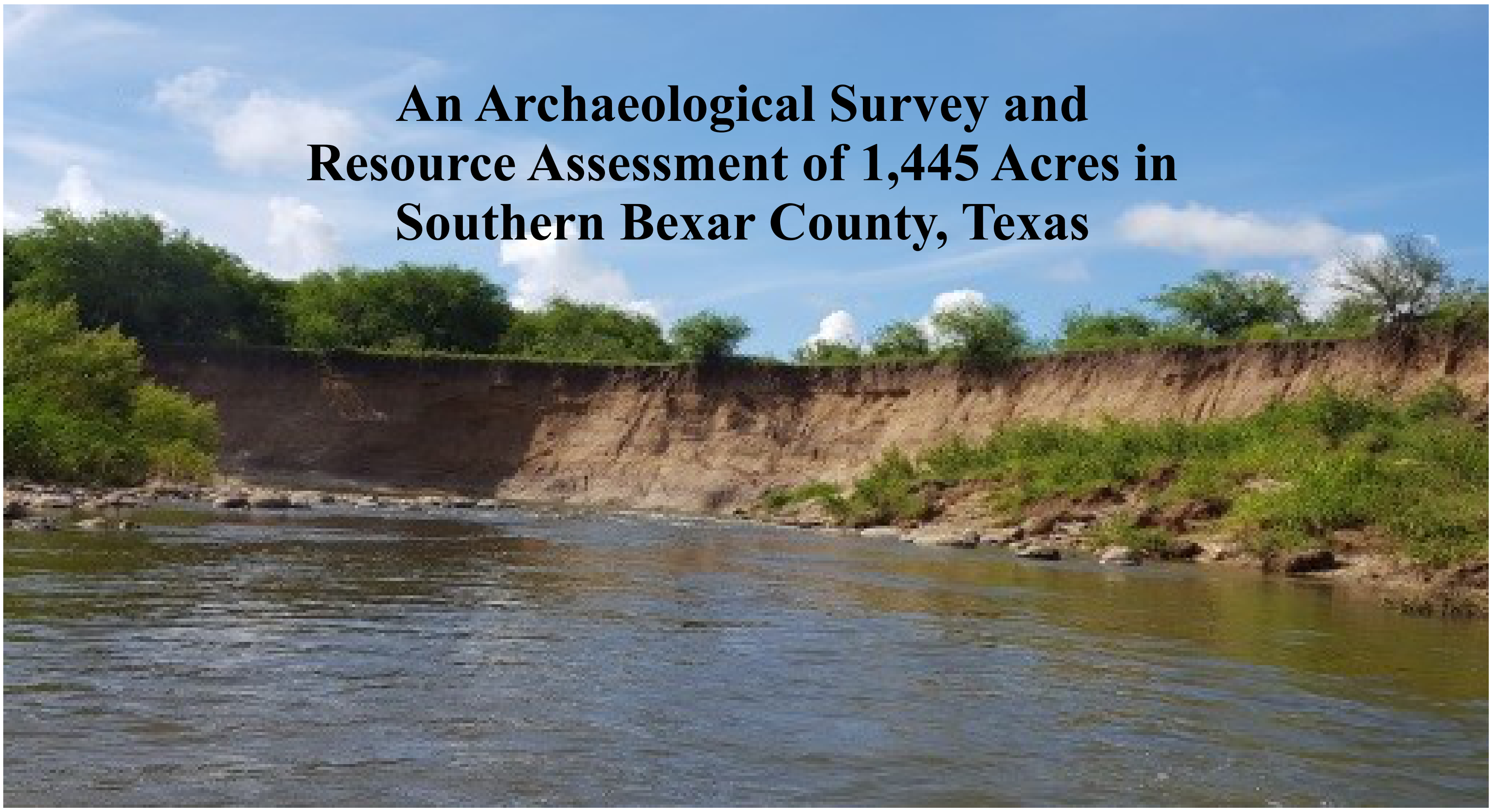
An Archaeological Survey and Resource Assessment of 1,445 Acres in Southern Bexar County, Texas



by
Raymond Mauldin, Antonia L. Figueroa,
Leonard Kemp, Clinton M. M. McKenzie, and Sarah Wigley

REDACTED

Principal Investigator
Paul Shawn Marceaux

Prepared for:
REDUS Texas Land, LLC
301 South College Street, 15th Floor
Charlotte, North Carolina 28202

Prepared by:
Center for Archaeological Research
The University of Texas at San Antonio
One UTSA Circle
San Antonio, Texas 78249
Archaeological Report, No. 455

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Abstract:

The Center for Archaeological Research (CAR) at The University of Texas at San Antonio (UTSA) performed an archaeological survey of 1,445 acres within a 1,833-acre Project Area south of Mission Espada in Bexar County, Texas. Dr. Paul Shawn Marceaux served as the Principal Investigator for the project, and Antonia L. Figueroa served as the Project Archaeologist. The survey was conducted in 2016 and 2017 on behalf of REDUS Texas Land, LLC (REDUS). The Survey Area is not within the City of San Antonio (COSA). However, COSA has review authority under the auspices of the Espada Conservation Subdivision Master Development Plan (2008). Therefore, CAR consulted with the COSA Office of Historic Preservation (OHP) prior to the start of the project. The principal goal of the survey was to document prehistoric and historic archaeological resources in the area that may be impacted by future development. CAR surveyed roughly 1,445 acres of the Project Area. About 384 acres were excluded from the survey as they were identified as a likely conservation easement. In addition, a small previously surveyed area associated with a hike and bike trail was excluded. Two different survey methods were used. About 518 acres recently had been plowed and were under cultivation. In these areas, CAR personnel walked transects spaced at 15 meters (m). Thirty-seven shovel tests were excavated in these fields to look for potential sites based on the exposure of material by the plow. In the remaining area, visibility was limited. CAR used 30-m transects and excavated 177 shovel tests in this 927-acre area. CAR completed archival research, conducted an oral history interview with a longtime resident of the area, processed two radiocarbon samples from profiles, and reviewed the west bank of the San Antonio River, which forms a portion of the eastern boundary of the larger Project Area, for archaeological deposits.

Within the 1,445-acre Survey Area, CAR defined four new historic sites (41BX2145, 41BX2146, 41BX2147, and 41BX2149), three new prehistoric sites (41BX2148, 41BX2190, and 41BX2191), and observed several irrigation ditches, including the Espada *Acequia* (41BX269) and a previously recorded ditch (41BX1796). CAR also identified a low-density background scatter of historic and prehistoric isolated artifacts. A fourth prehistoric site, 41BX2200, was recorded along the riverbank and is represented by a radiocarbon date of 3516 +/- 34 (3884-3696 cal BP) on a buried feature, along with a core and burned rock below the river cut. With the exception of sites 41BX269 (Espada *Acequia*) and the Late Archaic deposit on 41BX2200, none of the sites appear to contain significant data. However, two of the sites (41BX2190 and 41BX2191) have not been shovel tested, as they were discovered during site revisits. In addition, given the exposure patterns and the potential for burial of material in this Project Area, CAR suggests that there is a moderate likelihood that buried cultural deposits are present in many sections of the Survey Area. Backhoe trenching should be conducted to eliminate areas of concern, especially if impacts greater than 60 cm are to occur.

Finally, note that all collected artifacts and records generated during this project were prepared for curation according to Texas Historical Commission (THC) guidelines. The artifacts and records are permanently curated at CAR as Accession no. 1947, consistent with an agreement with the property owner.

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Acknowledgements:

We could not have completed this project without the efforts of the hardworking field crew that consisted of David Barron, Jason Perez, and Sarah Wigley. Thanks to the Gary Nelson and Marc Curtis with Wells Fargo. Norman Gore and Jon Yturri assisted with access to the Project Area. Mr. Yturri, a longtime resident of the community, was generous in providing information on land use. He also took Leonard Kemp and Antonia Figueroa on a trip down the San Antonio River (snacks included) on his personal boat to document any evidence of archaeological sites. Finally, Principal Investigator Dr. Paul Shawn Marceaux provided administrative support and reviewed the draft. Melissa Eiring processed the artifacts and records in the CAR laboratory, while Cynthia Munoz and Karlee Jeffrey prepared the material for curation. Dr. Kelly Harris edited the final document, and Katherine Smyth produced planning maps in advance of fieldwork. Dr. Jessica Nowlin's expertise and assistance was vital to interpreting GIS field data and helping with the final report figures. Special thanks to Leonard Kemp for his drafting expertise on multiple report figures. Thanks also to Kay Hindes and Matthew Elverson of the City of San Antonio's Office of Historic Preservation for their comments on the project and report.

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Chapter 1: Introduction

Antonia L. Figueroa and Raymond Mauldin

The Center for Archaeological Research (CAR) at The University of Texas at San Antonio (UTSA) conducted an archaeological pedestrian survey for REDUS Texas Land, LLC (REDUS) on a large tract of land south of Mission Espada in Bexar County, Texas (Figure 1-1). The Project Area is located on private land, and no Federal, State, or County funds are involved at this time. As such, the project did not require a Texas Antiquities Permit or review by the Texas Historical Commission (THC). Though much of the property is outside the boundary of the City of San Antonio (COSA), the COSA Office of Historic Preservation (OHP) had review authority for the project under the Master Development Plan (MDP) for the Espada Conservation Subdivision (MDP 2008). Consequently, prior to beginning fieldwork, CAR consulted with Kay Hindes and Matthew Elverson of COSA OHP regarding requirements from their office. OHP also reviewed the initial draft of this report.

The REDUS survey work was conducted from April through June of 2016, with follow-up work in the spring and early summer of 2017. CAR Director Dr. Paul Shawn Marceaux served as the Principal Investigator of the project, and Antonia L. Figueroa served as Project Archaeologist.

