streams. Is found in protected near shore areas such as banks and backwaters but also riffles and point bar habitats with low to moderate water velocities. Typically occurs in substrates of mud, sandy mud, gravel and cobble. Considered intolerant of reservoirs (Randklev et al. 2010; Howells 2010o; Randklev et al. 2014b,c; Randklev et al. 2017a,b). [Mussels of Texas 2019]

|                   |                 |                |
|-------------------|-----------------|----------------|
| Federal Status: T | State Status: T | SGCN: Y        |
| Endemic: Y        | Global Rank: G1 | State Rank: S2 |

#### **Texas pimpleback** *Cyclonaias petrina*

Occurs in medium-size streams to large rivers primarily in riffles and runs. Often found in substrates composed of sand, gravel, and cobble, including mud-silt or gravel-filled cracks in bedrock slabs. Considered intolerant of reservoirs (Howells 2010m; Randklev et al. 2017b). [Mussels of Texas 2019]

|                   |                 |                |
|-------------------|-----------------|----------------|
| Federal Status: E | State Status: E | SGCN: Y        |
| Endemic: Y        | Global Rank: G1 | State Rank: S1 |

### REPTILES

#### **American alligator** *Alligator mississippiensis*

Aquatic: Coastal marshes; inland natural rivers, swamps and marshes; manmade impoundments.

|                     |                 |                |
|---------------------|-----------------|----------------|
| Federal Status: SAT | State Status:   | SGCN: N        |
| Endemic: N          | Global Rank: G5 | State Rank: S4 |

#### **Cagle's map turtle** *Graptemys caglei*

Aquatic: shallow water with swift to moderate flow and gravel or cobble bottom, connected by deeper pools with a slower flow rate and a silt or mud bottom; gravel bar riffles and transition areas between riffles and pools especially important in providing insect prey items; nests on gently sloping sand banks within ca. 30 feet of waters edge.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status: T | SGCN: Y        |
| Endemic: Y      | Global Rank: G3 | State Rank: S1 |

#### **common garter snake** *Thamnophis sirtalis*

Terrestrial and aquatic: Habitats used include the grasslands and modified open areas in the vicinity of aquatic features, such as ponds, streams o marshes. Damp soils and debris for cover are thought to be critical.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G5 | State Rank: S2 |

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## HAYS COUNTY

### REPTILES

**eastern box turtle** *Terrapene carolina*

Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G5 | State Rank: S3 |

**keeled earless lizard** *Holbrookia propinqua*

Terrestrial: Habitats include coastal dunes, barrier islands, and other sandy areas (Axtell 1983). Although it occurs well inland, this species is most abundant on coastal dunes, where it seeks shelter in the burrows of small mammals or crabs (Bartlett and Bartlett 1999).

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G4 | State Rank: S3 |

**plateau spot-tailed earless lizard** *Holbrookia lacerata*

Terrestrial: Habitats include moderately open prairie-brushland regions, particularly fairly flat areas free of vegetation or other obstructions (e.g., open meadows, old and new fields, graded roadways, cleared and disturbed areas, prairie savanna, and active agriculture including row crops); also, oak-juniper woodlands and mesquite-prickly pear associations (Axtell 1968, Bartlett and Bartlett 1999).

|                 |                  |                |
|-----------------|------------------|----------------|
| Federal Status: | State Status:    | SGCN: Y        |
| Endemic: Y      | Global Rank: GNR | State Rank: S2 |

**slender glass lizard** *Ophisaurus attenuatus*

Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G5 | State Rank: S3 |

**Texas horned lizard** *Phrynosoma cornutum*

Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area.

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status: T   | SGCN: Y        |
| Endemic: N      | Global Rank: G4G5 | State Rank: S3 |

**Texas map turtle** *Graptemys versa*

Aquatic: Primarily a river turtle but can also be found in reservoirs. Can be found in deep and shallow water with sufficient basking sites (emergent rocks and woody debris).

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G4 | State Rank: SU |

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## HAYS COUNTY

### REPTILES

**western box turtle** *Terrapene ornata*

Terrestrial: Ornate or western box turtles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species.

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: N      | Global Rank: G4G5 | State Rank: S3 |

### PLANTS

**bigflower cornsalad** *Valerianella stenocarpa*

Usually along creekbeds or in vernal moist grassy open areas (Carr 2015).

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G3 | State Rank: S3 |

**bracted twistflower** *Streptanthus bracteatus*

Shallow, well-drained gravelly clays and clay loams over limestone in oak juniper woodlands and associated openings, on steep to moderate slopes and in canyon bottoms; several known soils include Tarrant, Brackett, or Speck over Edwards, Glen Rose, and Walnut geologic formations; populations fluctuate widely from year to year, depending on winter rainfall; flowering mid April-late May, fruit matures and foliage withers by early summer

|                   |                 |                |
|-------------------|-----------------|----------------|
| Federal Status: T | State Status:   | SGCN: Y        |
| Endemic: Y        | Global Rank: G1 | State Rank: S1 |

**Buckley tridens** *Tridens buckleyanus*

Occurs in juniper-oak woodlands on rocky limestone slopes; Perennial; Flowering/Fruiting April-Nov

|                 |                   |                  |
|-----------------|-------------------|------------------|
| Federal Status: | State Status:     | SGCN: Y          |
| Endemic: Y      | Global Rank: G3G4 | State Rank: S3S4 |

**canyon mock-orange** *Philadelphus texensis* var. *ernestii*

Usually found growing from honeycomb pits on outcrops of Cretaceous limestone exposed as rimrock along mesic canyons, usually in the shade of mixed evergreen-deciduous canyon woodland; flowering April-June, fruit dehiscing September-October

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: N      | Global Rank: G3T3 | State Rank: S3 |

**darkstem noseburn** *Tragia nigricans*

Occurs in oak-juniper woodlands on mesic limestone slopes and canyon bottoms; Perennial; Flowering/Fruiting April-Oct

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G3 | State Rank: S3 |

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## HAYS COUNTY

### PLANTS

**Glass Mountains coral-root** *Hexalectris nitida*

Apparently rare in mixed woodlands in canyons in the mountains of the Brewster County, but encountered with regularity, albeit in small numbers, under *Juniperus ashei* in woodlands over limestone on the Edwards Plateau, Callahan Divide and Lampasas Cutplain; Perennial; Flowering June-Sept; Fruiting July-Sept

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G3 | State Rank: S3 |

**gravelbar brickellbush** *Brickellia dentata*

Essentially restricted to frequently-scoured gravelly alluvial beds in creek and river bottoms; Perennial; Flowering June-Nov; Fruiting June-Oct

|                 |                   |                  |
|-----------------|-------------------|------------------|
| Federal Status: | State Status:     | SGCN: Y          |
| Endemic: Y      | Global Rank: G3G4 | State Rank: S3S4 |

**Hall's prairie clover** *Dalea hallii*

In grasslands on eroded limestone or chalk and in oak scrub on rocky hillsides; Perennial; Flowering May-Sept; Fruiting June-Sept

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G2 | State Rank: S2 |

**Heller's marbleseed** *Onosmodium helleri*

Occurs in loamy calcareous soils in oak-juniper woodlands on rocky limestone slopes, often in more mesic portions of canyons; Perennial; Flowering March-May

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G3 | State Rank: S3 |

**Hill Country wild-mercury** *Argythamnia aphoroides*

Mostly in bluestem-grama grasslands associated with plateau live oak woodlands on shallow to moderately deep clays and clay loams over limestone on rolling uplands, also in partial shade of oak-juniper woodlands in gravelly soils on rocky limestone slopes; Perennial; Flowering April-May with fruit persisting until midsummer

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G3 | State Rank: S3 |

**narrowleaf brickellbush** *Brickellia eupatorioides* var. *gracillima*

Moist to dry gravelly alluvial soils along riverbanks but also on limestone slopes; Perennial; Flowering/Fruiting April-Nov

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G5T3 | State Rank: S3 |

**net-leaf bundleflower** *Desmanthus reticulatus*

Mostly on clay prairies of the coastal plain of central and south Texas; Perennial; Flowering April-July; Fruiting April-Oct

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G3 | State Rank: S3 |

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## HAYS COUNTY

### PLANTS

**Osage Plains false foxglove** *Agalinis densiflora*

Most records are from grasslands on shallow, gravelly, well drained, calcareous soils; Prairies, dry limestone soils; Annual; Flowering Aug-Oct

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G3 | State Rank: S2 |

**Plateau loosestrife** *Lythrum ovalifolium*

Banks and gravelly beds of perennial (or strong intermittent) streams on the Edwards Plateau, Llano Uplift and Lampasas Cutplain; Perennial; Flowering/Fruiting April-Nov

|                 |                   |                  |
|-----------------|-------------------|------------------|
| Federal Status: | State Status:     | SGCN: Y          |
| Endemic: N      | Global Rank: G3G4 | State Rank: S3S4 |

**plateau milkvine** *Matelea edwardsensis*

Occurs in various types of juniper-oak and oak-juniper woodlands; Perennial; Flowering March-Oct; Fruiting May-June

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G3 | State Rank: S3 |

**scarlet leather-flower** *Clematis texensis*

Usually in oak-juniper woodlands in mesic rocky limestone canyons or along perennial streams; Perennial; Flowering March-July; Fruiting May July

|                 |                   |                  |
|-----------------|-------------------|------------------|
| Federal Status: | State Status:     | SGCN: Y          |
| Endemic: Y      | Global Rank: G3G4 | State Rank: S3S4 |

**Stanfield's beebalm** *Monarda stanfieldii*

Largely confined to granite sands along the middle course of the Colorado River and its tributaries; Perennial

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G3 | State Rank: S3 |

**sycamore-leaf snowbell** *Styrax platanifolius ssp. platanifolius*

Rare throughout range, usually in oak-juniper woodlands on steep rocky banks and ledges along intermittent or perennial streams, rarely far from some reliable source of moisture; Perennial; Flowering April-May; Fruiting May-Aug.

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G3T3 | State Rank: S3 |

**Texas amorphia** *Amorpha roemeriana*

Juniper-oak woodlands or shrublands on rocky limestone slopes, sometimes on dry shelves above creeks; Perennial; Flowering May-June; Fruiting June-Oct

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G3 | State Rank: S3 |

**Texas barberry** *Berberis swaseyi*

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## HAYS COUNTY

### PLANTS

Shallow calcareous stony clay of upland grasslands/shrublands over limestone as well as in loamier soils in openly wooded canyons and on creek terraces; Perennial; Flowering/Fruiting March-June

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G3 | State Rank: S3 |

**Texas claret-cup cactus** *Echinocereus coccineus* var. *paucispinus*

Mountains, hills, and mesas, igneous and limestone, oak-juniper-pinyon woodland or juniper woodland on limestone mesas, mostly rocky habitats but also in alluvial basins, grasslands, or among mesquite or other shrubs. Flowering March - April (Powell and Weedin 2004).

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: N      | Global Rank: G5T3 | State Rank: S3 |

**Texas fescue** *Festuca versuta*

Occurs in mesic woodlands on limestone-derived soils on stream terraces and canyon slopes; Perennial; Flowering/Fruiting April-June

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G3 | State Rank: S3 |

**Texas seymeria** *Seymeria texana*

Found primarily in grassy openings in juniper-oak woodlands on dry rocky slopes but sometimes on rock outcrops in shaded canyons; Annual; Flowering May-Nov; Fruiting July-Nov

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G3 | State Rank: S3 |

**Texas wild-rice** *Zizania texana*

Spring-fed river, in clear, cool, swift water mostly less than 1 m deep, with coarse sandy soils rather than finer clays; flowering year-round, peaking March-June

|                   |                 |                |
|-------------------|-----------------|----------------|
| Federal Status: E | State Status: E | SGCN: Y        |
| Endemic: Y        | Global Rank: G1 | State Rank: S1 |

**threeflower penstemon** *Penstemon triflorus* var. *triflorus*

Occurs sparingly on rock outcrops and in grasslands associated with juniper-oak woodlands (Carr 2015).

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G3T3 | State Rank: S3 |

**tree dodder** *Cuscuta exaltata*

Parasitic on various *Quercus*, *Juglans*, *Rhus*, *Vitis*, *Ulmus*, and *Diospyros* species as well as *Acacia berlandieri* and other woody plants; Annual; Flowering May-Oct; Fruiting July-Oct

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G3 | State Rank: S3 |

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## HAYS COUNTY

### PLANTS

**turnip-root scurfpea** *Pedimelum cyphocalyx*

Grasslands and openings in juniper-oak woodlands on limestone substrates on the Edwards Plateau and in north-central Texas (Carr 2015).

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G3G4

State Rank: S2S3

**Warnock's coral-root** *Hexalectris warnockii*

In leaf litter and humus in oak-juniper woodlands on shaded slopes and intermittent, rocky creekbeds in canyons; in the Trans Pecos in oak-pinyon-juniper woodlands in higher mesic canyons (to 2000 m [6550 ft]), primarily on igneous substrates; in Terrell County under *Quercus fusiformis* mottes on terraces of spring-fed perennial streams, draining an otherwise rather xeric limestone landscape; on the Callahan Divide (Taylor County), the White Rock Escarpment (Dallas County), and the Edwards Plateau in oak-juniper woodlands on limestone slopes; in Gillespie County on igneous substrates of the Llano Uplift; flowering June-September; individual plants do not usually bloom in successive years

Federal Status:

State Status:

SGCN: Y

Endemic: N

Global Rank: G2G3

State Rank: S2

#### DISCLAIMER

The information on this web application is provided "as is" without warranty as to the currentness, completeness, or accuracy of any specific data. The data provided are for planning, assessment, and informational purposes. Refer to the Frequently Asked Questions (FAQs) on the application website for further information.

**TO:** Laurie Brown, LEED AP (Vireo)  
**CC:** Aaron Petty (FNI)  
**FROM:** Wes Wiegrefe, CWB (FNI)  
**SUBJECT:** Ecological Resources Inventory and Analysis  
**DATE:** June 13, 2025  
**PROJECT:** AAC23422 – Upper San Marcos Site 5

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### Introduction

Freese and Nichols, Inc. (FNI) personnel conducted a pedestrian survey of the proposed Upper San Marcos Site 5 project area on September 7, 2023. The purpose of the survey was to inventory the ecological resources within the proposed project limits of investigation (LOI), including the identification of potential waters of the U.S. that could be regulated by Section 404 of the Clean Water Act and areas that could be potential habitat for federally listed threatened or endangered species. Furthermore, the survey was performed to characterize the soils, floodplains, fish and wildlife habitat, invasive species, and riparian areas identified within the proposed LOI. Figures and site photographs are presented in **Appendices A and B**, respectively.

### Project Description

The Upper San Marcos Site 5 project includes the completion of a Natural Resource Conservation Service (NRCS) Supplemental Watershed Plan-Environmental Document (Plan-ED) for the existing Upper San Marcos Flood Retarding Structure (FRS) No. 4. Hays County Soil and Water Conservation District and NRCS are seeking to complete an authorized plan assessing project alternatives, which would address the reclassification of the FRS to a high-hazard dam. The Plan-ED will describe the existing conditions, develop alternatives, evaluate the economic, social, and environmental impact of the alternatives, and recommend a preferred alternative. The Plan-ED must be prepared in accordance with the National Environmental Policy Act (NEPA).

Four alternatives were assessed that would address the reclassification of Upper San Marcos FRS No. 4 to a high-hazard dam, in addition to one alternative that would include decommissioning the FRS. Alternative 1A would include the conversion of the auxiliary spillway to a roller-compacted concrete (RCC) spillway, and widening the spillway to 385 ft with no change to the top of dam height. Alternative 1B would include the conversion of the auxiliary spillway to an RCC spillway of the same width, and raising the top of dam by 2.4 ft. Alternative 2A would include the conversion of the auxiliary spillway to an RCC, and widening the spillway to 405 ft with no change to the top of dam height. Alternative 2B would include the conversion of the auxiliary spillway to an RCC spillway of the same width, and raising of the top of dam by 2.9 ft. The decommissioning alternative would remove the storage function of the FRS by cutting a notch in the existing dam and restoring the existing upstream inundation area.



### Ecological Setting

The project area is located within the Balcones Canyonlands ecoregion of the Edwards Plateau. This ecoregion is located along the Balcones Fault Zone and has historically been dominated by deciduous woodlands characterized by escarpment black cherry (*Prunus serotina* var. *eximia*), Texas mountain laurel (*Sophora secundiflora*), Lacey oak (*Quercus laceyi*), bigtooth maple (*Acer grandidentatum*), Carolina basswood (*Tilia americana* var. *caroliniana*), and plateau live oak (*Quercus fusiformis*). Shrublands in more arid regions are characterized by Ashe juniper (*Juniperus ashei*), sumac (*Rhus* spp.), Texas sotol (*Dasylirion texanum*), sweet acacia (*Vachellia farnesiana*), and honey mesquite (*Prosopis glandulosa*). Wetland and riparian communities are characterized by bald cypress (*Taxodium distichum*), American sycamore (*Platanus occidentalis*), and black willow (*Salix nigra*). High-gradient streams originating from springs in steep-sided canyons bisect the landscape through porous limestone soils (USEPA, 2013).

### Site Conditions

The Upper San Marcos Site 5 project area is located approximately 1.8 miles west of San Marcos in Hayes County, Texas (**Figures 1 and 2**). The site is currently located within an area dominated by rocky, wooded hillslopes, scrubland, and riparian woodlands used for recreation and livestock grazing. The existing normal pool elevation impounds Purgatory Creek, a tributary of the San Marcos River. Site photos are attached in **Appendix B**.

Vegetation at the site is consistent with the surrounding area and included tree and shrub species such as: Agarita (*Berberis trifoliolata*), Ashe juniper, poverty weed (*Baccharis neglecta*), cedar elm (*Ulmus crassifolia*), dwarf palmetto (*sabal minor*), honey mesquite, plateau live oak, prairie sumac (*Rhus lanceolata*), Shumard oak (*Quercus shumardii*), Texas persimmon (*Diospyros texana*), and sugarberry (*Celtis laevigata*). Herbaceous, and vine species, as well as cacti, included: buffalo grass (*Bouteloua dactyloides*), common lantana (*Lantana camara*), inland sea oats (*Chasmanthium latifolium*), sawtooth greenbrier (*Smilax rotundifolia*), Texas prickly pear (*Opuntia engelmannii*), upright prairie coneflower (*Ratibida columnifera*), and Virginia wildrye (*Elymus virginicus*).

Hays County has a humid subtropical climate with hot summers and mild winters. Average summer temperatures are near 84 °F, and are near 52 °F during the winter. Precipitation is abundant throughout the year, with an approximate yearly average of 37 inches, though thunderstorms are common during the spring and summer months. The county rarely receives snow during the colder months.

Soil series present within the proposed project area include: Anhalt clay, 1 to 3 percent slopes; Comfort-Rock outcrop complex, 1 to 8 percent slopes; Denton silty clay, 1 to 3 percent slopes; Krum clay, 3 to 5 percent slopes; Orif soils, moist, 0 to 3 percent slopes, frequently flooded; Rumble-Comfort, rubbly association, 1 to 8 percent slopes; and Tarpley clay, 1 to 3 percent slopes. According to the NRCS list of hydric soils, one of the soil series within the proposed project area (Orif soils, moist, 0 to 3 percent slopes, frequently) is classified as hydric (**Figure 3**).