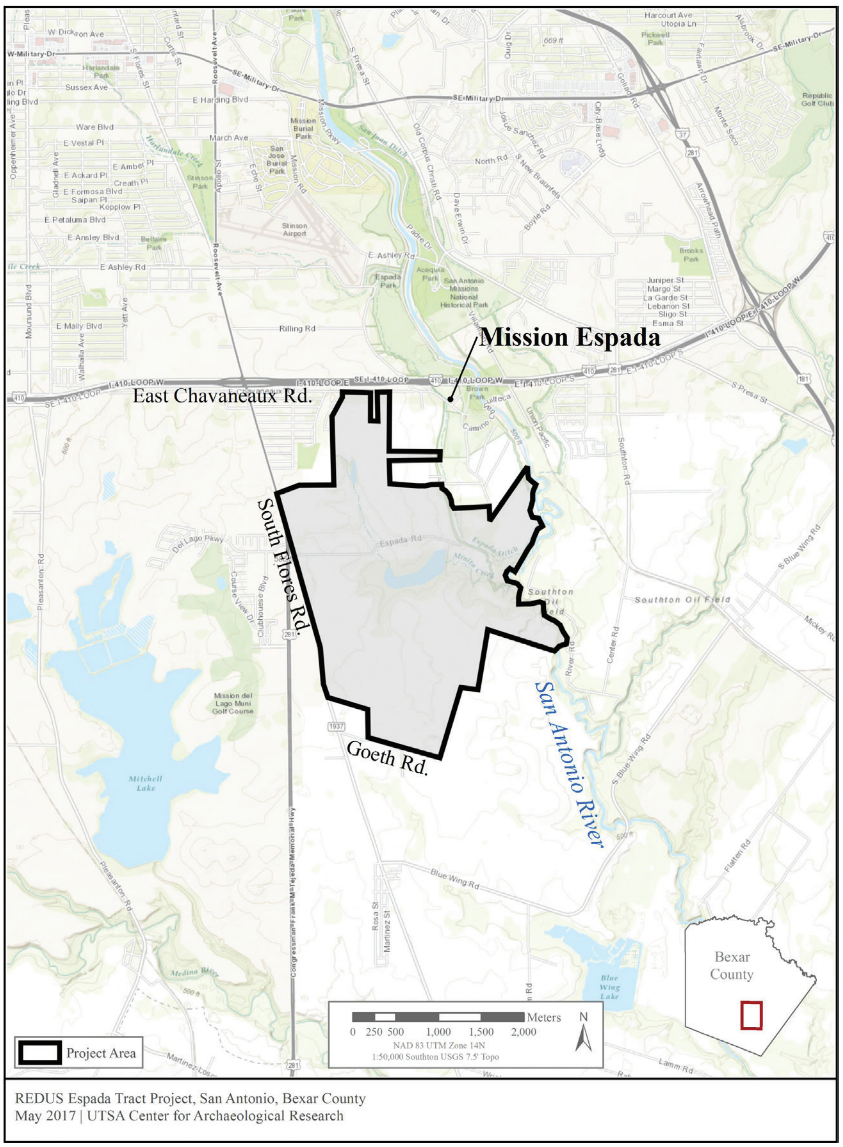

Figure 1-1. The location of the Project Area on the Southton USGS 7.5-minute series quadrangle map.

Project Description

The primary objective of the project was to identify and document archaeological and historic resources that were present within the Project Area. Background research undertaken prior to any work on the project indicated that previously recorded cultural and archaeological sites were present within and near the Project Area. Mission Espada is less than a kilometer to the northeast of the Project Area. Most importantly, a section of the Espada *Acequia* (41BX269) is located within the Project Area. The Espada *Acequia* is a National Historic Engineering Landmark, is listed on the National Register (Baker et al. 1974; Minor and Steinberg 1968), and is a component of the San Antonio Missions World Heritage Designation (National Parks Service [NPS] 2016; United Nations Educational, Scientific, and Cultural Organization [UNESCO] 2017. While originally designed as a subdivision (MDP 2008), no specific undertaking was identified prior to the initiation of the investigation reported here. Goals of the archaeological investigation were focused on identifying, documenting, and assessing any proto-historic or historic archaeological deposits, including those possibly associated with the Spanish Colonial period occupants of the area, any remnants of the acequia constructed to irrigate the lands near Mission Espada, and any prehistoric cultural deposits present in the Project Area (Figure 1-1). The Project Area covers roughly 1,833 acres (7.41 km^2). It is bounded on the north by East Chavaneaux Road, on the west by South Flores Road, on the east by the San Antonio River, and on the south by Goeth Road.

As shown in Figure 1-2, a previous survey associated with a hike and bike trail cuts through the center of the area (Padilla et al. 2017). Roughly 384 acres (1.55 km^2), in green in Figure