### **Waterbodies**

The USACE regulates the discharge of dredged and fill material into waters of the U.S. (WOTUS), including wetlands, under Section 404 of the Clean Water Act (Section 404). WOTUS (i.e., jurisdictional waters) include relatively permanent streams that display ordinary high water marks (OHWMs) and a surface downstream hydrologic connection with traditional navigable waters (TNW) of the U.S., impoundments of such streams, and wetlands directly abutting these jurisdictional waters. The term OHWM means “that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural lines 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” (33 CFR 328.3). Official determination of the presence or absence of WOTUS can only be obtained by requesting an approved jurisdictional determination (AJD) from the USACE.

#### *Open Water Bodies/Impoundments*

One open water body feature was identified in the proposed project area. The Upper San Marcos Site 5 FRS impounds flow along Purgatory Creek (**Photos 1, 2, & 3**). The area below the normal pool elevation of Upper San Marcos Site 5 FRS was dry at the time of the site visit and appears to only hold water temporarily following periods of significant precipitation.

#### *Streams*

Five streams were identified in the proposed project area. Purgatory Creek (Stream 1) is a tributary of the San Marcos River and is impounded by the Upper San Marcos FRS 5 within the LOI (**Photos 4, 5, 6, & 7**). The ephemeral reach of Stream 1 in the project area flows generally east through the LOI and has an average OHWM width of 20 ft. Stream 2 is an ephemeral tributary of Purgatory Creek, which flows east through the LOI and has an average OHWM width of 10 ft (**Photo 8**). Stream 3 is an ephemeral tributary of Purgatory Creek, which flows south through the LOI and has an average OHWM width of 15 ft (**Photo 9**). Stream 4 is an ephemeral tributary of Stream 3, which flows south through the LOI and has an average OHWM width of 10 ft. Stream 5 is an ephemeral tributary of Purgatory Creek, which flows east through the LOI and has an average OHWM width of 10 ft (**Photo 10**). Due to the ephemeral nature of Purgatory Creek and its tributaries within the project area it is FNI’s opinion that these reaches of stream would not be considered relatively permanent.

#### *Wetlands*

No wetlands were identified within the proposed project area.

Table 1 summarizes the potential WOTUS within the LOI. See relevant maps (**Figures 4 and 7**) in **Appendix A**, and site photos in **Appendix B**.



**Table 1 – Waterbodies within the Proposed Project Area**

| Feature Name                        | Feature Type     | Potential Jurisdictional Status* | Area in LOI (Acres) | Length in LOI (Linear Feet) |
|-------------------------------------|------------------|----------------------------------|---------------------|-----------------------------|
| Purgatory Creek (Stream 1)          | Ephemeral Stream | Non-jurisdictional               | 2.61                | 5,693                       |
| Stream 2                            | Ephemeral Stream | Non-jurisdictional               | 0.36                | 1,581                       |
| Stream 3                            | Ephemeral Stream | Non-jurisdictional               | 1.07                | 3,108                       |
| Stream 4                            | Ephemeral Stream | Non-jurisdictional               | 0.39                | 1,687                       |
| Stream 5                            | Ephemeral Stream | Non-jurisdictional               | 0.32                | 1,382                       |
| Upper San Marcos Site 5 Normal Pool | Impoundment      | Non-jurisdictional               | 22.95               | -                           |

\*Official determination of the presence or absence of WOTUS can only be obtained by requesting an AID from the USACE.

### Impact to WOTUS & Section 404

Purgatory Creek is a tributary of the San Marcos River, which is a perennial tributary of the Guadalupe River, which flows into the Gulf of Mexico. However, because Purgatory Creek, its tributaries, and the Upper San Marcos Site 5 Normal Pool are not relatively permanent within the project area, it is FNI's opinion that these features would not be considered WOTUS by the USACE.

The proposed project alternatives would avoid the discharge of dredged or fill materials into WOTUS, and therefore would not require authorization under Section 404. If construction activities were to impact WOTUS, the proposed construction activities would be subject to Section 404 permit regulations and should be designed to meet the terms and conditions of either a nationwide permit or standard individual permit.

### Water Quality

The Texas Commission on Environmental Quality (TCEQ) is charged through federal mandate with protecting the quality of waters within Texas. The TCEQ's approach to this mandate includes measuring water quality at locations across the state, determining if the quality in streams, lakes, and creeks is acceptable, and implementing plans to clean up water bodies that are impacted.

The TCEQ Texas Surface Water Quality Standards are rules designed to establish goals for water quality throughout the state and provide a basis for regulatory programs to attain those goals. Water quality standards serve to signal a situation where water quality may be inadequate to meet the use or uses of a particular water body. Five general categories for water use, known as "designated uses", are defined in Texas:

- General
- Aquatic life use
- Recreation

- Public water supply
- Fish consumption

Major surface water bodies in the state have been classified with site-specific designated uses in Title 30, Chapter 307 of the Texas Administrative Code (30 TAC §307), but many smaller water bodies have not been classified and do not have site-specific designated uses. All unclassified surface water bodies without site-specific designated uses are protected by the “general criteria” defined in 30 TAC §307.4.

The TCEQ divides water bodies into “segments” to provide the basic unit for assigning site-specific standards and for applying water quality management programs. Segments can be further divided into “assessment units.” All classified water bodies and some smaller unclassified water bodies have been assigned a unique segment identification code (TCEQ Segment ID). However, many water bodies in the state have not been assigned a TCEQ Segment ID.

Because it would be impractical to test every water body for all possible pollutants, assessments of water quality in Texas are performed by evaluating indicators of water quality. Indicators are an indirect measure of the health or quality of a particular part of the aquatic system. Some indicators, such as the health of fish communities, are tied to specific designated uses, while others, such as nutrients, are not.

#### *Section 303 (d), & 305 (b)*

If the indicator data published in the 2024 Texas Integrated Report of Surface Water Quality (the 2024 Texas Integrated Report) reveal that water quality is inadequate to meet the goals of the water body’s designated use, the TCEQ identifies the water body as an impaired water in a section of the 2024 Texas Integrated Report called the 303(d) list. The 303(d) list is required by the federal CWA and is submitted to the U. S. Environmental Protection Agency (EPA) for approval. Water bodies added to the list are subject to a Total Maximum Daily Load (TMDL) assessment, which is an assessment of the root cause of poor water quality. An Implementation Plan (I-Plan) developed by local stakeholders to remediate pollution sources usually accompanies the TMDL (**Appendix C**).

For the purpose of the Upper San Marcos Site 5 project, a water body is impaired if it has been identified, pursuant to the latest TCEQ and EPA approved CWA 303(d) lists or the 2022 Texas Integrated Report for CWA Sections 305(b) and 303(d). Additionally, water bodies with concerns for non-attainment or exceeding screening levels are identified within the Integrated Report and can be useful to evaluate potential sources of impairments.

The TCEQ requires that the classified segment that first receives discharges from the Upper San Marcos Site 5 project limits, either directly or indirectly, be identified. This evaluation has determined stormwater discharges from the Upper San Marcos Site 5 project eventually reach the following classified segment: Upper San Marcos River (Segment 1814).

Segment 1814 is located east of the Upper San Marcos Site 5 project and receives stormwater discharges from the Upper San Marcos Site 5 project indirectly by way of Purgatory Creek. According to the 2024 305(b) list, Segment 1814 fully supports General Use, Recreation Use, Aquatic Life Use, and Domestic Water Supply Use (Texas Integrated Report - Assessment Results for Basin 18 - Guadalupe River, 2024). Segment 1814 is identified on the



2024 Texas 303(d) List of Impaired Waters for Total Dissolved Solids, however Segment 1814 is not subject to TMDL requirements at this time; therefore, the Purgatory Creek-San Marcos River watershed does not have a TMDL to which stormwater discharges contribute. Segment 1814 is subject to the Upper San Marcos River Watershed Protection Plan (WPP), however, the WPP does not have best management practices in place that will affect The Upper San Marcos Site 5 project.

#### Section 402

Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) Program, which is administered by the State of Texas through the TPDES. Section 402 requires a permit for sewer and stormwater discharges from developments, construction sites, or other areas of soil disturbance. As mentioned, while Segment 1814 is not subject to TMDLs, construction activities must maintain compliance with the Texas Stormwater General Permit for Construction Activities (TXR150000).

Segment 1814, as well as unclassified/unnamed water bodies that receive stormwater discharges are summarized in Table 2.

**Table 2 – Classified Segment Summary**

| Classified Water Body/Watershed            | Receiving Water Body Name             | Receives Stormwater Directly or Indirectly | 303(d) or 305(b) List | TMDL | Listed Water Quality Concerns |
|--------------------------------------------|---------------------------------------|--------------------------------------------|-----------------------|------|-------------------------------|
| Purgatory Creek-San Marcos River Watershed | Purgatory Creek                       | Directly                                   | None                  | No   | None                          |
|                                            | Upper San Marcos River (Segment 1814) | Indirectly                                 | 305(b)                | No   | None                          |

#### Edwards Aquifer Contributing Zone

The Upper San Marcos Site 5 project is located within the Edwards Aquifer Contributing Zone, and must meet all applicable requirements of, and operate according to, 30 TAC §213 (Edwards Aquifer Rule). The operator or operators at the Upper San Marcos Site 5 project must comply with the Edwards Aquifer Rule due to the anticipated construction activities that include “clearing, excavation, or other activities which alter or disturb the topographic or existing stormwater runoff characteristics of a site...” and “any other activities that pose a potential for contaminating stormwater runoff...”. A Contributing Zone Plan must be prepared and submitted for approval by TCEQ prior to commencement of regulated activities.

### Clean Air Act

The Clean Air Act (CAA) regulates air emissions from stationary and mobile sources and authorizes the EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and public welfare and to regulate emissions of hazardous air pollutants. Non-attainment areas are areas considered to have air quality worse than the NAAQS defined in the Clean Air Act. The proposed LOI is currently not within a non-attainment area.

The proposed project is expected to result in only minor, short-term emissions of dust and other particulate matter from construction, and will not significantly increase the emission rate of any regulated air pollutant.

### FEMA Floodplains

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) 48209C0388F, 48209C0476F, and 48209C0477F, the proposed project site would be constructed within the floodplain of Stream 1 (**Figure 5**). As such, the local floodplain administrator should be contacted prior to construction for the proposed project to acquire floodplain-related authorizations, if needed.

### Threatened and Endangered Species

The proposed project LOI was surveyed for potential habitat of both federal and state listed threatened and endangered species. Table 3 lists federal and state listed species, which may be located in Hays County.

**Table 3. Federally Listed Species  
of Potential Occurrence in Hays County, Texas<sup>1</sup>**

| Common Name               | Scientific Name <sup>2</sup>          | Federal Status <sup>2</sup> | State Status <sup>2</sup> | Effects Determination |
|---------------------------|---------------------------------------|-----------------------------|---------------------------|-----------------------|
| Tricolored Bat            | <i>Perimyotis subflavus</i>           | PE                          | -                         | May Effect            |
| Golden-cheeked Warbler    | <i>Setophaga chrysoparia</i>          | E                           | E                         | May Effect            |
| Interior Least Tern       | <i>Sternula antillarum athalassos</i> | -                           | E                         | No Effect             |
| Piping Plover             | <i>Charadrius melodus</i>             | T                           | T                         | No Effect             |
| Rufa Red Knot             | <i>Calidris canutus rufa</i>          | T                           | T                         | No Effect             |
| White-faced Ibis          | <i>Plegadis chihi</i>                 | -                           | T                         | No Effect             |
| Whooping Crane            | <i>Grus americana</i>                 | E                           | E                         | No Effect             |
| Wood Stork                | <i>Mycteria americana</i>             | -                           | T                         | No Effect             |
| Cagle's Map Turtle        | <i>Graptemys caglei</i>               | -                           | T                         | No Effect             |
| Texas Horned Lizard       | <i>Phrynosoma cornutum</i>            | -                           | T                         | May Effect            |
| Austin Blind Salamander   | <i>Eurycea waterlooensis</i>          | E                           | E                         | No Effect             |
| San Marcos Salamander     | <i>Eurycea nana</i>                   | T                           | T                         | No Effect             |
| Barton Springs Salamander | <i>Eurycea sosorum</i>                | E*                          | E                         | No Effect             |
| Blanco Blind Salamander   | <i>Eurycea robusta</i>                | -                           | T                         | No Effect             |
| Texas Blind Salamander    | <i>Eurycea rathbuni</i>               | E                           | E                         | No Effect             |



| Common Name                    | Scientific Name <sup>2</sup>  | Federal Status <sup>2</sup> | State Status <sup>2</sup> | Effects Determination |
|--------------------------------|-------------------------------|-----------------------------|---------------------------|-----------------------|
| Texas Salamander               | <i>Eurycea neotenes</i>       | -                           | T                         | No Effect             |
| Texas Troglobitic Water Slater | <i>Lirceolus smithii</i>      | -                           | T                         | No Effect             |
| Fountain Darter                | <i>Etheostoma fonticola</i>   | E                           | E                         | No Effect             |
| Headwater Catfish              | <i>Ictalurus lupus</i>        | -                           | T                         | No Effect             |
| Guadalupe Darter               | <i>Percina apristis</i>       | -                           | T                         | No Effect             |
| Balcones Spike                 | <i>Fusconaia iheringi</i>     | E*                          | E                         | No Effect             |
| False Spike                    | <i>Fusconaia mitchelli</i>    | E*                          | E                         | No Effect             |
| Guadalupe Fatmucket            | <i>Lampsilis bergmanni</i>    | E                           | T                         | No Effect             |
| Guadalupe Orb                  | <i>Cyclonaias necki</i>       | E                           | E                         | No Effect             |
| Texas Fatmucket                | <i>Lampsilis bracteata</i>    | E*                          | T                         | No Effect             |
| Texas Fawnsfoot                | <i>Truncilla macrodon</i>     | T*                          | T                         | No Effect             |
| Texas Pimpleback               | <i>Cyclonaias petrina</i>     | E*                          | E                         | No Effect             |
| Comal Springs Dryopid Beetle   | <i>Stygoparnus comalensis</i> | E                           | E                         | No Effect             |
| Comal Springs Riffle Beetle    | <i>Heterelmis comalensis</i>  | E                           | E                         | No Effect             |
| Monarch Butterfly              | <i>Danaus plexippus</i>       | PT                          | -                         | May Effect            |
| Peck's Cave Amphipod           | <i>Stygobromus pecki</i>      | E                           | E                         | No Effect             |
| Texas Wild-rice                | <i>Zizania texana</i>         | E                           | E                         | No Effect             |

<sup>1</sup> According to TPWD (2025) and USFWS (2025).

<sup>2</sup> E = Endangered; T = Threatened; PE = Proposed Endangered; PT = Proposed Threatened; C = Candidate; E\* = Endangered based on RTEST but not present in IPaC Report; T\* = Threatened based on RTEST but not present in IPaC Report

### Federally Listed Species

According to the U.S. Fish and Wildlife Service's (USFWS) Information for Planning and Consultation (IPaC) resource list received on June 13, 2025 (**Appendix D**), the following species are listed as threatened, endangered, or candidate under the Endangered Species Act (ESA), and may occur in the project area located within Hays County, Texas:

The tricolored bat (*Perimyotis subflavus*) is a species proposed for federal listing as endangered in Hays County. Tricolored bats roost in deciduous hardwood forests, pine trees, eastern red cedar (*Juniperus virginiana*), Spanish moss (*Tillandsia usneoides*), and human structures such as barns, beneath porch roofs, bridges, and concrete bunkers during the spring, summer, and fall. They prefer mature deciduous hardwood forests which provide more structural diversity for roosting sites. Winter hibernacula in the southern U.S. frequently include road-associated culverts and other human structures; caves and tree cavities may also be used. While no individuals were identified during the pedestrian survey, preferred summer habitat for this species was identified within the project area (**Appendix A, Figure 6; Appendix B, Photo 8**). Therefore, alternatives which would impact trees within the proposed project area (Decommissioning, Alternative 1A, and Alternative 2A) may affect the tricolored bat.

The golden-cheeked warbler (*Setophaga chrysoparia*) is federally listed as endangered in Hays County. Golden-cheeked warblers breed in oak (*Quercus* spp.) and Ashe juniper woodlands along hillslopes and require Ashe juniper bark to construct their nests. While no individuals were identified during the pedestrian survey, preferred breeding habitat for this species was identified within the LOI (**Appendix A, Figure 6; Appendix B, Photo 9**). Therefore, alternatives that would impact oak and Ashe juniper woodlands within the project area (Decommissioning, Alternative 1A, and Alternative 2A) may affect the golden-cheeked warbler.

The piping plover (*Charadrius melodus*) is federally listed as threatened in Hays County. In the interior U.S., piping plovers nest on the unvegetated shorelines of alkaline lakes, reservoirs, or river sandbars. Additionally, the piping plover is currently designated within the area as only needing impact considerations for wind energy projects. No shorelines/sandbars, which may serve as nesting habitat were identified within the proposed project area. Therefore, no alternatives may affect the piping plover.

The rufa red knot (*Calidris canutus rufa*) is federally listed as threatened in Hays County. In the interior U.S., rufa red knots use saline lakes, and possibly large wetlands and riverine sandbars as stopover habitat. Additionally, the rufa red knot is currently designated within the area as only needing impact considerations for wind energy projects. No potential stopover habitats were identified within the proposed project area. Therefore, no alternatives may affect the rufa red knot.

The whooping crane (*Grus americana*) is federally listed as endangered in Hays County. Whooping cranes winter in Canada and breed on the Texas Gulf Coast, utilizing sparsely-vegetated, shallow wetlands and flooded fields in rolling terrain away from human activity during migration. No potential stopover habitats were identified within the proposed project area. Therefore, no alternatives may affect the whooping crane.

The Austin blind salamander (*Eurycea waterlooensis*) is federally listed as endangered in Hays County. Austin blind salamanders inhabit high quality waters maintained by groundwater sources from the Barton Springs Segment of the Edwards Aquifer, and are typically found in subterranean habitats within caves or underground areas. The project area is not one of the four Barton Springs outlets where the salamanders have been identified, and no caves exhibiting groundwater were identified within the project area. Therefore, no alternatives may affect the Austin blind salamander.

The San Marcos salamander (*Eurycea nana*) is federally listed as threatened in Hays County. San Marcos salamanders inhabit thermally stable, spring-fed streams with velocities around one centimeter per second, that contain cobble, gravel, and boulder substrates with coverage from *Amblystegium* moss and filamentous algae. The project area is not within or adjacent to the San Marcos Springs to which the salamander is endemic, and no streams that constitute habitat for the San Marcos salamander were identified in the project area. Therefore, no alternatives may affect the San Marcos salamander.

The Texas blind salamander (*Eurycea rathbuni*) is federally listed as endangered in Hays County. Texas blind salamanders inhabit water-filled subterranean caverns of the Edwards Aquifer in San Marcos, Texas. Additionally,



the Texas blind salamander is currently designated within the area as only needing impact considerations for projects which would adversely affect the water quality and quantity of the Edwards Aquifer and surface waters, which contribute to the Edwards Aquifer. No caves which constitute habitat for the salamander were identified within the project area. Streams within the project area may contribute to recharge of the Edwards Aquifer, however the proposed project, which only temporarily impounds flows of the stream during flood events, would not adversely affect the water quality or quantity of these surface waters. Therefore, no alternatives may affect the Texas blind salamander.

The Fountain Darter (*Etheostima fonticola*) is federally listed as endangered in Hays County. Fountain Darters inhabit clean, undisturbed stream bottoms with constant temperatures, adequate flows, and a mix of submergent plants such as algae, mosses, and vascular plants. No streams that constitute habitat for the Fountain Darter were identified in the project area. Therefore, no alternatives may affect the Fountain Darter.

The Guadalupe Fatmucket (*Lampsilis bergmanni*) is federally listed as endangered in Hays County. Guadalupe Fatmucket inhabit small, flowing streams and rivers with mud, sand, and gravel substrates. No streams that constitute habitat for the Guadalupe Fatmucket were identified in the project area. Therefore, no alternatives may affect the Guadalupe Fatmucket.

The Guadalupe Orb (*Cyclonaias necki*) is federally listed as endangered in Hays County. Guadalupe Orbs inhabit riffles and runs of moderately sized rivers to depths of 3.3 feet with mud, silt, gravel, or cobble substrates. No streams that constitute habitat for the Guadalupe Orb were identified in the project area. Therefore, no alternatives may affect the Guadalupe Orb.

The Comal Springs dryopid beetle (*Stygoparnus comalensis*) is federally listed as endangered in Hays County. Comal Springs Dryopid Beetles inhabit both gravel and cobble dominated surface waters with aquatic vegetation and subterranean spaces associated with springs issuing from the Edwards Aquifer. The project area is not within or adjacent to the Comal or Fern Bank Springs where the beetle has been identified, and no streams or caves that constitute habitat for the beetle were identified in the project area. Therefore, no alternatives may affect the Comal Springs dryopid beetle.

The Comal Springs riffle beetle (*Heterelmis comalensis*) is federally listed as endangered in Hays County. Comal Springs Riffle Beetles inhabit gravel dominated riffles associated with springs issuing from the Edwards Aquifer. The project area is not within or adjacent to the Comal or San Marcos Springs where the beetle has been identified, and no streams that constitute habitat for the beetle were identified in the project area. Therefore, no alternatives may affect the Comal Springs riffle beetle.

The monarch butterfly (*Danaus plexippus*) is a species proposed for federal listing as threatened in Hays County. Monarch butterflies undergo long-distance migrations throughout North America and lay their eggs on obligate milkweed host plants in a variety of forested and grassland habitats. Native grasslands which could support milkweed are located within the project area. Therefore, alternatives that would impact native grasslands within

the project area (Decommissioning, Alternative 1A, Alternative 1B, Alternative 2A, and Alternative 2B) may affect the monarch butterfly.

The Peck's cave amphipod (*Stygobromus pecki*) is federally listed as endangered in Hays County. Peck's cave amphipod inhabits water-filled subterranean caverns and springs of the Edwards Aquifer in San Marcos, Texas. The project area is not within or adjacent to San Marcos Springs where the amphipod has been identified, and no streams that constitute habitat for the amphipod were identified in the project area. Therefore, no alternatives may affect the Peck's cave amphipod.

Texas wild-rice (*Zizania texana*) is federally listed as endangered in Hays County. Texas wild-rice is a submergent aquatic perennial grass that stands at depths up to 3.3 feet and requires clear, thermally constant, flowing water. Texas wild-rice is only found in the San Marcos River and prefers spring-fed gravel and sand substrates overlying clay. The project area is not within or adjacent to the San Marcos River, and no streams that constitute habitat for Texas wild-rice were identified in the project area. Therefore, no alternatives may affect Texas wild-rice.

#### *State Listed Species*

The Texas Parks and Wildlife Department's (TPWD) List of Rare, Threatened, and Endangered Species of Texas (RTEST) by County designated species that are federally and state listed as threatened and endangered, as well as rare species which are not listed as threatened or endangered (**Appendix D**). The following abbreviated list includes state listed threatened or endangered species included in the RTEST that may occur within Hays County, Texas:

The interior least tern (*Sternula antillarum athalassos*) is state listed as endangered within Hays County. Interior least terns nest and stop over along sand and gravel bars within large, braided streams and man-made structures, such as inland beaches, wastewater treatment plants, and gravel mines in the interior U. S. No potential stopover or nesting habitats were identified within the proposed project area. Therefore, no alternatives may affect the interior least tern.

The white-faced ibis (*Plegadis chihi*) is state listed as threatened within Hays County. White-faced ibis winter in the northern Great Plains and breed on the Texas Gulf Coast, utilizing freshwater marshes, sloughs, and irrigated rice fields, as well as brackish and saltwater habitats, as stop-over habitat during migration. No potential stopover habitats were identified within the proposed project area. Therefore, no alternatives may affect the white-faced ibis.

The wood stork (*Mycteria americana*) is state listed as threatened within Hays County. Wood storks forage in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water in Texas during the non-breeding season, roosting in tall snags and sometime in heronries with other wading birds. No roosting or foraging habitats for the wood stork were identified in the project area. Therefore, no alternatives may affect the wood stork.



The Cagle's map turtle (*Graptemys caglei*) is state listed as threatened within Hays County. Cagle's map turtles inhabit swift to moderately flowing streams with gravel or cobble substrates connected by silt or mud bottomed pools, and nest on gently sloping sand banks. No streams that constitute habitat for the turtle were identified within the project area. Therefore, no alternatives may affect the Cagle's map turtle.

The Texas horned lizard (*Phrynosoma cornutum*) is state listed as threatened within Hays County. Texas horned lizards use open, sandy to rocky habitats with sparse vegetation, including grassland, prairie, cactus, scattered brush, or scrubby trees. While no individuals were identified during the pedestrian survey, preferred habitat for this species was identified contiguously across the proposed project area. Therefore, alternatives that would impact brush, trees, or grasslands within the project area (Decommissioning, Alternative 1A, Alternative 1B, Alternative 2A, and Alternative 2B) may affect the Texas horned lizard.

The Texas salamander (*Eurycea neotenes*) is state listed as threatened within Hays County. Texas salamanders inhabit streams maintained by groundwater sources from the Edwards Aquifer, and can be found in both surface and subterranean habitats within caves or underground areas. No streams or caves that constitute habitat for the Texas salamander were identified in the project area. Therefore, no alternatives may affect the Texas salamander.

The Barton Springs salamander (*Eurycea sosorum*) is state and federally listed as endangered in Hays County, but was not listed in the USFWS IPAC for the project area. Barton Springs salamanders inhabit streams maintained by groundwater sources from the Barton Springs Segment of the Edwards Aquifer, and can be found in both surface and subterranean habitats within caves or underground areas. The project area is not one of the four Barton Springs outlets where the salamanders have been identified, and no surface waters or caves exhibiting groundwater were identified within the project area. Therefore, no alternatives may affect the Barton Springs salamander.

The Blanco blind salamander (*Eurycea robusta*) is state listed as threatened in Hays County. The Blanco blind salamander is thought to inhabit water-filled subterranean caverns of the Edwards Aquifer near the Blanco River in San Marcos, Texas. Blanco blind salamanders were identified in 1951, and no other individuals have been identified since. No streams or caves that constitute habitat for the Blanco blind salamander were identified in the project area. Therefore, no alternatives may affect the Blanco blind salamander.

The Texas troglobitic water slater (*Lirceolus smithii*) is state listed as threatened in Hays County. The Texas troglobitic water slater is an obligate inhabitant of subterranean caves with groundwater sources from the Edwards Aquifer. No caves that constitute habitat for the Texas troglobitic water slater were identified in the project area. Therefore, no alternatives may affect the Texas troglobitic water slater.

The Guadalupe Darter (*Percina apristis*) is state listed as threatened in Hays County. The Guadalupe Darter inhabits stream riffles with moderately turbid water and boulder substrate. No streams that constitute habitat for the Guadalupe Darter were identified in the project area. Therefore, no alternatives may affect the Guadalupe Darter.

The Headwater Catfish (*Ictalurus lupus*) is state listed as threatened in Hays County. Headwater Catfish inhabit riffles, runs, and pools of sandy to rocky creeks, rivers, and associated springs. No streams that constitute habitat for the Headwater Catfish were identified in the project area. Therefore, no alternatives may affect the Headwater Catfish.

The Balcones Spike (*Fusconaia iheringi*) is state and federally listed as endangered in Hays County, but was not listed in the USFWS IPAC for the project area. Balcones Spike inhabit flowing streams and rivers with sand, gravel, and cobble substrate riffles and runs. No streams that constitute habitat for the Balcones Spike were identified in the project area. Therefore, no alternatives may affect the Balcones Spike.

The False Spike (*Fusconaia mitchelli*) is state and federally listed as endangered in Hays County, but was not listed in the USFWS IPAC for the project area. False Spike inhabit flowing streams and rivers with sand, gravel, and cobble substrate riffles and runs. No streams that constitute habitat for the False Spike were identified in the project area. Therefore, no alternatives may affect the False Spike.

The Texas Fatmucket (*Lampsilis bracteata*) is state listed as threatened and federally listing as endangered in Hays County, but was not listed in the USFWS IPAC for the project area. Texas Fatmucket inhabits flowing streams and rivers with mud, sand, and gravel substrates. No streams that constitute habitat for the Texas Fatmucket were identified in the project area. Therefore, no alternatives may affect the Texas fatmucket.

The Texas Fawnsfoot (*Truncilla macrodon*) is state and federally listing as threatened in Hays County, but was not listed in the USFWS IPAC for the project area. Texas Fawnsfoot inhabit flowing medium to large streams and rivers with mud, sand, and gravel substrates. No streams that constitute habitat for the Texas Fawnsfoot were identified in the project area. Therefore, no alternatives may affect the Texas fawnsfoot.

The Texas Pimpleback (*Cyclonaias petrina*) is state and federally listing as endangered in Hays County, but was not listed in the USFWS IPAC for the project area. Texas Pimpleback inhabit flowing medium to large streams and rivers with riffle and run habitats of gravel and bedrock substrates. No streams that constitute habitat for the Texas Pimpleback were identified in the project area. Therefore, no alternatives may affect the Texas Pimpleback.

### **Migratory Birds and Bald and Golden Eagle Protection**

The Migratory Bird Treaty Act (MBTA) of 1918 prohibits the “take” (e.g., pursue, hunt, shoot, wound, kill, trap, capture, or collect) or possession of migratory birds, as well as the parts, nest, or eggs of migratory birds. The following migratory birds were observed during the site visit: bluejay (*Cyanocitta cristata*), canyon wren (*Catherpes mexicanus*), chimney swift (*Chaetura pelagica*), lesser goldfinch (*Spinus psaltria*), mourning dove (*Zenaida macroura*), northern cardinal (*Cardinalis cardinalis*), northern mockingbird (*mimus polyglottos*), tufted titmouse (*Baeolophus bicolor*), turkey vulture (*Cathartes aura*), upland sandpiper (*Bartamia longicauda*), and white-eyed vireo (*Vireo griseus*).



No migratory bird nests were observed during the survey; however, migratory birds are likely to nest within the project area or the immediate vicinity. According to US Department of the Interior Memorandums 37050 and 37085, “incidental take”, which includes the take or kill of migratory birds that results from, but is not the purpose of an activity, is not included as “take” under the MBTA. However, according to Chapter 64 of the Texas Parks and Wildlife Code, no person may destroy or take the nest, eggs, or young of birds within the State of Texas. Two common avoidance practices to reduce the potential for the “incidental take” of migratory birds are (1) clearing or grading of the site during the non-breeding season, or (2) conducting migratory bird nest surveys shortly before project construction.

Coordination with the USFWS would be required by the Bald and Golden Eagle Protection Act of 1940 if proposed project activities would “take” or disturb a protected eagle or their nest. It is generally not considered disturbance if construction activities occur greater than 660 feet from a protected nest. Bald and golden eagles or their nests were not observed during the pedestrian survey and are unlikely to use the LOI due to the absence of permanent water features nearby.

### **Amphibian and Reptile Community**

No amphibians were observed during the site visit. Amphibians found in Hays County include: American bullfrog (*Lithobates catesbeianus*), barking frog (*Eleutherodactylus augusti*), Blanchard’s cricket frog (*Acris blanchardi*), cliff chirping frog (*Eleutherodactylus marnockii*), Cope’s gray treefrog (*Hyla chrysoscelis*), couch’s spadefoot toad (*Scaphiopus couchii*), gray treefrog (*Hyla versicolor*), green treefrog (*Hyla cinerea*), green toad (*Bufo debilis*), Gulf Coast toad (*Bufo nebulifer*), fern bank salamander (*Eurycea pterophila*), Rio Grande leopard frog (*Lithobates berlandieri*), small-mouthed salamander (*Ambystoma texanum*), southern leopard frog (*Lithobates sphenoccephala*), spotted chorus frog (*Pseudacris clarkii*), Strecker’s chorus frog (*Pseudacris streckeri*), Texas salamander (*Eurycea neotenes*), Texas toad (*Bufo speciosus*), western narrow-mouthed toad (*Gastrophryne olivacea*), Woodhouse’s toad (*Anaxyrus woodhousii*), and western slimy salamander (*Plethodon albagula*).

The common spotted whiptail (*Aspidoscelis gularis*) and Texas spiny lizard (*Sceloporus olivaceus*) were the only reptiles observed during the site visit. Other reptiles found in Hays County include: black-necked gartersnake (*Thamnophis cyrtopsis*), checkered gartersnake (*Thamnophis marcianus*), coachwhip (*Masticophis flagellum*), common box turtle (*Terrapene carolina*), common kingsnake (*Lampropeltis getula*), common snapping turtle (*Chelydra serpentina*), copperhead (*Agkistrodon contortrix*), cottonmouth (*Agkistrodon piscivorus*), Dekay’s brownsnake (*Storeria dekayi*), diamondback watersnake (*Nerodia rhombifer*), eastern collared lizard (*Crotaphytus collaris*), eastern hog-nosed snake (*Heterodon platirhinos*), eastern mud turtle (*Kinosternon subrubrum*), eastern musk turtle (*Sternotherus odoratus*), eastern racer (*Coluber constrictor*), flat-headed snake (*Tantilla gracilis*), four-lined skink (*Eumeces tetragrammus*), glossy snake (*Arizona elegans*), gophersnake (*Pituophis catenifer*), greater earless lizard (*Cophosaurus texanus*), Great Plains ratsnake (*Elaphe emoryi*), green anole (*Anolis carolinensis*), lined snake (*Tropidoclonion lineatum*), little brown skink (*Scincella lateralis*), long-nosed snake (*Rhinocheilus lecontei*), milksnake (*Lampropeltis triangulum*), ornate box turtle (*Terrapene ornate*), plain-bellied watersnake (*Nerodia erythrogaster*), pond slider (*Trachemys scripta*), prairie kingsnake (*Lampropeltis calligaster*), prairie lizard (*Sceloporus consobrinus*), ring-necked snake (*Diadophis punctatus*), rough earthsnake (*Virginia striatulata*), rough

greensnake (*Opheodrys aestivus*), six-lined racerunner (*Aspidoscelis sexlineatus*), slender glass lizard (*Ophisaurus attenuatus*), spiny softshell (*Apalone spinifera*), spot-tailed earless lizard (*Holbrookia lacerate*), Texas alligator lizard (*Gerrhonotus infernalis*), Texas cooter (*Pseudemys texana*), Texas coral snake (*Micrurus tener*), Texas map turtle (*Graptemys versa*), Texas ratsnake (*Elaphe obsoleta*), Texas spiny lizard (*Sceloporus olivaceus*), Texas threadsnake (*Leptotyphlops dulcis*), western diamondback rattlesnake (*Crotalus atrox*), western groundsnake (*Sonora semiannulata*), western ribbonsnake (*Thamnophis Proximus*), and yellow mud turtle (*Kinosternon flavescens*).

### Terrestrial Vertebrate Community

Eastern fox squirrel (*Sciurus niger*), rock squirrel (*Spermophilus variegatus*), and white-tailed deer (*Odocoileus virginianus*) were the only terrestrial vertebrates observed during the site visit. Scat and bones of wild hogs (*Sus scrofa*) were also observed in the LOI. Other terrestrial vertebrates found in Hays County include: American badger (*Taxidea taxus*), American beaver (*Castor canadensis*), American mink (*Mustela vison*), black-tailed jackrabbit (*Lepus californicus*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), deer mouse (*Peromyscus maniculatus*), eastern cottontail (*Sylvilagus floridanus*), eastern gray squirrel (*Sciurus carolinensis*), eastern mole (*Scalopus aquaticus*), eastern woodrat (*Neotoma floridana*), eastern spotted skunk (*Spilogale putorius*), fulvous harvest mouse (*Reithrodontomys fulvescens*), gray fox (*Urocyon cinereoargenteus*), hispid cotton rat (*Sigmodon hispidus*), hispid pocket mouse (*Chaetodipus hispidus*), hog-nosed skunk (*Conepatus leuconotus*), long-tailed weasel (*Mustela frenata*), least shrew (*Cryptotis parva*), Mexican ground squirrel (*Spermophilus mexicanus*), mountain lion (*Puma concolor*), nine-banded armadillo (*Dasypus novemcinctus*), northern pygmy mouse (*Baiomys taylori*), nutria (*Myocastor coypus*), raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), ringtail (*Bassariscus astutus*), southern plains woodrat (*Neotoma micropus*), striped skunk (*Mephitis mephitis*), swamp rabbit (*Sylvilagus aquaticus*), Texas mouse (*Peromyscus attwateri*), white-ankled mouse (*Peromyscus pectoralis*), white-footed mouse (*Peromyscus leucopus*), and Virginia opossum (*Didelphis virginiana*).

### Fish Habitat

No fish species were observed during the site visit. Fish found within Hays County include: Bigscale Logperch (*Percina maculata*), Black Bullhead (*Ameiurus melas*), Black Crappie (*Pomoxis nigromaculatus*), Blackstripe Topminnow (*Fundulus notatus*), Blacktail Shiner (*Cyprinella venusta*), Blue Catfish (*Ictalurus furcatus*), Bluegill (*Lepomis macrochirus*), Bullhead Minnow (*Pimephales vigilax*), Burrhead Chub (*Macrhybopsis marconis*), Central Stoneroller (*Campostoma anomalum*), Channel Catfish (*Ictalurus punctatus*), Common Carp (*Cyprinus carpio*), Dusky Darter (*Percina sciera*), Fathead Minnow (*Pimephales promelas*), Flathead Catfish (*Pylodictis olivaris*), Freshwater Drum (*Aplodinotus grunniens*), Gizzard Shad (*Dorosoma cepedianum*), Golden Shiner (*Notemigonus crysoleucas*), Grass Carp (*Ctenopharyngodon idella*), Green Sunfish (*Lepomis cyanellus*), Gray Redhorse (*Moxostoma congestum*), Guadalupe Bass (*Micropterus treculii*), Guadalupe Roundnose Minnow (*Dionda nigrotaeniata*), Largemouth Bass (*Micropterus salmoides*), Largespring Gambusia (*Gambusia geiseri*), Longear Sunfish (*Lepomis megalotis*), Longnose Gar (*Lepisosteus osseus*), Mexican Tetra (*Astyanax mexicanus*), Mimic Shiner (*Notropis volucellus*), Orangethroat Darter (*Etheostoma spectabile*), Red Shiner (*Cyprinella lutrensis*), Redbreast Sunfish (*Lepomis auritus*), Redear Sunfish (*Lepomis microlophus*), Redspotted Sunfish (*Lepomis miniatus*), Rio Grande Cichlid (*Herichthys cyanoguttatus*), River Carpsucker (*Carpiodes carpio*), Smallmouth Buffalo



(*Ictiobus bubalus*), Spotted Gar (*Lepisosteus oculatus*), Tadpole Madtom (*Noturus gyrinus*), Texas Logperch (*Percina carbonaria*), Texas Shiner (*Notropis amabilis*), Warmouth (*Lepomis gulosus*), Western Mosquitofish (*Gambusia affinis*), White Bass (*Morone chrysops*), White Crappie (*Pomoxis annularis*), and Yellow Bullhead (*Ameiurus natalis*). The proposed project area is inland and not located in or adjacent to areas designated as Essential Fish Habitat.