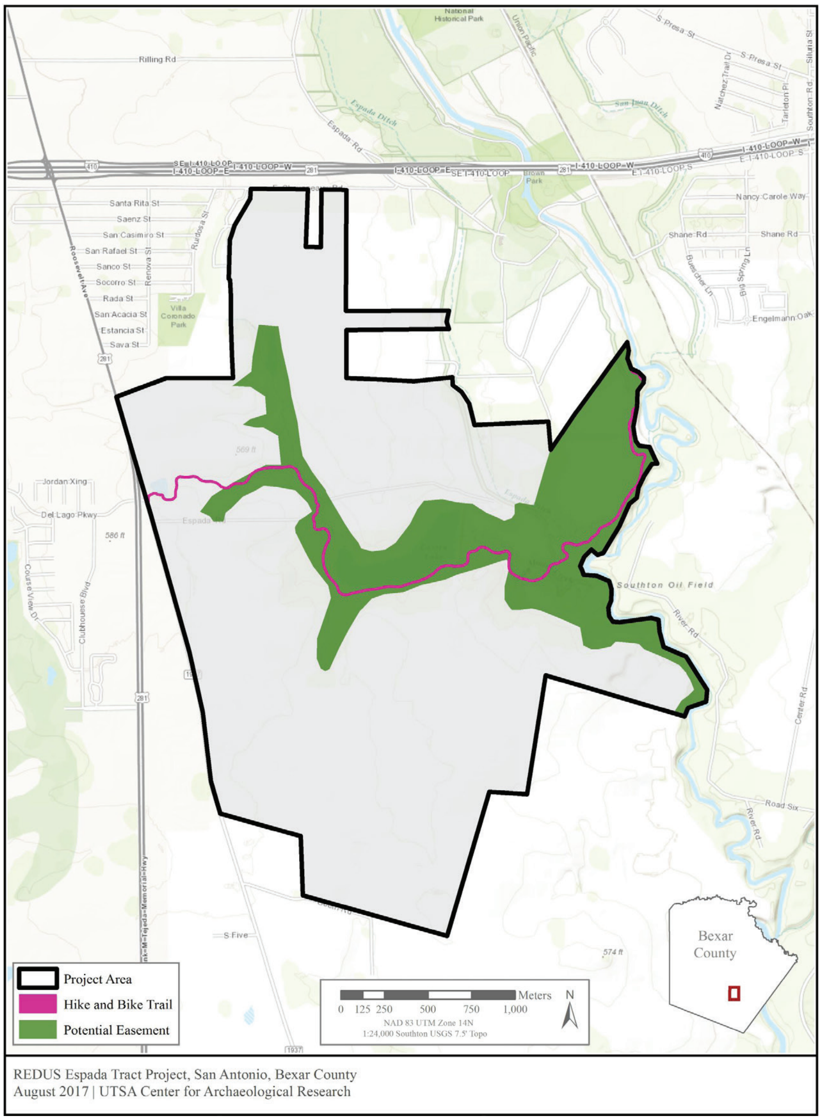

Figure 1-2. Project Area with previously surveyed hike and bike trail segment outlined in red, and potential conservation easement shown in green.

1-2, were also eliminated from the survey as they fell within a potential conservation easement and, as such, may not be subject to future development. Removing these two areas of the previous survey (Padilla et al. 2017) and the conservation easement, the CAR survey covered about 1,445 acres (5.84 km^2). In this report, the 1,445 acres are referred to as the Survey Area, and Project Area is used to reference the larger, 1,833-acre tract. CAR staff also conducted archival research, completed an oral history interview with a local landowner, and scanned the west bank of the San Antonio River for buried archaeological deposits.

Figure 1-3 is a 2016 aerial of the Project Area that shows land use at the time the survey was initiated. While it is probable that most sections of the project have been plowed at some point, the figure clearly shows that several areas, including roughly a third of the Project Area on the southern end, were actively farmed in 2016.

Plowing results in significant soil disruption, generally 30-40 cm below the surface depending on the type of tilling. However, both experimental results of the impact of plowing on artifacts and longer term monitoring of plowed fields (e.g., Ammerman 1985) suggest that the churning of the soil causes significant vertical displacement of buried material, without major horizontal displacement. Plowing, then, can provide a partial guide to where additional buried materials (e.g., artifacts and features) may be located. After harvest, the ground surface on most plowed fields is not obstructed by vegetation. The top photograph in Figure 1-4 shows an example of high visibility