### **Invasive Species**

Wild hogs (*Sus scrofa*) were the only invasive animal identified in the LOI. Vegetative invasive species observed during the site visit include common lantana. Because this species is ubiquitous within the LOI, if excavated fill from the LOI is not removed, but is used on-site for project related earthwork, construction of the proposed project would not contribute to the spread of vegetative invasive species within or outside the LOI.

No evidence of invasive fungi or microbial organisms were observed during the site visit, and no areas at risk for future invasions were identified.

### **Riparian Areas**

Riparian areas adjacent to Stream 1 are located within the project LOI. These areas contribute to floodplain function, streambank stability and integrity, nutrient cycling, pollutant filtering, sediment retention, and biological diversity of these habitats. NRCS policy requires project alternatives to maintain or improve water quality benefits of riparian areas as a result of project construction. If preferred alternatives do not maintain or improve water quality benefits, the NRCS must discontinue assistance on those portions of the plan impacting riparian areas.

### **Natural Areas**

A recorded designation of a non-federal natural area (Purgatory Creek Natural Area) was observed within the project LOI (**Appendix A, Figure 6**). The Purgatory Creek Natural Area consists of 570 acres of upland meadows, canyon bluffs, dense juniper thickets, and oaks woodlands originally owned by the City of San Marcos (City of San Marcos, 2023). In 2023 the Purgatory Creek Natural Area was acquired by Hays county and designated within a conservation easement to preserve the land from future development. A segment of the Purgatory Creek Natural Area within and adjacent to the LOI of proposed project alternatives was investigated as part of the survey (**Appendix B, Photo 14**). The natural area consists primarily of rocky, wooded hillslopes, scrubland, and riparian woodlands adjacent to Purgatory Creek and the normal pool of the Upper San Marcos Site 5 FRS. NRCS policy is to support the designation of appropriate natural areas and to recognize dedicated natural areas as a land use. FNI recommends that final project design minimize impacts to areas within the boundaries of the Purgatory Creek Natural Area and that Hays County Soil and Water Conservation District and NRCS consultation with Hays County and the City of San Marcos to reach a mutually satisfactory construction alternative.

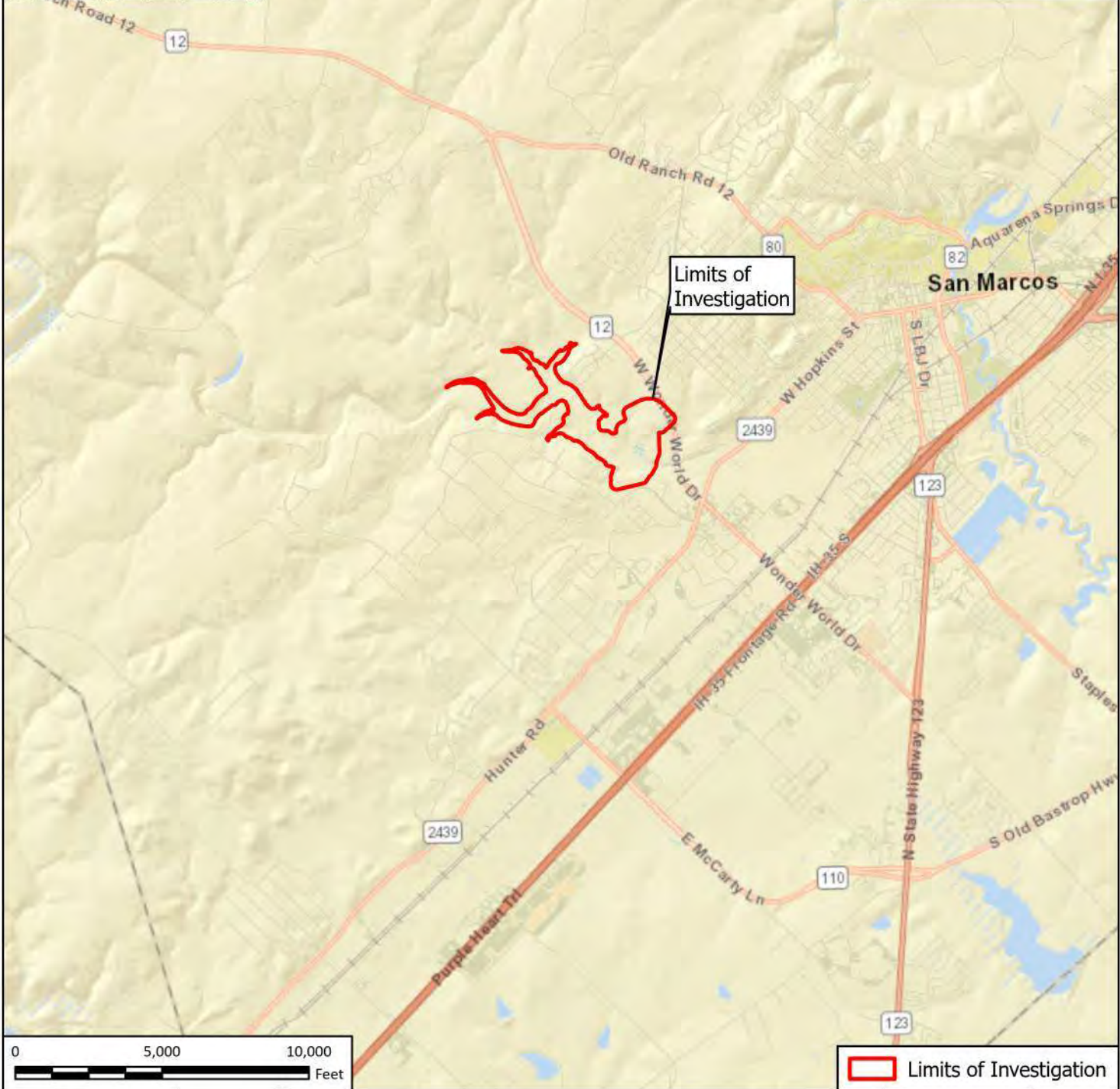
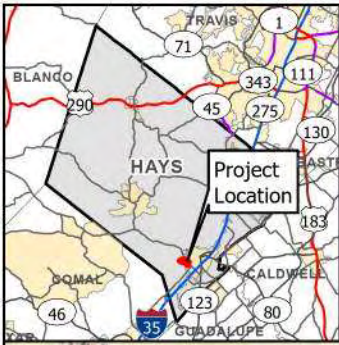
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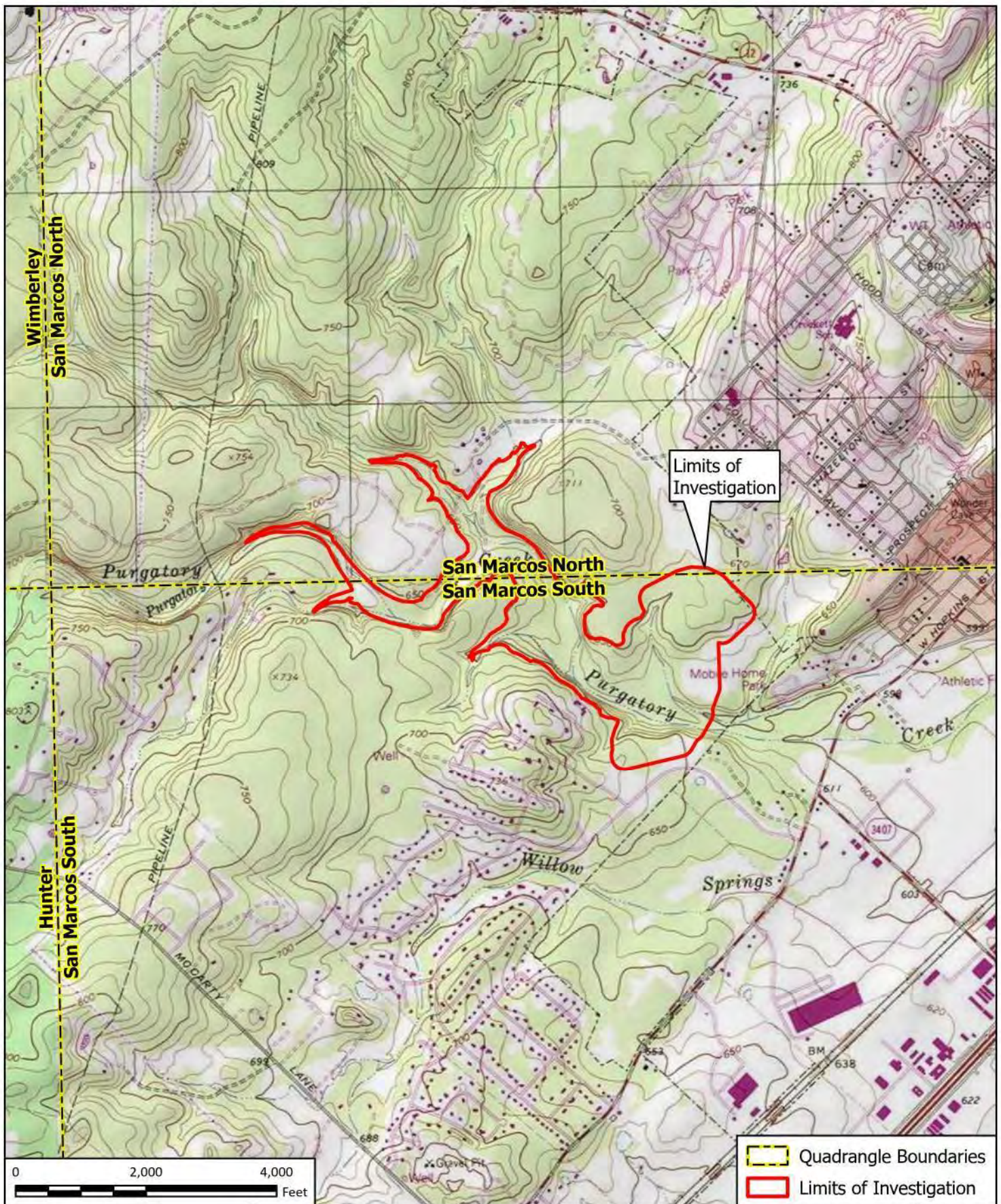
## **Appendix A**

### **Figures**



|                                                                                                                                                                                         |  |                                                                                                         |  |                                       |                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------|--|---------------------------------------|--------------------------------------|
| <p><b>FRESE AND NICHOLS</b><br/>         FRESE AND NICHOLS, INC.<br/>         801 Cherry Street, Suite 2800<br/>         Fort Worth, TX 76102<br/>         Phone - (817) 735 - 7300</p> |  | <p>AD ASTRA COLLABORATIVE</p> <p><b>SWP EA - Upper San Marcos Site 5</b></p> <p><b>Overview Map</b></p> |  | <p>FN JOB NO<br/>AAC23422</p>         | <p><b>1</b></p> <p><b>FIGURE</b></p> |
|                                                                                                                                                                                         |  |                                                                                                         |  | <p>FILE NAME<br/>ES_Memo_USM5.mxd</p> |                                      |
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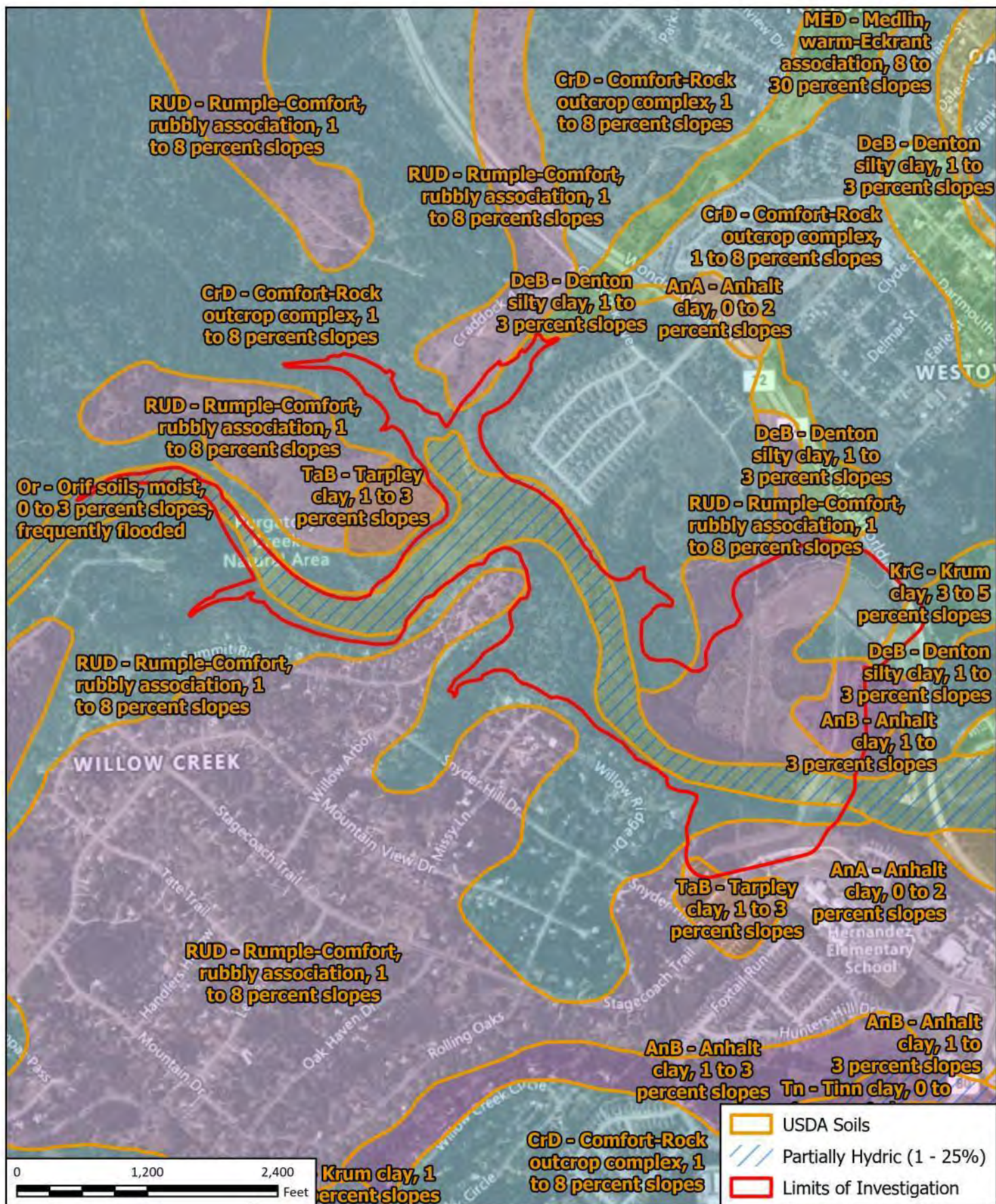
AD ASTRA COLLABORATIVE  
**SWP EA - Upper San Marcos Site 5**  
**USGS Topographic Map**  
 Quad Names: San Marcos North and South

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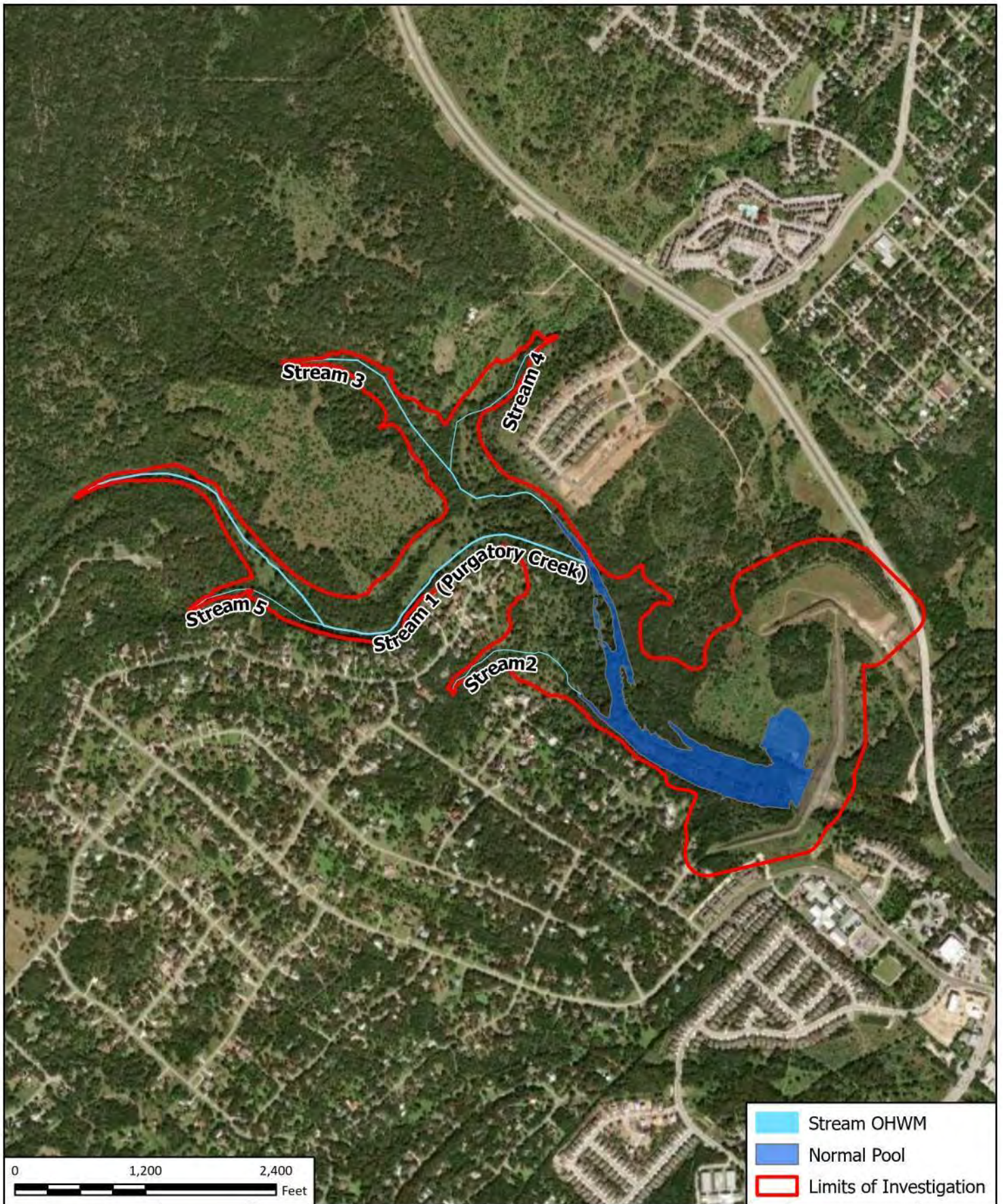
**2**

**FIGURE**



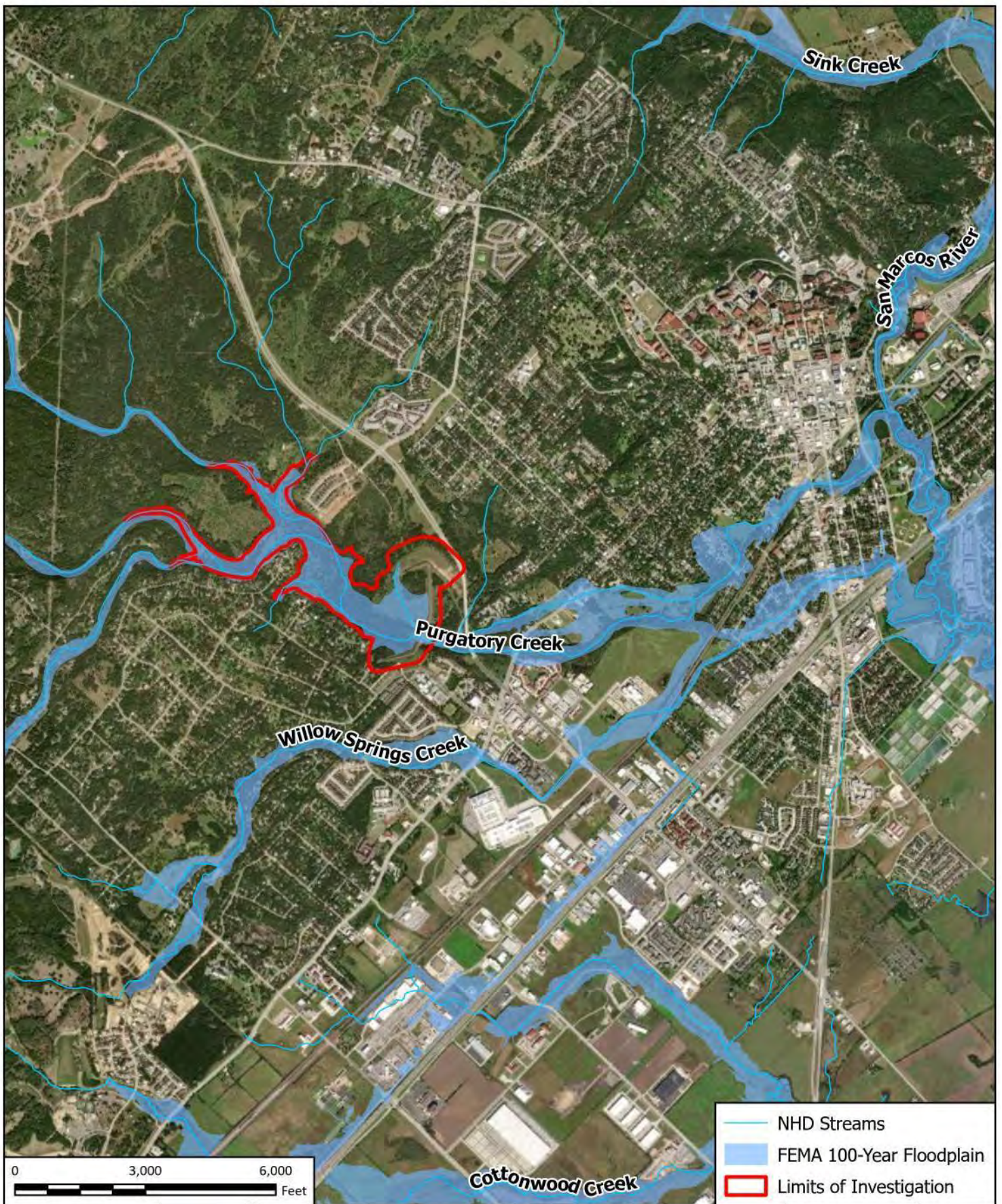






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| <br><b>FREASE AND NICHOLS, INC.</b><br>801 Cherry Street, Suite 2800<br>Fort Worth, TX 76102<br>Phone - (817) 735 - 7300 |  | AD ASTRA COLLABORATIVE<br><b>SWP EA - Upper San Marcos Site 5</b> |  | FN JOB NO<br>AAC23422         | <b>4</b><br><br><b>FIGURE</b> |
|                                                                                                                                                                                                            |                                                                                     | <b>Waterbodies Map</b>                                            |  | FILE NAME<br>ES_Memo_USM5.mxd |                               |
|                                                                                                                                                                                                            |                                                                                     |                                                                   |  | DATE<br>10/25/2023            |                               |
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|                                                                                                                                |  |                                                                                                                |  | FILE NAME<br>ES_Memo_USM5.mxd |                                                                                                      |
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AD ASTRA COLLABORATIVE

**SWP EA - Upper San Marcos Site 5**

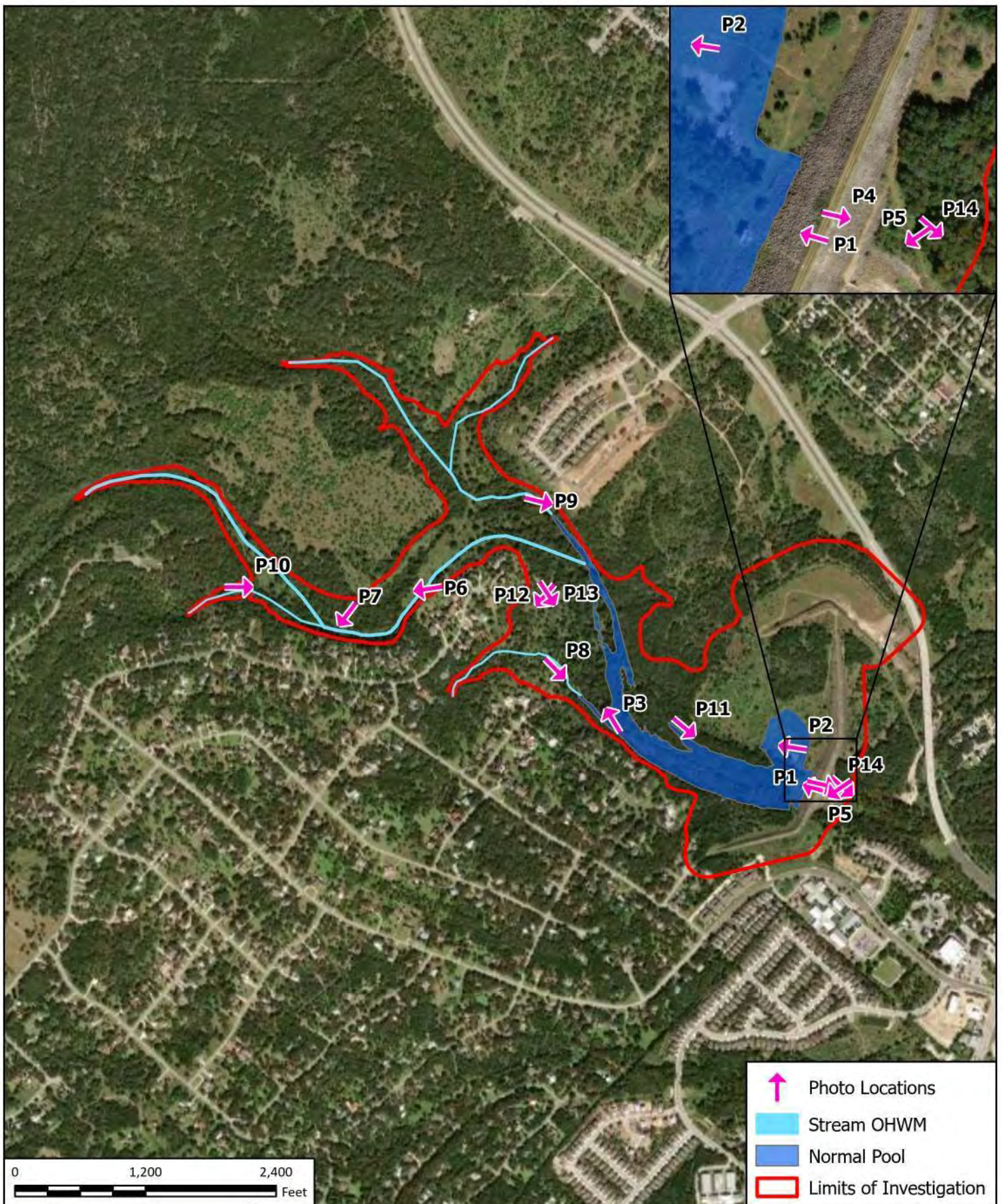
**Endangered Species Map**

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**6**

**FIGURE**





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AD ASTRA COLLABORATIVE  
**SWP EA - Upper San Marcos Site 5**

**Photo Map**

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**7**

**FIGURE**



## **Appendix B**

### **Site Photographs**



Photo 1. View looking west towards the normal pool from the existing dam crest of the Upper San Marcos Site 5 FRS.



Photo 2. View looking west within a large depression within the Upper San Marcos Site 5 FRS normal pool.





Photo 3. View looking northwest within along the historic channel of Purgatory Creek upstream of the FRS riser within the Upper San Marcos Site 5 normal pool.



Photo 4. View looking east (downstream) at Purgatory Creek, and the principal spillway outfall and plunge pool of the Upper San Marcos Site 5 FRS.





Photo 5. View looking southwest at the principal spillway outfall and plunge pool of the Upper San Marcos Site 5 FRS where it outfalls into the vegetated channel of Purgatory Creek.



Photo 6. View looking west (upstream) along the vegetated channel of Purgatory Creek west of the normal pool of the Upper San Marcos Site 5 FRS.





Photo 7. View looking west (upstream) along the vegetated flow path of Purgatory Creek northwest of the normal pool of the Upper San Marcos Site 5 FRS.



Photo 8. View looking southeast (downstream) along Stream 2, an ephemeral tributary of Purgatory Creek in the LOI.





Photo 9. View looking east (downstream) along Stream 3, an ephemeral tributary of Purgatory Creek in the LOI.



Photo 10. View looking east (downstream) along Stream 5, an ephemeral tributary of Purgatory Creek in the LOI.





Photo 11. View looking east at woodlands within the LOI with mature deciduous hardwood trees, which may be potential habitat for the tricolored bat.



Photo 12. View looking southeast at Ashe juniper woodlands within the LOI, which may be potential habitat for the golden-cheeked warbler.





Photo 13. View looking southwest at sparsely vegetated, rocky habitats with cactus and scrubby trees which may be potential habitat for Texas horned lizards.



Photo 14. View looking east at a trail associated with the Purgatory Creek Natural Area east of the Upper San Marcos Site 5 FRS within the project LOI.



**Appendix C**  
**Texas Integrated Report – Assessment Results for Basin 18 –**  
**Guadalupe River, 2024 Pg. 25-26**

| Seg ID: 1814 - Upper San Marcos River<br>AU ID: 1814_01 |                                           |                        |            |          |          |                |                    |              |                  |              |     |    |         |                                 |     |
|---------------------------------------------------------|-------------------------------------------|------------------------|------------|----------|----------|----------------|--------------------|--------------|------------------|--------------|-----|----|---------|---------------------------------|-----|
| Use                                                     | Method                                    | Parameter              | Start Date | End Date | Criteria | #Data Assessed | Mean Data Assessed | #Exceedances | Mean Exceedances | DS Qualifier | LOS | CF | Int LOS | TCEQ Cause                      | Cal |
| General Use                                             | Dissolved Solids                          | Sulfate                | 12/01/15   | 11/30/22 | 50       | 26             | 28.93              | 0            |                  | AD           | FS  | N  | FS      |                                 |     |
|                                                         |                                           | Chloride               | 12/01/15   | 11/30/22 | 50       | 26             | 21.09              | 0            |                  | AD           | FS  | N  | FS      |                                 |     |
|                                                         |                                           | Total dissolved solids | 12/01/15   | 11/30/22 | 400      | 26             | 403.33             | 1            |                  | AD           | NS  | N  | NS      | Total dissolved solids in water | Sr  |
| Public Water Supply Use                                 | Surface Water HH criteria for PWS average | Fluoride               | 12/01/15   | 11/30/22 | 4        | 3              | 0.17               | 0            |                  | ID           | NA  | N  | NA      |                                 |     |
|                                                         |                                           | Nitrate                | 12/01/15   | 11/30/22 | 10       | 26             | 1.24               | 0            |                  | AD           | FS  | N  | FS      |                                 |     |

| Seg ID: 1814 - Upper San Marcos River<br>AU ID: 1814_02 |                                           |                        |            |          |          |                |                    |              |                  |              |     |    |         |                                 |     |
|---------------------------------------------------------|-------------------------------------------|------------------------|------------|----------|----------|----------------|--------------------|--------------|------------------|--------------|-----|----|---------|---------------------------------|-----|
| Use                                                     | Method                                    | Parameter              | Start Date | End Date | Criteria | #Data Assessed | Mean Data Assessed | #Exceedances | Mean Exceedances | DS Qualifier | LOS | CF | Int LOS | TCEQ Cause                      | Cal |
| General Use                                             | Dissolved Solids                          | Sulfate                | 12/01/15   | 11/30/22 | 50       | 26             | 28.93              | 0            |                  | AD           | FS  | N  | FS      |                                 |     |
|                                                         |                                           | Chloride               | 12/01/15   | 11/30/22 | 50       | 26             | 21.09              | 0            |                  | AD           | FS  | N  | FS      |                                 |     |
|                                                         |                                           | Total dissolved solids | 12/01/15   | 11/30/22 | 400      | 26             | 403.33             | 1            |                  | AD           | NS  | N  | NS      | Total dissolved solids in water | Sr  |
| Public Water Supply Use                                 | Surface Water HH criteria for PWS average | Fluoride               | 12/01/15   | 11/30/22 | 4        | 3              | 0.17               | 0            |                  | ID           | NA  | N  | NA      |                                 |     |
|                                                         |                                           | Nitrate                | 12/01/15   | 11/30/22 | 10       | 26             | 1.24               | 0            |                  | AD           | FS  | N  | FS      |                                 |     |

| Seg ID: 1814 - Upper San Marcos River<br>AU ID: 1814_03 |                                       |                        |            |          |          |                |                    |              |                  |              |     |    |         |                                 |     |
|---------------------------------------------------------|---------------------------------------|------------------------|------------|----------|----------|----------------|--------------------|--------------|------------------|--------------|-----|----|---------|---------------------------------|-----|
| Use                                                     | Method                                | Parameter              | Start Date | End Date | Criteria | #Data Assessed | Mean Data Assessed | #Exceedances | Mean Exceedances | DS Qualifier | LOS | CF | Int LOS | TCEQ Cause                      | Cal |
| Aquatic Life Use                                        | Dissolved Oxygen grab minimum         | Dissolved oxygen Grab  | 12/01/15   | 11/30/22 | 4        | 26             |                    | 0            |                  | AD           | FS  | N  | FS      |                                 |     |
|                                                         | Dissolved Oxygen grab screening level | Dissolved oxygen Grab  | 12/01/15   | 11/30/22 | 6        | 26             |                    | 0            |                  | AD           | NC  | N  | NC      |                                 |     |
| General Use                                             | Dissolved Solids                      | Sulfate                | 12/01/15   | 11/30/22 | 50       | 26             | 28.93              | 0            |                  | AD           | FS  | N  | FS      |                                 |     |
|                                                         |                                       | Chloride               | 12/01/15   | 11/30/22 | 50       | 26             | 21.09              | 0            |                  | AD           | FS  | N  | FS      |                                 |     |
|                                                         |                                       | Total dissolved solids | 12/01/15   | 11/30/22 | 400      | 26             | 403.33             | 1            |                  | AD           | NS  | N  | NS      | Total dissolved solids in water | Sr  |
|                                                         | High pH                               | pH                     | 12/01/15   | 11/30/22 | 9        | 26             |                    | 0            |                  | AD           | FS  | N  | FS      |                                 |     |
|                                                         |                                       | Low pH                 | 12/01/15   | 11/30/22 | 6.5      | 26             |                    | 0            |                  | AD           | FS  | N  | FS      |                                 |     |
|                                                         | Nutrient Screening Levels             | Nitrate                | 12/01/15   | 11/30/22 | 1.95     | 26             |                    | 0            |                  | AD           | NC  | N  | NC      |                                 |     |
|                                                         |                                       | Chlorophyll-a          | 12/01/15   | 11/30/22 | 14.1     | 25             |                    | 0            |                  | AD           | NC  | N  | NC      |                                 |     |
|                                                         |                                       | Total phosphorus       | 12/01/15   | 11/30/22 | 0.69     | 26             |                    | 0            |                  | AD           | NC  | N  | NC      |                                 |     |
|                                                         |                                       | Ammonia                | 12/01/15   | 11/30/22 | 0.33     | 26             |                    | 0            |                  | AD           | NC  | N  | NC      |                                 |     |
|                                                         | Water Temperature                     | Water temperature      | 12/01/15   | 11/30/22 | 26.7     | 26             |                    | 0            |                  | AD           | FS  | N  | FS      |                                 |     |

November 13, 2024

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2024 Texas Integrated Report - Assessment Results for Basin 18 - Guadalupe River

| Seg ID: 1814 - Upper San Marcos River<br>AU ID: 1814_03 |                                           |           |            |          |          |                |                    |              |                  |              |     |    |         |            |     |
|---------------------------------------------------------|-------------------------------------------|-----------|------------|----------|----------|----------------|--------------------|--------------|------------------|--------------|-----|----|---------|------------|-----|
| Use                                                     | Method                                    | Parameter | Start Date | End Date | Criteria | #Data Assessed | Mean Data Assessed | #Exceedances | Mean Exceedances | DS Qualifier | LOS | CF | Int LOS | TCEQ Cause | Cal |
| Public Water Supply Use                                 | Surface Water HH criteria for PWS average | Nitrate   | 12/01/15   | 11/30/22 | 10       | 26             | 1.24               | 0            |                  | AD           | FS  | N  | FS      |            |     |
|                                                         |                                           | Fluoride  | 12/01/15   | 11/30/22 | 4        | 3              | 0.17               | 0            |                  | ID           | NA  | N  | NA      |            |     |
| Recreation Use                                          | Bacteria Geomean                          | E. coli   | 12/01/15   | 11/30/22 | 126      | 26             | 93.79              | 0            |                  | AD           | FS  | N  | FS      |            |     |

| Seg ID: 1814 - Upper San Marcos River<br>AU ID: 1814_04 |                                           |                        |            |          |          |                |                    |              |                  |              |     |    |         |                                 |     |
|---------------------------------------------------------|-------------------------------------------|------------------------|------------|----------|----------|----------------|--------------------|--------------|------------------|--------------|-----|----|---------|---------------------------------|-----|
| Use                                                     | Method                                    | Parameter              | Start Date | End Date | Criteria | #Data Assessed | Mean Data Assessed | #Exceedances | Mean Exceedances | DS Qualifier | LOS | CF | Int LOS | TCEQ Cause                      | Cal |
| General Use                                             | Dissolved Solids                          | Sulfate                | 12/01/15   | 11/30/22 | 50       | 26             | 28.93              | 0            |                  | AD           | FS  | N  | FS      |                                 |     |
|                                                         |                                           | Chloride               | 12/01/15   | 11/30/22 | 50       | 26             | 21.09              | 0            |                  | AD           | FS  | N  | FS      |                                 |     |
|                                                         |                                           | Total dissolved solids | 12/01/15   | 11/30/22 | 400      | 26             | 403.33             | 1            |                  | AD           | NS  | N  | NS      | Total dissolved solids in water | Sr  |
| Public Water Supply Use                                 | Surface Water HH criteria for PWS average | Fluoride               | 12/01/15   | 11/30/22 | 4        | 3              | 0.17               | 0            |                  | ID           | NA  | N  | NA      |                                 |     |
|                                                         |                                           | Nitrate                | 12/01/15   | 11/30/22 | 10       | 26             | 1.24               | 0            |                  | AD           | FS  | N  | FS      |                                 |     |



**Appendix D**  
**USFWS IPaC &**  
**TPWD Rare, Threatened, and**  
**Endangered Species of Texas by County**



# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Austin Ecological Services Field Office

1505 Ferguson Lane

Austin, TX 78754-4501

Phone: (512) 937-7371



In Reply Refer To:

06/13/2025 14:34:18 UTC

Project Code: 2023-0130611

Project Name: Upper San Marcos Site 5

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seqA).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seqA), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological



evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at <https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf>.