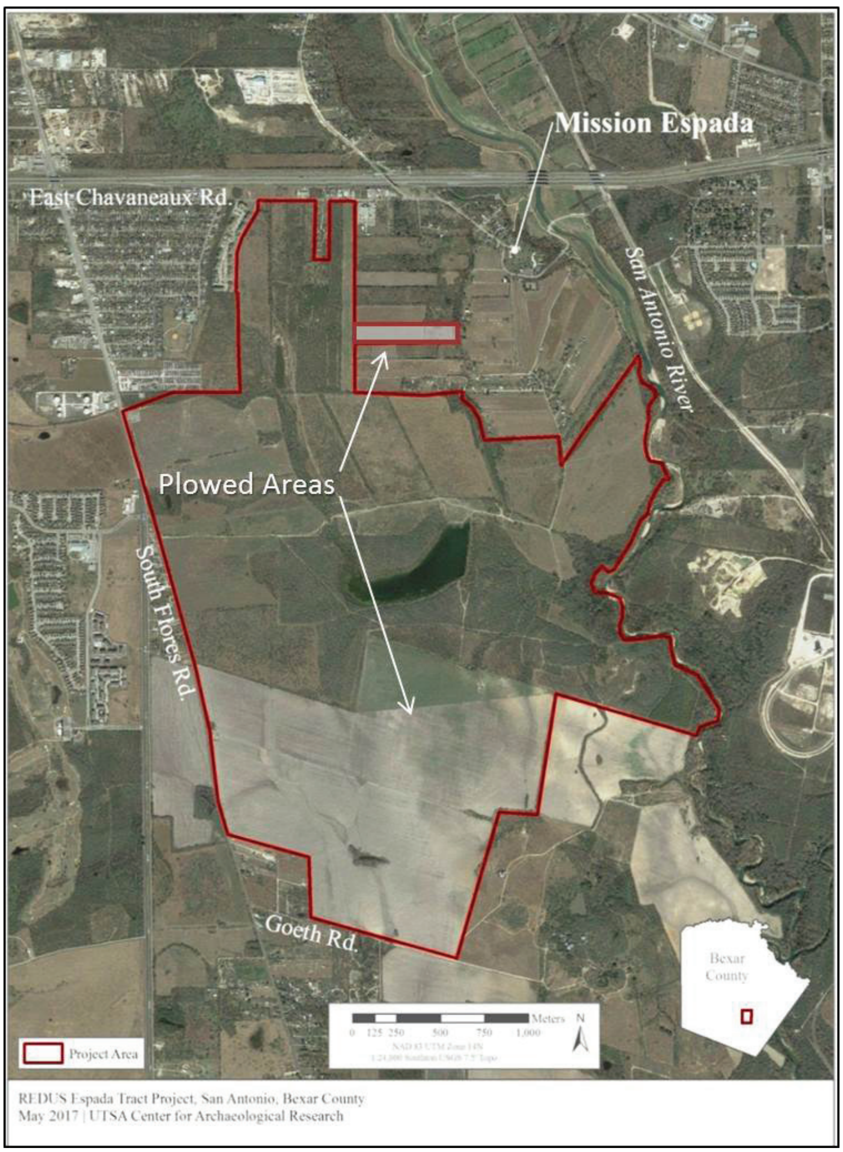

Figure 1-3. Aerial photo of Project Area showing recent land use patterns, including areas of active planting at the time the survey was initiated in late spring of 2016.

in the southern section of the Survey Area. Unfortunately, surfaces in fallowed or abandon fields can be overrun by ground cover and secondary growth that significantly reduce surface visibility (Figure 1-4, bottom photo).

Modern land use activities in the Project Area have dramatically altered both surface visibility and the probability that previously buried material would be exposed on the surface. Because of these different land use histories, CAR used two different survey methods for the project. On the recently plowed areas (ca. 518 acres; 2.1 km^2), CAR conducted an intensive reconnaissance survey during which transects, spaced at 15 m, were walked by staff. Shovel testing was limited and used to explore potential sites based on the exposure of material by the plow. Shown in gray on Figure 1-5, 37 shovel tests were excavated in these high exposure areas. In the remaining areas characterized by low visibility (orange shading), CAR used 30-m transects with shovel testing. CAR excavated 177 shovel tests in the 927-acre (3.75 km^2) area shaded in orange on Figure 1-5.

In addition to the reconnaissance and shovel test survey of the 1,445 acres, CAR staff completed archival research on the property, conducted an oral history interview with a life-long resident of the area, processed two radiocarbon samples from exposed profiles, and reviewed the west bank of the San Antonio River, which forms a portion of the eastern boundary of the larger survey tract, for archaeological deposits.

Figure 1-4. Sections of the Survey Area as they looked in late January 2016: (top) looking into a plowed field in the southern section and (bottom) an area in the northern section.