**Migratory Birds.** In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 CFR Sec. 10.12 and 16 USC Sec. 668(a)). For more information regarding these Acts, see <https://www.fws.gov/program/migratory-bird-permit/what-we-do>.

It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see <https://www.fws.gov/library/collections/threats-birds>.

In addition to MBTA and BGEPA, Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds," obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <https://www.fws.gov/partner/council-conservation-migratory-birds>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s)

- Official Species List

## OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to 'request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action'.

This species list is provided by:

Austin Ecological Services Field Office  
1505 Ferguson Lane  
Austin, TX 78754-4501  
(512) 937-7371



## PROJECT SUMMARY

Project Code1 2023-0130611

Project Name1 Upper San Marcos Site 5

Project Type1 Dam - Maintenance/Modification

Project Description1 Hays County Soil and Water Conservation District and the NRCS propose rehabilitating the Upper San Marcos 5 Flood Retarding Structure to meet NRCS specification for a high hazard dam.

Project Location1

The approximate location of the project can be viewed in Google Maps1 <https://www.google.com/maps/@29.87375035,-97.96884185818814,14z>



Counties1 Hays County, Texas

## ENDANGERED SPECIES ACT SPECIES

There is a total of 16 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 2 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries<sup>1</sup>, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

- 
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.



## MAMMALS

| NAME                                                                                                                                                                                                                                  | STATUS                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <p>Tricolored Bat <i>Permyotis subflavus</i></p> <p>No critical habitat has been designated for this species.</p> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/10515">https://ecos.fws.gov/ecp/species/10515</a></p> | <p>Proposed</p> <p>Endangered</p> |

## BIROS

| NAME                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | STATUS            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <p>Golden-cheeked Warbler <i>Setophaga chrysopara</i></p> <p>No critical habitat has been designated for this species.</p> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/33">https://ecos.fws.gov/ecp/species/33</a></p>                                                                                                                                                                                                                                                                                                                                         | <p>Endangered</p> |
| <p>Piping Plover <i>Charadrius dominicus</i></p> <p>Population: Atlantic Coast and Northern Great Plains populations - Wherever found, except those areas where listed as endangered.</p> <p>There is final critical habitat for this species. Your location does not overlap the critical habitat.</p> <p>This species only needs to be considered under the following conditions:</p> <ul style="list-style-type: none"> <li>Wind Energy Projects</li> </ul> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/6039">https://ecos.fws.gov/ecp/species/6039</a></p> | <p>Threatened</p> |
| <p>Rufa Red Knot <i>Calidris canutus rufa</i></p> <p>There is proposed critical habitat for this species. Your location does not overlap the critical habitat.</p> <p>This species only needs to be considered under the following conditions:</p> <ul style="list-style-type: none"> <li>Wind Energy Projects</li> </ul> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/1864">https://ecos.fws.gov/ecp/species/1864</a></p>                                                                                                                                      | <p>Threatened</p> |
| <p>Whooping Crane <i>Grus americana</i></p> <p>Population: Wherever found, except where listed as an experimental population</p> <p>There is final critical habitat for this species. Your location does not overlap the critical habitat.</p> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/758">https://ecos.fws.gov/ecp/species/758</a></p>                                                                                                                                                                                                                   | <p>Endangered</p> |

## AMPHIBIANS

| NAME                                                                                                                                                                                                                                                                                        | STATUS            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <p>Austin Blind Salamander <i>Eurycea waterlooensis</i></p> <p>There is final critical habitat for this species. Your location does not overlap the critical habitat.</p> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/5737">https://ecos.fws.gov/ecp/species/5737</a></p> | <p>Endangered</p> |
| <p>San Marcos Salamander <i>Eurycea nana</i></p> <p>There is final critical habitat for this species. Your location does not overlap the critical habitat.</p> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/6374">https://ecos.fws.gov/ecp/species/6374</a></p>            | <p>Threatened</p> |
| <p>Texas Blind Salamander <i>Eurycea rathbunae</i></p> <p>No critical habitat has been designated for this species.</p> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/5130">https://ecos.fws.gov/ecp/species/5130</a></p>                                                   | <p>Endangered</p> |

| NAME                                                                                                                                                                                                                                                                | STATUS     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Fountain Darter <i>Etheostoma fonticola</i><br>There is final critical habitat for this species. Your location does not overlap the critical habitat.<br>Species profile: <a href="https://ecos.fws.gov/ecp/species/5858">https://ecos.fws.gov/ecp/species/5858</a> | Endangered |

## CLAM S

| NAME                                                                                                                                                                                                                                                                                | STATUS     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Guadalupe Fatmucket <i>Lampsilis bergmanni</i><br>There is final critical habitat for this species. Your location does not overlap the critical habitat.<br>Species profile: <a href="https://ecos.fws.gov/ecp/species/10783">https://ecos.fws.gov/ecp/species/10783</a>            | Endangered |
| Guadalupe Orb <i>Cyclopterus nebulosus</i><br>Population:<br>There is final critical habitat for this species. Your location does not overlap the critical habitat.<br>Species profile: <a href="https://ecos.fws.gov/ecp/species/10781">https://ecos.fws.gov/ecp/species/10781</a> | Endangered |

## g N SECTS

| NAME                                                                                                                                                                                                                                                                               | STATUS                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Comal Springs Dryopid Beetle <i>Stygoparnus comaiensis</i><br>There is final critical habitat for this species. Your location does not overlap the critical habitat.<br>Species profile: <a href="https://ecos.fws.gov/ecp/species/7175">https://ecos.fws.gov/ecp/species/7175</a> | Endangered             |
| Comal Springs Riffle Beetle <i>Heterelmis comaiensis</i><br>There is final critical habitat for this species. Your location does not overlap the critical habitat.<br>Species profile: <a href="https://ecos.fws.gov/ecp/species/3403">https://ecos.fws.gov/ecp/species/3403</a>   | Endangered             |
| Monarch Butterfly <i>Danaus plexippus</i><br>There is proposed critical habitat for this species. Your location does not overlap the critical habitat.<br>Species profile: <a href="https://ecos.fws.gov/ecp/species/9743">https://ecos.fws.gov/ecp/species/9743</a>               | Proposed<br>Threatened |

## CRUSTACEAN S

| NAME                                                                                                                                                                                                                                                                                                 | STATUS     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Peck's Cave Amphipod <i>Stygobromus</i> (= <i>Stygonectes</i> ) <i>pecki</i><br>There is final critical habitat for this species. Your location does not overlap the critical habitat.<br>Species profile: <a href="https://ecos.fws.gov/ecp/species/8575">https://ecos.fws.gov/ecp/species/8575</a> | Endangered |

## FLOWERING PLANTS

| NAME                                                                                                                                                                                                                                                       | STATUS     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Texas Wildrice <i>Zizania texana</i><br>There is final critical habitat for this species. Your location does not overlap the critical habitat.<br>Species profile: <a href="https://ecos.fws.gov/ecp/species/805">https://ecos.fws.gov/ecp/species/805</a> | Endangered |



## CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

## PAC USER CONTACT INFORMATION

Agency. Private Entity  
Name. Wesley Wiegrefe  
Address. 801 Cherry Street  
Address Line 2. Suite 2800  
City. Fort Worth  
State. TX  
Zip. 76102  
Email. wes.wiegrefe@freeseP.com  
Phone. 8177357514

## LEAD AGENCY CONTACT INFORMATION

Lead Agency. Natural Resources Conservation Service



Last Update: 1/15/2025

## HAYS COUNTY

### AMPHIBIANS

|                                                                                                                         |                             |                  |  |
|-------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------------|--|
| <b>Barton Springs salamander</b>                                                                                        | <i>Eurycea sosorum</i>      |                  |  |
| Aquatic; springs, streams and caves with rocky or cobble beds.                                                          |                             |                  |  |
| Federal Status: E                                                                                                       | State Status: E             | SGCN: Y          |  |
| Endemic: Y                                                                                                              | Global Rank: G1             | State Rank: S1   |  |
| <b>Blanco blind salamander</b>                                                                                          | <i>Eurycea robusta</i>      |                  |  |
| Aquatic and subterranean; streams and caves.                                                                            |                             |                  |  |
| Federal Status:                                                                                                         | State Status: T             | SGCN: Y          |  |
| Endemic: Y                                                                                                              | Global Rank: G1             | State Rank: S1   |  |
| <b>Blanco River Springs salamander</b>                                                                                  | <i>Eurycea pterophila</i>   |                  |  |
| Aquatic; springs, streams and caves with rocky or cobble beds.                                                          |                             |                  |  |
| Federal Status:                                                                                                         | State Status:               | SGCN: Y          |  |
| Endemic: Y                                                                                                              | Global Rank: G3             | State Rank: S3   |  |
| <b>Pedernales River Springs salamander</b>                                                                              | <i>Eurycea sp. 6</i>        |                  |  |
| Aquatic; springs, streams and caves with rocky or cobble beds.                                                          |                             |                  |  |
| Federal Status:                                                                                                         | State Status:               | SGCN: N          |  |
| Endemic: Y                                                                                                              | Global Rank: G1             | State Rank: S1S2 |  |
| <b>San Marcos salamander</b>                                                                                            | <i>Eurycea nana</i>         |                  |  |
| Aquatic; springs and associated water.                                                                                  |                             |                  |  |
| Federal Status: T                                                                                                       | State Status: T             | SGCN: Y          |  |
| Endemic: Y                                                                                                              | Global Rank: G1             | State Rank: S1   |  |
| <b>Strecker's chorus frog</b>                                                                                           | <i>Pseudacris streckeri</i> |                  |  |
| Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates. |                             |                  |  |
| Federal Status:                                                                                                         | State Status:               | SGCN: Y          |  |
| Endemic: N                                                                                                              | Global Rank: G5             | State Rank: S3   |  |
| <b>Texas blind salamander</b>                                                                                           | <i>Eurycea rathbuni</i>     |                  |  |
| Aquatic and subterranean; streams and caves.                                                                            |                             |                  |  |
| Federal Status: E                                                                                                       | State Status: E             | SGCN: Y          |  |
| Endemic: Y                                                                                                              | Global Rank: G1             | State Rank: S1   |  |

#### DISCLAIMER

The information on this web application is provided "as is" without warranty as to the currentness, completeness, or accuracy of any specific data. The data provided are for planning, assessment, and informational purposes. Refer to the Frequently Asked Questions (FAQs) on the application website for further information.

## HAYS COUNTY

### AMPHIBIANS

**Texas salamander**

*Eurycea neotenes*

Aquatic; springs, streams and caves with rocky or cobble beds.

Federal Status:

State Status: T

SGCN: Y

Endemic: Y

Global Rank: G1G2

State Rank: S1S2

**Woodhouse's toad**

*Anaxyrus woodhousii*

Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied.

Federal Status:

State Status:

SGCN: Y

Endemic: N

Global Rank: G5

State Rank: S5

### ARACHNIDS

**No accepted common name**

*Texella diplospina*

Habitat description is not available at this time.

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G1G2

State Rank: S1

**No accepted common name**

*Texella grubbsi*

Habitat description is not available at this time.

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G1G2

State Rank: S1

**No accepted common name**

*Texella mulaiki*

Habitat description is not available at this time.

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G2G3

State Rank: S1

**No accepted common name**

*Texella renkesae*

Habitat description is not available at this time.

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G1G2

State Rank: S1

**No accepted common name**

*Tartarocreagris grubbsi*

Habitat description is not available at this time.

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G1G2

State Rank: S1

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## HAYS COUNTY

### ARACHNIDS

**No accepted common name** *Cicurina ezelli*

Habitat description is not available at this time.

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G1G2 | State Rank: S1 |

**No accepted common name** *Cicurina russelli*

Habitat description is not available at this time.

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G1G2 | State Rank: S1 |

**No accepted common name** *Cicurina ubicki*

Habitat description is not available at this time.

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G1G2 | State Rank: S1 |

### BIRDS

**bald eagle** *Haliaeetus leucocephalus*

Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds

|                 |                 |                     |
|-----------------|-----------------|---------------------|
| Federal Status: | State Status:   | SGCN: N             |
| Endemic: N      | Global Rank: G5 | State Rank: S3B,S3N |

**Bank Swallow** *Riparia riparia*

Bank Swallows live in low areas along rivers, streams, ocean coasts, and reservoirs. Their territories usually include vertical cliffs or banks where they nest in colonies of 10 to 2,000 nests. Though in the past Bank Swallows were most commonly found around natural bluffs or eroding streamside banks, they now often nest in human-made sites, such as sand and gravel quarries or road cuts. They forage in open areas and avoid places with tree cover.

|                 |                 |                     |
|-----------------|-----------------|---------------------|
| Federal Status: | State Status:   | SGCN: Y             |
| Endemic: N      | Global Rank: G5 | State Rank: S2B,S4N |

**black-capped vireo** *Vireo atricapilla*

Oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G5 | State Rank: S3B |

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## HAYS COUNTY

### BIRDS

#### **Brewer's Blackbird**

*Euphagus cyanocephalus*

Shrubby and bushy areas (especially near water), riparian woodland, aspen parklands, cultivated lands, marshes, and around human habitation; in migration and winter also in pastures and fields (AOU 1983).

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G5 | State Rank: S5 |

#### **Brown Pelican**

*Pelecanus occidentalis*

Largely coastal and near shore areas, where it roosts and nests on islands and spoil banks. Feeds in lagunas and shallow seaward waters.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: N         |
| Endemic: N      | Global Rank: G4 | State Rank: S3B |

#### **Cactus Wren**

*Campylorhynchus brunneicapillus*

Desert (especially with cholla cactus or yucca), mesquite, arid scrub, coastal sage scrub, and in trees in towns in arid regions (Tropical to Subtropical zones) (AOU 1983). Nests in OPUNTIA cactus, or in twiggy, thorny, trees and shrubs, sometimes in buildings. Nest may be relined and used as a winter roost.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G5 | State Rank: S4B |

#### **chestnut-collared longspur**

*Calcarius ornatus*

Occurs in open shortgrass settings especially in patches with some bare ground. Also occurs in grain sorghum fields and Conservation Reserve Program lands

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G5 | State Rank: S3 |

#### **Common Nighthawk**

*Chordeiles minor*

Common Nighthawks nest in both rural and urban habitats including coastal sand dunes and beaches, logged forest, recently burned forest, woodland clearings, prairies, plains, sagebrush, grasslands, open forests, and rock outcrops. They also nest on flat gravel rooftops, though less often as gravel roofs are being replaced by smooth, rubberized roofs that provide an unsuitable surface.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G5 | State Rank: S4B |

#### **Franklin's gull**

*Leucophaeus pipixcan*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G5 | State Rank: S2N |

#### **golden-cheeked warbler**

*Setophaga chrysoparia*

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## HAYS COUNTY

### BIRDS

Ashe juniper in mixed stands with various oaks (*Quercus* spp.). Edges of cedar brakes. Dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer.

|                   |                 |                   |
|-------------------|-----------------|-------------------|
| Federal Status: E | State Status: E | SGCN: Y           |
| Endemic: N        | Global Rank: G2 | State Rank: S2S3B |

#### **interior least tern** *Sternula antillarum athalassos*

Sand beaches, flats, bays, inlets, lagoons, islands. Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony

|                 |                    |                 |
|-----------------|--------------------|-----------------|
| Federal Status: | State Status: E    | SGCN: N         |
| Endemic: N      | Global Rank: G4T3Q | State Rank: S1B |

#### **lark bunting** *Calamospiza melanocorys*

Overall, it's a generalist in most short grassland settings including ones with some brushy component plus certain agricultural lands that include grain sorghum. Short grasses include sideoats and blue gramas, sand dropseed, prairie junegrass (*Koeleria*), buffalograss also with patches of bluestem and other mid-grass species. This bunting will frequent smaller patches of grasses or disturbed patches of grasses including rural yards. It also uses weedy fields surrounding playas. This species avoids urban areas and cotton fields.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G5 | State Rank: S4B |

#### **Least Tern** *Sternula antillarum*

Sand beaches, flats, bays, inlets, lagoons, islands, river sandbars and flat gravel rooftops in urban areas.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G4 | State Rank: S2B |

#### **Loggerhead Shrike** *Lanius ludovicianus*

Loggerhead Shrikes inhabit open country with short vegetation and well-spaced shrubs or low trees, particularly those with spines or thorns. They frequent agricultural fields, pastures, old orchards, riparian areas, desert scrublands, savannas, prairies, golf courses, and cemeteries. Loggerhead Shrikes are often seen along mowed roadsides with access to fence lines and utility poles.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G4 | State Rank: S4B |

#### **Mottled Duck** *Anas fulvigula*

Estuaries, ponds, lakes, secondary bays.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G4 | State Rank: S4B |

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## HAYS COUNTY

### BIRDS

#### mountain plover

*Charadrius montanus*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G3 | State Rank: S2 |

#### Northern Bobwhite

*Colinus virginianus*

Inhabits a wide variety of vegetation types, particularly early successional stages. Occurs in croplands, grasslands, pastures, fallow fields, grass-brush rangelands, open pinelands, open mixed pine-hardwood forests, and habitat mosaics (Brennan 1999).

|                 |                   |                 |
|-----------------|-------------------|-----------------|
| Federal Status: | State Status:     | SGCN: Y         |
| Endemic: N      | Global Rank: G4G5 | State Rank: S4B |

#### piping plover

*Charadrius melodus*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance.

|                   |                 |                 |
|-------------------|-----------------|-----------------|
| Federal Status: T | State Status: T | SGCN: Y         |
| Endemic: N        | Global Rank: G3 | State Rank: S2N |

#### Pyrrhuloxia

*Cardinalis sinuatus*

Pyrrhuloxias live in upland deserts, mesquite savannas, riparian (streamside) woodlands, desert scrublands, farm fields with hedgerows, and residential areas with nearby mesquite. When not breeding, some Pyrrhuloxias wander into urban habitats, mesquite-hackberry habitats, and riparian habitats with Arizona sycamore and cottonwood.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G5 | State Rank: S4B |

#### Sanderling

*Calidris alba*

Nonbreeding: primarily sandy beaches, less frequently on mud flats and shores of lakes or rivers (AOU 1983) also on exposed reefs (Pratt et al. 1987). Sleeps/loafs on upper beach or on salt pond dike.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G5 | State Rank: S5 |

#### Snowy Plover

*Charadrius nivosus*

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## HAYS COUNTY

### BIRDS

Algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. An optimal site characteristic would be large in size. The size of populations appear to be roughly proportional to the total area of suitable habitat used. Formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G3 | State Rank: S3B |

#### **Sprague's pipit** *Anthus spragueii*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat during migration and in winter consists of pastures and weedy fields (AOU 1983), including grasslands with dense herbaceous vegetation or grassy agricultural fields.

|                 |                   |                 |
|-----------------|-------------------|-----------------|
| Federal Status: | State Status:     | SGCN: Y         |
| Endemic: N      | Global Rank: G3G4 | State Rank: S3N |

#### **western burrowing owl** *Athene cunicularia hypugaea*

Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: N        |
| Endemic: N      | Global Rank: G4T4 | State Rank: S2 |

#### **white-faced ibis** *Plegadis chihi*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status: T | SGCN: N         |
| Endemic: N      | Global Rank: G5 | State Rank: S4B |

#### **whooping crane** *Grus americana*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties.

|                   |                 |                   |
|-------------------|-----------------|-------------------|
| Federal Status: E | State Status: E | SGCN: Y           |
| Endemic: N        | Global Rank: G1 | State Rank: S1S2N |

#### **Willet** *Tringa semipalmata*

Marshes, tidal mudflats, beaches, lake margins, mangroves, tidal channels, river mouths, coastal lagoons, sandy or rocky shores, and, less frequently, open grassland (AOU 1983, Stiles and Skutch 1989).