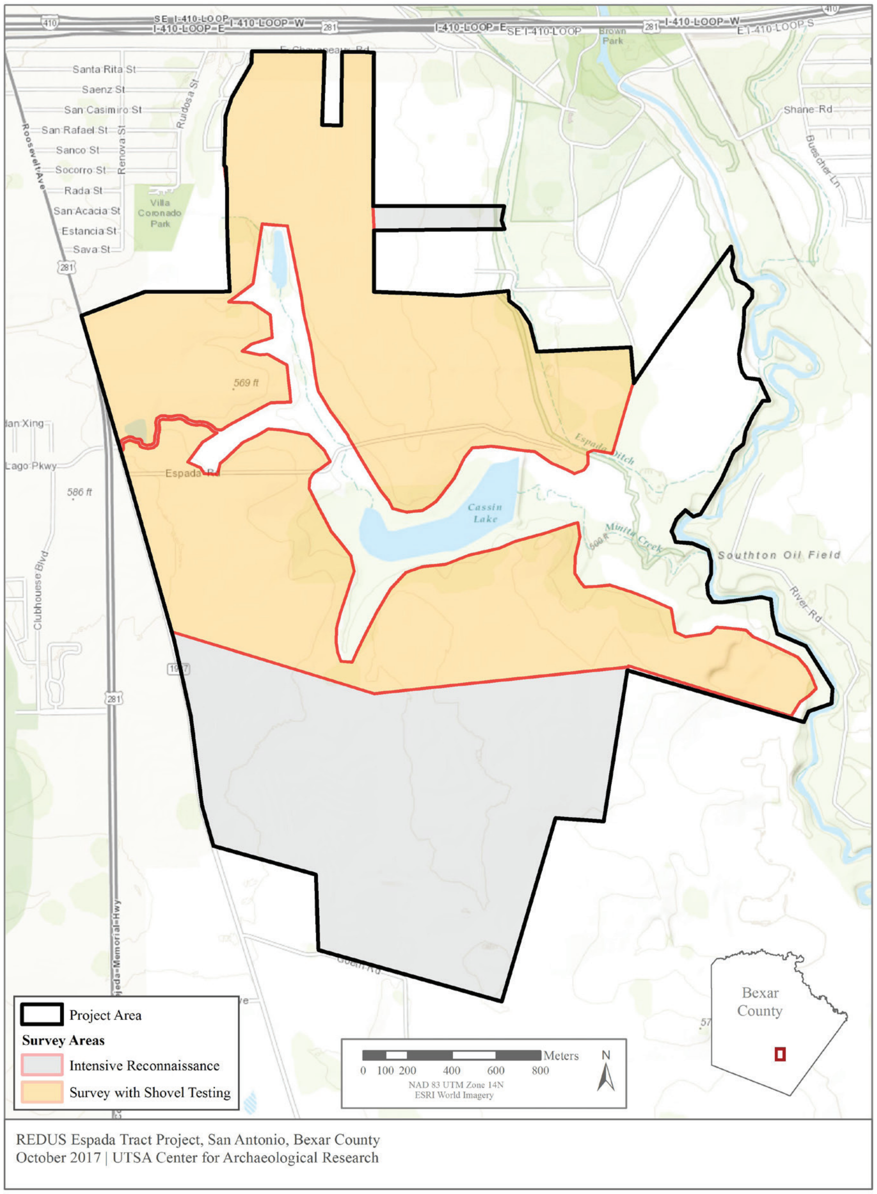

Figure 1-5. Areas of intensive reconnaissance survey (gray), survey with shovel tests (orange), and remaining Project Area (no shading). Heavy red line on the west in the orange shovel test area is a previously surveyed hike and bike trail (see Padilla et al. 2017).

Project Results

Archival research conducted in association with the project clarified aspects of site 41BX269, the Espada *Acequia*. Based on survey, CAR defined four new historic sites (41BX2145, 41BX2146, 41BX2147, and 41BX2149), three new prehistoric sites (41BX2148, 41BX2190, and 41BX2191), and observed several irrigation ditches. In addition, a low-density background scatter of historic and prehistoric isolated artifacts was identified within the surveyed area. During the trip down the San Antonio River and a subsequent revisit, CAR staff defined a fourth prehistoric site, 41BX2200, based on a Late Archaic radiocarbon date from a buried feature. This site is within the Project Area but is outside the Survey Area. With the exception of the Espada *Acequia* (41BX269) and 41BX2200, none of the sites are likely to contain significant data. However, given the artifact exposure patterns in the plowed fields, site exposure, deposition over radiocarbon dated events, and soil depositional and erosional patterns, CAR suggests that there is a high likelihood that buried cultural deposits are present in sections of the Survey Area. Based on that potential, CAR suggests that backhoe trenching should be conducted to eliminate areas of concern, especially in cases where impacts are anticipated to exceed 60 cm.

Collected artifacts, notes, and associated project records generated on this project were prepared for curation according to Texas Historical Commission (THC) guidelines. These materials are permanently curated at CAR (Accession No. 1947) under agreement with the property owner.

Report Outline

Including the current chapter, this report contains eight chapters and five appendices. Chapter 2 provides an overview of the physical environment, including aspects of climate, hydrology, geology, soils, and floral and faunal resources. Chapter 3 presents an overview of the prehistoric and historic occupations in the region, while Chapter 4 summarizes the history of the Project Area. Chapter 5 reviews previous archaeological sites within the project as well as the immediate area. Chapter 6 summarizes the field and laboratory methods used in the study, including information on curation. The results of the intensive reconnaissance survey as well as the pedestrian survey with shovel testing are discussed in Chapter 7. That chapter also presents recommendations regarding sites. Chapter 8 concludes the report with a summary of the project findings and develops recommendations for subsequent investigations that may be necessary in both the Survey Area and the greater Project Area.

The chapters are supported by five appendices. Appendix A provides a summary of the surface artifacts observed or collected, while Appendix B lists shovel test results. Appendix C is an edited transcript of an interview with Mr. John Yturri, a life-long resident of the area. Appendix D provides a brief summary and photographic record of the trip down the San Antonio River that was conducted by CAR staff in August of 2016 to look for buried material in the west riverbank. Finally, Appendix E presents additional information on the results of the two radiocarbon dates submitted from the project.

Chapter 2: The Natural Environment

Raymond Mauldin, Leonard Kemp, Antonia L. Figueroa, and Sarah Wigley

This chapter presents an overview of the natural environment. Included are discussions of aspects of the modern and historic climate, geology, hydrology, soils, and floral and faunal resources potentially important to occupants of the region. The final section of this chapter focuses specifically on the Project Area environment.

Climate

Bexar County, where the project is located, is characterized as having a moderate, subtropical, humid climate with cool winters and hot summers (Taylor et al. 1991). Figure 2-1 presents the monthly average temperature in San Antonio, Texas, between 1981 and 2010 (National Oceanic and Atmospheric Association [NOAA] 2017). The average annual temperature in San Antonio for this period was 69.5°F (20.8°C). The warmest months are July and August while the coolest are December and January. Between 1971 and 2000 the growing season averaged 270 days, with the average date of the last freeze being February 28, and the average date of the first freeze falling on November 25 (Texas Almanac 2017a).

Figure 2-2 presents the monthly average precipitation in San Antonio from 1981 through 2010. Rainfall totals peak in May and June with a smaller peak occurring in the fall months of September and October. The driest period occurs from winter to early spring in the months of December, January, February, and March with each averaging less than 2.5 in. (6.35 cm) of rain.