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G5 | State Rank: S5B |

#### **Wilson's Warbler** *Cardellina pusilla*

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## HAYS COUNTY

### BIRDS

Wilson's warblers key in on forests and scrubby areas along streams to fatten up during migration. During the nonbreeding season they use many types of habitats from lowland thickets near streams to high-elevation cloud forests in Mexico and Central America.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G5 | State Rank: S4 |

#### wood stork *Mycteria americana*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers to nest in large tracts of baldcypress (*Taxodium distichum*) or red mangrove (*Rhizophora mangle*); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960.

|                 |                 |                     |
|-----------------|-----------------|---------------------|
| Federal Status: | State Status: T | SGCN: Y             |
| Endemic: N      | Global Rank: G4 | State Rank: SHB,S3N |

#### yellow-billed cuckoo *Coccyzus americanus*

In Texas, the populations of concern are found breeding in riparian areas in the Trans Pecos (known as part of the Western Distinct Population Segment). It is the Western DPS that is on the U.S. ESA threatened list and includes the Texas counties Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio. Riparian woodlands below 6,000' in elevation consisting of cottonwoods and willows are prime habitat. This species is a long-distant migrant that summers in Texas, but winters mainly in South America. Breeding birds of the Trans Pecos populations typically arrive on their breeding grounds possibly in late April but the peak arrival time is in May. Threats to preferred habitat include hydrologic changes that don't promote the regeneration of cottonwoods and willows, plus livestock browsing and trampling of sapling trees in sensitive riparian areas.

|                   |                 |                   |
|-------------------|-----------------|-------------------|
| Federal Status: T | State Status:   | SGCN: Y           |
| Endemic: N        | Global Rank: G5 | State Rank: S4S5B |

### CRUSTACEANS

#### Balcones Cave amphipod *Stygobromus balconis*

Subaquatic, subterranean obligate amphipod

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G2G3 | State Rank: S2 |

#### Bifurcated Cave Amphipod *Stygobromus bifurcatus*

Habitat description is not available at this time.

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G3G4 | State Rank: S3 |

#### Ezell's Cave amphipod *Stygobromus flagellatus*

Known only from artesian wells

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G2G3 | State Rank: S3 |

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## HAYS COUNTY

### CRUSTACEANS

|                                                                                    |                              |                 |
|------------------------------------------------------------------------------------|------------------------------|-----------------|
| <b>No accepted common name</b>                                                     | <i>Palaemonetes texanus</i>  |                 |
| Collected in Comal and Hays counties (Middel Guadalupe and San Marcos watersheds). |                              |                 |
| Federal Status:                                                                    | State Status:                | SGCN: Y         |
| Endemic: Y                                                                         | Global Rank: G1G2            | State Rank: S1? |
| <b>No accepted common name</b>                                                     | <i>Artesia subterranea</i>   |                 |
| Habitat description is not available at this time.                                 |                              |                 |
| Federal Status:                                                                    | State Status:                | SGCN: Y         |
| Endemic: Y                                                                         | Global Rank: G1G2            | State Rank: S2  |
| <b>No accepted common name</b>                                                     | <i>Texiweckelia texensis</i> |                 |
| Habitat description is not available at this time.                                 |                              |                 |
| Federal Status:                                                                    | State Status:                | SGCN: Y         |
| Endemic: Y                                                                         | Global Rank: G2G3            | State Rank: S2  |
| <b>Purgatory Cave shrimp</b>                                                       | <i>Calathaemon holthuisi</i> |                 |
| Last known collection was in San Marcos, Hays Co. (Ezell's Cave) (Reddell 1994).   |                              |                 |
| Federal Status:                                                                    | State Status:                | SGCN: Y         |
| Endemic: Y                                                                         | Global Rank: G1G2            | State Rank: S1  |
| <b>Texas troglobitic water slater</b>                                              | <i>Lirceolus smithii</i>     |                 |
| Subaquatic, subterranean obligate, aquifer.                                        |                              |                 |
| Federal Status:                                                                    | State Status: T              | SGCN: Y         |
| Endemic: Y                                                                         | Global Rank: G1G2            | State Rank: S1  |

### FISH

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                          |                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------|
| <b>american eel</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <i>Anguilla rostrata</i> |                |
| Originally found in all river systems from the Red River to the Rio Grande. Aquatic habtiats include large rivers, streams, tributaries, coastal watersheds, estuaries, bays, and oceans. Spawns in Sargasso Sea, larva move to coastal waters, metamorphose, and begin upstream movements. Females tend to move further upstream than males (who are often found in brackish estuaries). American Eel are habitat generalists and may be found in a broad range of habitat conditions including slow- and fast-flowing waters over many substrate types. Extirpation in upstream drainages attributed to reservoirs that impede upstream migration. |                          |                |
| Federal Status:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | State Status:            | SGCN: Y        |
| Endemic: N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Global Rank: G4          | State Rank: S4 |

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## HAYS COUNTY

### FISH

**fountain darter** *Etheostoma fonticola*

Known only from the spring-fed San Marcos and Comal rivers in dense beds of aquatic plants growing close to bottom; may be found in slow- and fast-flowing habitats.

|                   |                 |                |
|-------------------|-----------------|----------------|
| Federal Status: E | State Status: E | SGCN: Y        |
| Endemic: Y        | Global Rank: G1 | State Rank: S1 |

**Guadalupe bass** *Micropterus treculii*

Endemic to the streams of the northern and eastern Edwards Plateau including portions of the Brazos, Colorado, Guadalupe, and San Antonio basins; species also found outside of the Edwards Plateau streams in decreased abundance, primarily in the lower Colorado River; two introduced populations have been established in the Nueces River system. A pure population was re-established in a portion of the Blanco River in 2014. Species prefers lentic environments but commonly taken in flowing water; numerous smaller fish occur in rapids, many times near eddies; large individuals found mainly in riffle tail races; usually found in spring-fed streams having clear water and relatively consistent temperatures.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G3 | State Rank: S3 |

**Guadalupe darter** *Percina apristis*

Endemic to the Guadalupe River Basin; Found in riffles; most common under or around 25-30 cm boulders in the main current; seems to prefer moderately turbid water.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status: T | SGCN: Y        |
| Endemic: Y      | Global Rank: G4 | State Rank: S2 |

**Guadalupe roundnose minnow** *Dionda flavipinnis*

Endemic to Guadalupe and southern Colorado drainages; primarily restricted to clear spring-fed waters that have slight temperature variations.

|                 |                  |                 |
|-----------------|------------------|-----------------|
| Federal Status: | State Status:    | SGCN: Y         |
| Endemic:        | Global Rank: GNR | State Rank: SNR |

**headwater catfish** *Ictalurus lupus*

Originally throughout streams of the Edwards Plateau and the Rio Grande basin, currently limited to Rio Grande drainage, including Pecos River basin; springs, and sandy and rocky riffles, runs, and pools of clear creeks and small rivers.

|                 |                 |                  |
|-----------------|-----------------|------------------|
| Federal Status: | State Status: T | SGCN: Y          |
| Endemic: N      | Global Rank: G3 | State Rank: S1S2 |

**ironcolor shiner** *Notropis chalybaeus*

Found only in northeastern streams from the Sabine to the Red River with the exception of an isolated population found in the San Marcos River headwaters. Found primarily in acidic, tannin-stained, non-turbid, sluggish Coastal Plain streams and rivers of low to moderate gradient. Occurs in aggregation, often at the upstream ends of pools, with a moderate to sluggish current and sand, mud, silt or detritus substrates. Usually associated with aquatic vegetation.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G4 | State Rank: S3 |

**Nueces roundnose minnow** *Dionda texensis*

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## HAYS COUNTY

### FISH

Endemic to the headwaters of the Nueces River; habitat unknown but likely similar to Devils River Minnow (Often found in association with spring outflows over gravel-cobble substrate and adjacent to aquatic macrophytes; may inhabit a microhabitat associated with the interface between spring runs and the river).

|                 |                  |                 |
|-----------------|------------------|-----------------|
| Federal Status: | State Status:    | SGCN: Y         |
| Endemic:        | Global Rank: GNR | State Rank: SNR |

#### **Texas shiner** *Notropis amabilis*

In Texas, it is found primarily in Edwards Plateau streams from the San Gabriel River in the east to the Pecos River in the west. Typical habitat includes rocky or sandy runs, as well as pools.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G4 | State Rank: S4 |

### INSECTS

#### **American bumblebee** *Bombus pensylvanicus*

Habitat description is not available at this time.

|                 |                   |                 |
|-----------------|-------------------|-----------------|
| Federal Status: | State Status:     | SGCN: Y         |
| Endemic:        | Global Rank: G3G4 | State Rank: SNR |

#### **Comal Springs diving beetle** *Comaldessus stygius*

Known only from the outflows at Comal Springs; aquatic; diving beetles generally inhabit the water column

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G1 | State Rank: S1 |

#### **Comal Springs dryopid beetle** *Stygoparnus comalensis*

Dryopids usually cling to objects in a stream; dryopids are sometimes found crawling on stream bottoms or along shores; adults may leave the stream and fly about, especially at night; most dryopid larvae are vermiform and live in soil or decaying wood

|                   |                   |                |
|-------------------|-------------------|----------------|
| Federal Status: E | State Status: E   | SGCN: Y        |
| Endemic: Y        | Global Rank: G1G2 | State Rank: S1 |

#### **Comal Springs riffle beetle** *Heterelmis comalensis*

Comal and San Marcos Springs

|                   |                 |                |
|-------------------|-----------------|----------------|
| Federal Status: E | State Status: E | SGCN: Y        |
| Endemic:          | Global Rank: G1 | State Rank: S1 |

#### **Edwards Aquifer diving beetle** *Haideoporus texanus*

Habitat poorly known; known from an artesian well in Hays County

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G1G2 | State Rank: S1 |

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## HAYS COUNTY

### INSECTS

**migratory monarch butterfly**      *Danaus plexippus plexippus*

Habitat description is not available at this time.

Federal Status: C

State Status:

SGCN: Y

Endemic:

Global Rank: G4T3

State Rank: SNR

**No accepted common name**      *Procloeon distinctum*

Mayflies distinguished by aquatic larval stage; adult stage generally found in shoreline vegetation

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G1G3Q

State Rank: S2?

**No accepted common name**      *Plauditus texanus*

Larvae are associated with small to medium limestone cobble and macrophytes in shallow riffles of clear, cool, alkaline streams (P. McCafferty, personal communication, December 2003).

Federal Status:

State Status:

SGCN: Y

Endemic: N

Global Rank: G2G3

State Rank: S1?

**No accepted common name**      *Rhadine austinica*

Habitat description is not available at this time.

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G1G2

State Rank: S2

**No accepted common name**      *Rhadine insolita*

Habitat description is not available at this time.

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G1G2

State Rank: S1

**No accepted common name**      *Batrisodes grubbsi*

Habitat description is not available at this time.

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G1G2

State Rank: S1

**No accepted common name**      *Ochrotrichia capitana*

Habitat description is not available at this time.

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G1G3

State Rank: S2?

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## HAYS COUNTY

### INSECTS

**No accepted common name** *Neotrichia juani*

Specimens were collected from perennial and ephemeral rivers, and small spring-fed streams (Harris and Tiemann 1993).

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic:        | Global Rank: G1 | State Rank: S1 |

**No accepted common name** *Xiphocentron messapus*

Habitat description is not available at this time.

|                 |                   |                 |
|-----------------|-------------------|-----------------|
| Federal Status: | State Status:     | SGCN: Y         |
| Endemic: Y      | Global Rank: G1G3 | State Rank: S2? |

**San Marcos saddle-case caddisfly** *Protoptila arca*

Known from an artesian well in Hays County; locally very abundant; swift, well-oxygenated warm water about 1-2 m deep; larvae and pupal cases abundant on rocks

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G1 | State Rank: S1 |

**Texas austrotinodes caddisfly** *Austrotinodes texensis*

Appears endemic to the karst springs and spring runs of the Edwards Plateau region; flow in type locality swift but may drop significantly during periods of little drought; substrate coarse and ranges from cobble and gravel to limestone bedrock; many limestone outcroppings also found along the streams

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G2 | State Rank: S2 |

### MAMMALS

**big free-tailed bat** *Nyctinomops macrotis*

Habitat data sparse but records indicate that species prefers to roost in crevices and cracks in high canyon walls, but will use buildings, as well; reproduction data sparse, gives birth to single offspring late June-early July; females gather in nursery colonies; winter habits undetermined, but may hibernate in the Trans-Pecos; opportunistic insectivore

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G5 | State Rank: S3 |

**cave myotis bat** *Myotis velifer*

Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (*Hirundo pyrrhonota*) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore.

|                 |                   |                  |
|-----------------|-------------------|------------------|
| Federal Status: | State Status:     | SGCN: Y          |
| Endemic: N      | Global Rank: G4G5 | State Rank: S2S3 |

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## HAYS COUNTY

### MAMMALS

#### **eastern spotted skunk** *Spilogale putorius*

Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges & woodlands. Prefer wooded, brushy areas & tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available.

|                 |                 |                  |
|-----------------|-----------------|------------------|
| Federal Status: | State Status:   | SGCN: Y          |
| Endemic: N      | Global Rank: G4 | State Rank: S1S3 |

#### **hoary bat** *Lasiurus cinereus*

Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways.

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: N      | Global Rank: G3G4 | State Rank: S3 |

#### **mountain lion** *Puma concolor*

Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains & riparian zones.

|                 |                 |                  |
|-----------------|-----------------|------------------|
| Federal Status: | State Status:   | SGCN: Y          |
| Endemic: N      | Global Rank: G5 | State Rank: S2S3 |

#### **plains spotted skunk** *Spilogale interrupta*

Generalist; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie

|                 |                 |                  |
|-----------------|-----------------|------------------|
| Federal Status: | State Status:   | SGCN: Y          |
| Endemic: N      | Global Rank: G3 | State Rank: S1S3 |

#### **Seminole bat** *Lasiurus seminolus*

Pine-oak and long-leaf pine in east Texas. Habitats include pine, mixed pine-hardwood, and hardwood forests of uplands and bottomlands, particularly pine-dominated forests, including mature pine and pine-hardwood corridors in managed pine forest landscapes (Menzel et al. 1998, 1999, 2000; Carter et al. 2004; Marks and Marks 2006; Perry and Thill 2007; Perry et al. 2007; Hein et al. 2008; Ammerman et al. 2012).

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G5 | State Rank: S3 |

#### **tricolored bat** *Perimyotis subflavus*

Forest, woodland and riparian areas are important. Caves are very important to this species.

|                    |                   |                |
|--------------------|-------------------|----------------|
| Federal Status: PE | State Status:     | SGCN: Y        |
| Endemic: N         | Global Rank: G3G4 | State Rank: S2 |

### MOLLUSKS

#### **Balcones spike** *Fusconaia iheringi*

Habitat not yet described.

|                   |                 |         |
|-------------------|-----------------|---------|
| Federal Status: E | State Status: E | SGCN: Y |
|-------------------|-----------------|---------|

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## HAYS COUNTY

### MOLLUSKS

Endemic: Y                      Global Rank: G1                      State Rank: SNR

**Edwards Plateau liptooth**                      *Millerelix gracilis*

Habitat description is not available at this time.

Federal Status:                      State Status:                      SGCN: Y  
Endemic:                      Global Rank: G2G3                      State Rank: S3

**false spike**                      *Fusconaia mitchelli*

Occurs in small streams to medium-size rivers in habitats such as riffles and runs with flowing water. Is often found in stable substrates of sand, gravel, and cobble (Howells 2010; Randklev et al. 2012; Sowards et al. 2013; Tsakiris and Randklev 2016). [Mussels of Texas 2019]

Federal Status: E                      State Status: E                      SGCN: Y  
Endemic: N                      Global Rank: G1                      State Rank: S1

**Glossy Wolfsnail**                      *Euglandina texasiana*

Habitat description is not available at this time.

Federal Status:                      State Status:                      SGCN: Y  
Endemic:                      Global Rank: G1G2                      State Rank: S3

**Guadalupe fatmucket**                      *Lampsilis bergmanni*

Reported to occur in slow to moderate current in sand, mud, and gravel substrates among large cobble, boulders, bedrock ledges, horizontal cracks in bedrock slabs, and macrophyte beds. Has also been observed inhabiting the roots of cypress trees and vegetation along steep banks. Reported in lakes at Kerrville, Texas, which suggests it may occasionally persist in some impoundment conditions (Robert G. Howells, personal communication). (Mussels of Texas, 2020)

Federal Status: E                      State Status: T                      SGCN: Y  
Endemic: Y                      Global Rank: G1                      State Rank: SNR

**Guadalupe orb**                      *Cyclonaias necki*

Species' distribution is limited to the Guadalupe River basin. Occurs in both mainstem and tributary habitats. Often found in substrates composed of sand, gravel, and cobble, including mud-silt or gravel-filled cracks in bedrock slabs. Considered intolerant of reservoirs, but are known to occur in them (Howells 2010m; Randklev et al. 2017b). [Mussels of Texas 2020]

Federal Status: E                      State Status: E                      SGCN: Y  
Endemic: Y                      Global Rank: G1                      State Rank: S2

**Mapleleaf**                      *Quadrula quadrula*

Reported from streams to rivers, lakes, and reservoirs. In riverine habitats, it may be found in main-channel habitats such as riffles or runs in sand, gravel, and cobble substrates with moderate to swift currents. May also be found in nearshore habitats such as banks and backwaters to include pools in sand or mud substrates with little to no flow. (Williams et al. 2008; Howells 2016; Haag and Cicerello 2016).

Federal Status:                      State Status:                      SGCN: Y  
Endemic: N                      Global Rank: G5                      State Rank: S3

**No accepted common name**                      *Phreatodrobia conica*

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## HAYS COUNTY

### MOLLUSKS

Habitat description is not available at this time.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G1 | State Rank: S2 |

**No accepted common name** *Phreatodrobia micra*

Habitat description is not available at this time.

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G2G3 | State Rank: S2 |

**No accepted common name** *Phreatodrobia plana*

Habitat description is not available at this time.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G2 | State Rank: S2 |

**No accepted common name** *Phreatodrobia punctata*

Habitat description is not available at this time.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G2 | State Rank: S1 |

**No accepted common name** *Phreatodrobia rotunda*

Habitat description is not available at this time.

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G1G2 | State Rank: S2 |

**Pimpleback** *Cyclonaias pustulosa*

Occurs in small streams to large rivers in habitats including riffles and runs with flowing water, also found in nearshore habitats such as banks and backwaters or pools. Can occur in reservoirs but varies based by population. Is often found in substrates comprising of sand, gravel, and cobble but also mud and silt (Howells et al. 1996; Williams et al. 2008; Watters et al. 2009).

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Federal Status: | State Status:   | SGCN: Y         |
| Endemic: N      | Global Rank: G5 | State Rank: SNR |

**Pistolgrip** *Tritogonia verrucosa*

Reported from streams to rivers, lakes, and reservoirs, but considered less tolerant of impoundment (Haag and Cicerello 2016). Can occur in a variety of habitat types but most often found in main channel habitats such as riffles and runs with moderate current and sand, gravel, or cobble substrates (Howells et al. 1996; Williams et al. 2008).

|                 |                   |                  |
|-----------------|-------------------|------------------|
| Federal Status: | State Status:     | SGCN: Y          |
| Endemic: N      | Global Rank: G4G5 | State Rank: S3S4 |

**Texas fatmucket** *Lampsilis bracteata*

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## HAYS COUNTY

### MOLLUSKS

Reported to occur in slow to moderate current in sand, mud, and gravel substrates among large cobble, boulders, bedrock ledges, horizontal cracks in bedrock slabs, and macrophyte beds. Has also been observed inhabiting the roots of cypress trees and vegetation along steep banks. Past authorities have reported this species intolerant of reservoir conditions but recent surveys suggest it may persist in some impoundment conditions (Howells 2010c; Randklev et al. 2017b). [Mussel of Texas 2019]

|                   |                 |                |
|-------------------|-----------------|----------------|
| Federal Status: E | State Status: T | SGCN: Y        |
| Endemic: Y        | Global Rank: G1 | State Rank: S1 |

#### **Texas fawnsfoot** *Truncilla macrodon*

Occurs in large rivers but may also be found in medium-sized streams. Is found in protected near shore areas such as banks and backwaters but also riffles and point bar habitats with low to moderate water velocities. Typically occurs in substrates of mud, sandy mud, gravel and cobble. Considered intolerant of reservoirs (Randklev et al. 2010; Howells 2010o; Randklev et al. 2014b,c; Randklev et al. 2017a,b). [Mussels of Texas 2019]

|                   |                 |                |
|-------------------|-----------------|----------------|
| Federal Status: T | State Status: T | SGCN: Y        |
| Endemic: Y        | Global Rank: G1 | State Rank: S2 |

#### **Texas pimpleback** *Cyclonaias petrina*

Occurs in medium-size streams to large rivers primarily in riffles and runs. Often found in substrates composed of sand, gravel, and cobble, including mud-silt or gravel-filled cracks in bedrock slabs. Considered intolerant of reservoirs (Howells 2010m; Randklev et al. 2017b). [Mussels of Texas 2019]

|                   |                 |                |
|-------------------|-----------------|----------------|
| Federal Status: E | State Status: E | SGCN: Y        |
| Endemic: Y        | Global Rank: G1 | State Rank: S1 |

### REPTILES

#### **American alligator** *Alligator mississippiensis*

Aquatic: Coastal marshes; inland natural rivers, swamps and marshes; manmade impoundments.

|                     |                 |                |
|---------------------|-----------------|----------------|
| Federal Status: SAT | State Status:   | SGCN: N        |
| Endemic: N          | Global Rank: G5 | State Rank: S4 |

#### **Cagle's map turtle** *Graptemys caglei*

Aquatic: shallow water with swift to moderate flow and gravel or cobble bottom, connected by deeper pools with a slower flow rate and a silt or mud bottom; gravel bar riffles and transition areas between riffles and pools especially important in providing insect prey items; nests on gently sloping sand banks within ca. 30 feet of waters edge.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status: T | SGCN: Y        |
| Endemic: Y      | Global Rank: G3 | State Rank: S1 |

#### **common garter snake** *Thamnophis sirtalis*

Terrestrial and aquatic: Habitats used include the grasslands and modified open areas in the vicinity of aquatic features, such as ponds, streams o marshes. Damp soils and debris for cover are thought to be critical.

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G5 | State Rank: S2 |

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## HAYS COUNTY

### REPTILES

#### eastern box turtle

*Terrapene carolina*

Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures.

Federal Status:

State Status:

SGCN: Y

Endemic: N

Global Rank: G5

State Rank: S3

#### keeled earless lizard

*Holbrookia propinqua*

Terrestrial: Habitats include coastal dunes, barrier islands, and other sandy areas (Axtell 1983). Although it occurs well inland, this species is most abundant on coastal dunes, where it seeks shelter in the burrows of small mammals or crabs (Bartlett and Bartlett 1999).

Federal Status:

State Status:

SGCN: Y

Endemic: N

Global Rank: G4

State Rank: S3

#### plateau spot-tailed earless lizard

*Holbrookia lacerata*

Terrestrial: Habitats include moderately open prairie-brushland regions, particularly fairly flat areas free of vegetation or other obstructions (e.g., open meadows, old and new fields, graded roadways, cleared and disturbed areas, prairie savanna, and active agriculture including row crops); also, oak-juniper woodlands and mesquite-prickly pear associations (Axtell 1968, Bartlett and Bartlett 1999).

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: GNR

State Rank: S2

#### slender glass lizard

*Ophisaurus attenuatus*

Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil.

Federal Status:

State Status:

SGCN: Y

Endemic: N

Global Rank: G5

State Rank: S3

#### Texas horned lizard

*Phrynosoma cornutum*

Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area.

Federal Status:

State Status: T

SGCN: Y

Endemic: N

Global Rank: G4G5

State Rank: S3

#### Texas map turtle

*Graptemys versa*

Aquatic: Primarily a river turtle but can also be found in reservoirs. Can be found in deep and shallow water with sufficient basking sites (emergent rocks and woody debris).

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G4

State Rank: SU

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## HAYS COUNTY

### REPTILES

**western box turtle** *Terrapene ornata*

Terrestrial: Ornate or western box turtles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species.

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: N      | Global Rank: G4G5 | State Rank: S3 |

### PLANTS

**bigflower cornsalad** *Valerianella stenocarpa*

Usually along creekbeds or in vernal moist grassy open areas (Carr 2015).

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G3 | State Rank: S3 |

**bracted twistflower** *Streptanthus bracteatus*

Shallow, well-drained gravelly clays and clay loams over limestone in oak juniper woodlands and associated openings, on steep to moderate slopes and in canyon bottoms; several known soils include Tarrant, Brackett, or Speck over Edwards, Glen Rose, and Walnut geologic formations; populations fluctuate widely from year to year, depending on winter rainfall; flowering mid April-late May, fruit matures and foliage withers by early summer

|                   |                 |                |
|-------------------|-----------------|----------------|
| Federal Status: T | State Status:   | SGCN: Y        |
| Endemic: Y        | Global Rank: G1 | State Rank: S1 |

**Buckley tridens** *Tridens buckleyanus*

Occurs in juniper-oak woodlands on rocky limestone slopes; Perennial; Flowering/Fruiting April-Nov

|                 |                   |                  |
|-----------------|-------------------|------------------|
| Federal Status: | State Status:     | SGCN: Y          |
| Endemic: Y      | Global Rank: G3G4 | State Rank: S3S4 |

**canyon mock-orange** *Philadelphus texensis* var. *ernestii*

Usually found growing from honeycomb pits on outcrops of Cretaceous limestone exposed as rimrock along mesic canyons, usually in the shade of mixed evergreen-deciduous canyon woodland; flowering April-June, fruit dehiscing September-October

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: N      | Global Rank: G3T3 | State Rank: S3 |

**darkstem noseburn** *Tragia nigricans*

Occurs in oak-juniper woodlands on mesic limestone slopes and canyon bottoms; Perennial; Flowering/Fruiting April-Oct

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G3 | State Rank: S3 |

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## HAYS COUNTY

### PLANTS

**Glass Mountains coral-root** *Hexalectris nitida*

Apparently rare in mixed woodlands in canyons in the mountains of the Brewster County, but encountered with regularity, albeit in small numbers, under *Juniperus ashei* in woodlands over limestone on the Edwards Plateau, Callahan Divide and Lampasas Cutplain; Perennial; Flowering June-Sept; Fruiting July-Sept

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G3 | State Rank: S3 |

**gravelbar brickellbush** *Brickellia dentata*

Essentially restricted to frequently-scoured gravelly alluvial beds in creek and river bottoms; Perennial; Flowering June-Nov; Fruiting June-Oct

|                 |                   |                  |
|-----------------|-------------------|------------------|
| Federal Status: | State Status:     | SGCN: Y          |
| Endemic: Y      | Global Rank: G3G4 | State Rank: S3S4 |

**Hall's prairie clover** *Dalea hallii*

In grasslands on eroded limestone or chalk and in oak scrub on rocky hillsides; Perennial; Flowering May-Sept; Fruiting June-Sept

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G2 | State Rank: S2 |

**Heller's marbleseed** *Onosmodium helleri*

Occurs in loamy calcareous soils in oak-juniper woodlands on rocky limestone slopes, often in more mesic portions of canyons; Perennial; Flowering March-May

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G3 | State Rank: S3 |

**Hill Country wild-mercury** *Argythamnia aphoroides*

Mostly in bluestem-grama grasslands associated with plateau live oak woodlands on shallow to moderately deep clays and clay loams over limestone on rolling uplands, also in partial shade of oak-juniper woodlands in gravelly soils on rocky limestone slopes; Perennial; Flowering April-May with fruit persisting until midsummer

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G3 | State Rank: S3 |

**narrowleaf brickellbush** *Brickellia eupatorioides* var. *gracillima*

Moist to dry gravelly alluvial soils along riverbanks but also on limestone slopes; Perennial; Flowering/Fruiting April-Nov

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G5T3 | State Rank: S3 |

**net-leaf bundleflower** *Desmanthus reticulatus*

Mostly on clay prairies of the coastal plain of central and south Texas; Perennial; Flowering April-July; Fruiting April-Oct

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G3 | State Rank: S3 |

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## HAYS COUNTY

### PLANTS

|                                                                                                                                                                                                                                      |                                                |                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|------------------|
| <b>Osage Plains false foxglove</b>                                                                                                                                                                                                   | <i>Agalinis densiflora</i>                     |                  |
| Most records are from grasslands on shallow, gravelly, well drained, calcareous soils; Prairies, dry limestone soils; Annual; Flowering Aug-Oct                                                                                      |                                                |                  |
| Federal Status:                                                                                                                                                                                                                      | State Status:                                  | SGCN: Y          |
| Endemic: N                                                                                                                                                                                                                           | Global Rank: G3                                | State Rank: S2   |
| <b>Plateau loosestrife</b>                                                                                                                                                                                                           | <i>Lythrum ovalifolium</i>                     |                  |
| Banks and gravelly beds of perennial (or strong intermittent) streams on the Edwards Plateau, Llano Uplift and Lampasas Cutplain; Perennial; Flowering/Fruiting April-Nov                                                            |                                                |                  |
| Federal Status:                                                                                                                                                                                                                      | State Status:                                  | SGCN: Y          |
| Endemic: N                                                                                                                                                                                                                           | Global Rank: G3G4                              | State Rank: S3S4 |
| <b>plateau milkvine</b>                                                                                                                                                                                                              | <i>Matelea edwardsensis</i>                    |                  |
| Occurs in various types of juniper-oak and oak-juniper woodlands; Perennial; Flowering March-Oct; Fruiting May-June                                                                                                                  |                                                |                  |
| Federal Status:                                                                                                                                                                                                                      | State Status:                                  | SGCN: Y          |
| Endemic: Y                                                                                                                                                                                                                           | Global Rank: G3                                | State Rank: S3   |
| <b>scarlet leather-flower</b>                                                                                                                                                                                                        | <i>Clematis texensis</i>                       |                  |
| Usually in oak-juniper woodlands in mesic rocky limestone canyons or along perennial streams; Perennial; Flowering March-July; Fruiting May July                                                                                     |                                                |                  |
| Federal Status:                                                                                                                                                                                                                      | State Status:                                  | SGCN: Y          |
| Endemic: Y                                                                                                                                                                                                                           | Global Rank: G3G4                              | State Rank: S3S4 |
| <b>Stanfield's beebalm</b>                                                                                                                                                                                                           | <i>Monarda stanfieldii</i>                     |                  |
| Largely confined to granite sands along the middle course of the Colorado River and its tributaries; Perennial                                                                                                                       |                                                |                  |
| Federal Status:                                                                                                                                                                                                                      | State Status:                                  | SGCN: Y          |
| Endemic: Y                                                                                                                                                                                                                           | Global Rank: G3                                | State Rank: S3   |
| <b>sycamore-leaf snowbell</b>                                                                                                                                                                                                        | <i>Styrax platanifolius ssp. platanifolius</i> |                  |
| Rare throughout range, usually in oak-juniper woodlands on steep rocky banks and ledges along intermittent or perennial streams, rarely far from some reliable source of moisture; Perennial; Flowering April-May; Fruiting May-Aug. |                                                |                  |
| Federal Status:                                                                                                                                                                                                                      | State Status:                                  | SGCN: Y          |
| Endemic: Y                                                                                                                                                                                                                           | Global Rank: G3T3                              | State Rank: S3   |
| <b>Texas amorphia</b>                                                                                                                                                                                                                | <i>Amorpha roemeriana</i>                      |                  |
| Juniper-oak woodlands or shrublands on rocky limestone slopes, sometimes on dry shelves above creeks; Perennial; Flowering May-June; Fruiting June-Oct                                                                               |                                                |                  |
| Federal Status:                                                                                                                                                                                                                      | State Status:                                  | SGCN: Y          |
| Endemic: N                                                                                                                                                                                                                           | Global Rank: G3                                | State Rank: S3   |
| <b>Texas barberry</b>                                                                                                                                                                                                                | <i>Berberis swaseyi</i>                        |                  |

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## HAYS COUNTY

### PLANTS

Shallow calcareous stony clay of upland grasslands/shrublands over limestone as well as in loamier soils in openly wooded canyons and on creek terraces; Perennial; Flowering/Fruiting March-June

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G3 | State Rank: S3 |

**Texas claret-cup cactus** *Echinocereus coccineus* var. *paucispinus*

Mountains, hills, and mesas, igneous and limestone, oak-juniper-pinyon woodland or juniper woodland on limestone mesas, mostly rocky habitats but also in alluvial basins, grasslands, or among mesquite or other shrubs. Flowering March - April (Powell and Weedin 2004).

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: N      | Global Rank: G5T3 | State Rank: S3 |

**Texas fescue** *Festuca versuta*

Occurs in mesic woodlands on limestone-derived soils on stream terraces and canyon slopes; Perennial; Flowering/Fruiting April-June

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G3 | State Rank: S3 |

**Texas seymeria** *Seymeria texana*

Found primarily in grassy openings in juniper-oak woodlands on dry rocky slopes but sometimes on rock outcrops in shaded canyons; Annual; Flowering May-Nov; Fruiting July-Nov

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: Y      | Global Rank: G3 | State Rank: S3 |

**Texas wild-rice** *Zizania texana*

Spring-fed river, in clear, cool, swift water mostly less than 1 m deep, with coarse sandy soils rather than finer clays; flowering year-round, peaking March-June

|                   |                 |                |
|-------------------|-----------------|----------------|
| Federal Status: E | State Status: E | SGCN: Y        |
| Endemic: Y        | Global Rank: G1 | State Rank: S1 |

**threeflower penstemon** *Penstemon triflorus* var. *triflorus*

Occurs sparingly on rock outcrops and in grasslands associated with juniper-oak woodlands (Carr 2015).

|                 |                   |                |
|-----------------|-------------------|----------------|
| Federal Status: | State Status:     | SGCN: Y        |
| Endemic: Y      | Global Rank: G3T3 | State Rank: S3 |

**tree dodder** *Cuscuta exaltata*

Parasitic on various *Quercus*, *Juglans*, *Rhus*, *Vitis*, *Ulmus*, and *Diospyros* species as well as *Acacia berlandieri* and other woody plants; Annual; Flowering May-Oct; Fruiting July-Oct

|                 |                 |                |
|-----------------|-----------------|----------------|
| Federal Status: | State Status:   | SGCN: Y        |
| Endemic: N      | Global Rank: G3 | State Rank: S3 |

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## HAYS COUNTY

### PLANTS

**turnip-root scurfpea** *Pedimelum cyphocalyx*

Grasslands and openings in juniper-oak woodlands on limestone substrates on the Edwards Plateau and in north-central Texas (Carr 2015).

Federal Status:

State Status:

SGCN: Y

Endemic: Y

Global Rank: G3G4

State Rank: S2S3

**Warnock's coral-root** *Hexalectris warnockii*

In leaf litter and humus in oak-juniper woodlands on shaded slopes and intermittent, rocky creekbeds in canyons; in the Trans Pecos in oak-pinyon-juniper woodlands in higher mesic canyons (to 2000 m [6550 ft]), primarily on igneous substrates; in Terrell County under *Quercus fusiformis* mottes on terraces of spring-fed perennial streams, draining an otherwise rather xeric limestone landscape; on the Callahan Divide (Taylor County), the White Rock Escarpment (Dallas County), and the Edwards Plateau in oak-juniper woodlands on limestone slopes; in Gillespie County on igneous substrates of the Llano Uplift; flowering June-September; individual plants do not usually bloom in successive years

Federal Status:

State Status:

SGCN: Y

Endemic: N

Global Rank: G2G3

State Rank: S2

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