While evaporation and precipitation data suggest that in all months of the year there is, on average, a water deficit at a regional level (see Texas Water Development Board 2017), lower rainfall and higher temperature during the months of July and August combine to significantly increase that deficit, stressing plant and animal resources (see Riskind and Diamond 1986). The region can also experience intense, localized rainfall that may produce flash floods, especially during the summer and early fall (e.g., Ellsworth 1923), as well as periodic multi-year droughts (see Cleaveland et al. 2011; Mauldin 2003). Both floods and droughts can negatively impact agricultural yields, damage infrastructure, and reduce natural resource production.

Figure 2-3, which tracks annual rainfall in San Antonio from 1871 through 2015 (NOAA 2017; U.S. Climate Data 2017), documents substantial year-to-year variability. The wettest years over this 145-year period were in 1973, with 52.28 in. (132.79 cm) of precipitation, 1919 (50.3 in; 127.76 cm) and 1957 (48.83 in.; 124 cm.). Major floods, often associated with storms originating in the Gulf of Mexico or the Pacific, are recorded in 1921, 1946, 1998, and 2002. The driest years in the last 145 were in 1917, when only 10.11 in. (25.68 cm) of rain fell, 2008 (13.76 in: 34.95 cm), and several years in the early 1950s (Figure 2-3).

Tree-ring data from the region suggest that the variability seen in the modern data is not unique (see Cleaveland et al. 2011; Mauldin 2003). Focusing on South Central Texas

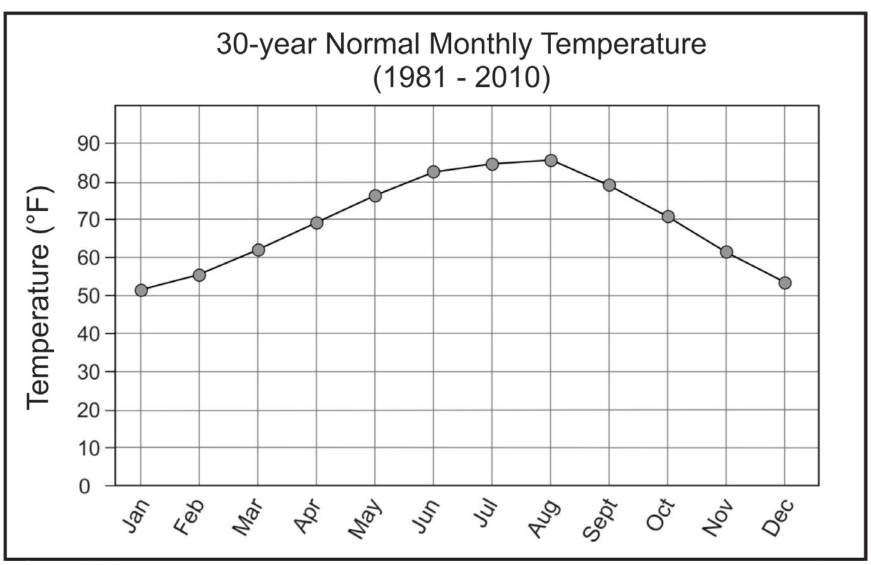

Figure 2-1. Mean monthly temperature for San Antonio, Texas (1981-2010). Data are from NOAA (2017).

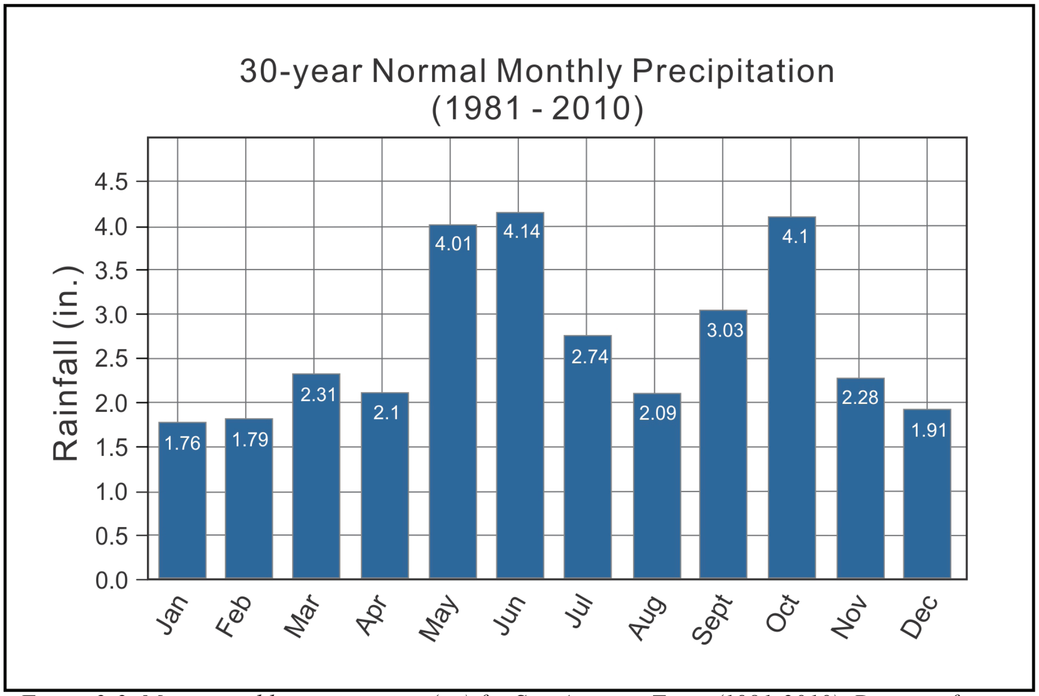

Figure 2-2. Mean monthly precipitation (in.) for San Antonio, Texas (1981-2010). Data are from NOAA 2017.

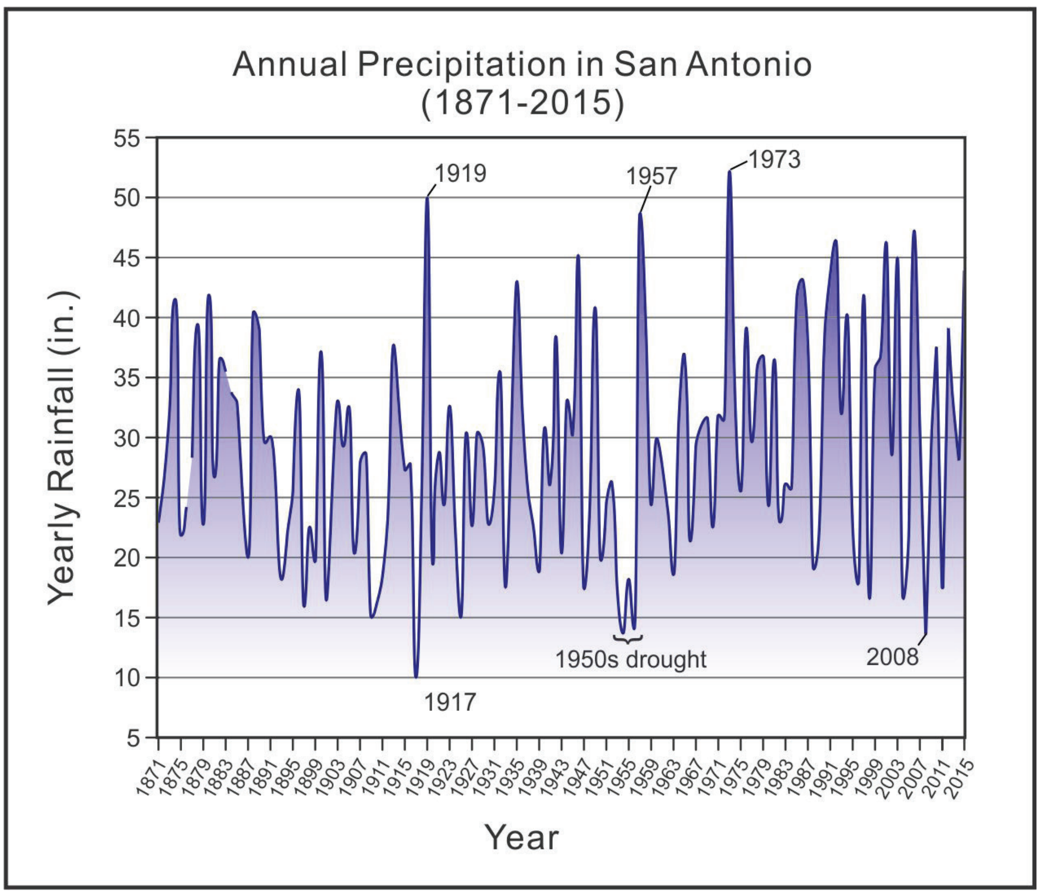

Figure 2-3. Annual precipitation for San Antonio (1871-2015). Complete data are lacking for 1876, 1883, and 1884. Data are from NOAA (2017) for 1871-2012 and U.S. Climate Data (2017) for 2013-2015. Graphic format is after Smith et al. (2015).

(Climate Division 7) between AD 1500 and 2008 and using tree-ring based Palmer Drought Severity Indices (PDSI) for the month of June, data in Cleaveland et al. (2011:63, 67) suggest that the 1500s and 1700s were both characterized by extremely dry periods. Interestingly, PDSI values for 1956, at the end of a multi-year drought (see Figure 2-3), rank as the twentieth driest year between 1500 and 2008 with a PDSI value of -4.97. The PDSI value in 1806 (-6.67) was the driest recorded (Cleaveland et al. 2011:67).

Geology, Hydrology, and Soils

Figure 2-4 shows the large-scale geological and hydrological features of Bexar County, as well as the general location of the Project Area. The data are derived from Arnow (1963), Sellards (1919), and the U.S. Geological Survey (USGS 2017). Cretaceous age deposits of limestone, which includes the Glen Rose (Kgr) and Edwards (Ked) limestone formations, chalk, and marl make up the Edwards Plateau that dominates the northern portion of the county. The plateau is an elevated region formed by tectonic uplift. The central part of the county contains Upper Cretaceous age Austin (Kau) and Pecan Gap chalk (Kpg), as well as Buda (Kbd) and Anacacho (Kac) limestone. Geology in the southern portion of the county includes Tertiary Wilcox (EPAwi) and Midway (Pami) groups, as well as Carrizo Sand (Ec) and Quaternary age terrace deposits. The Project Area is within the Midway Group (Figure 2-4) that includes deposits characterized as mixed sedimentary formations of mudstone and sandstone with secondary deposits of limestone (USGS 2017). Chert deposits are common in the Edwards Limestone (Ked) to the north and are often present as secondary deposits in streambeds in the southern portion of the county.

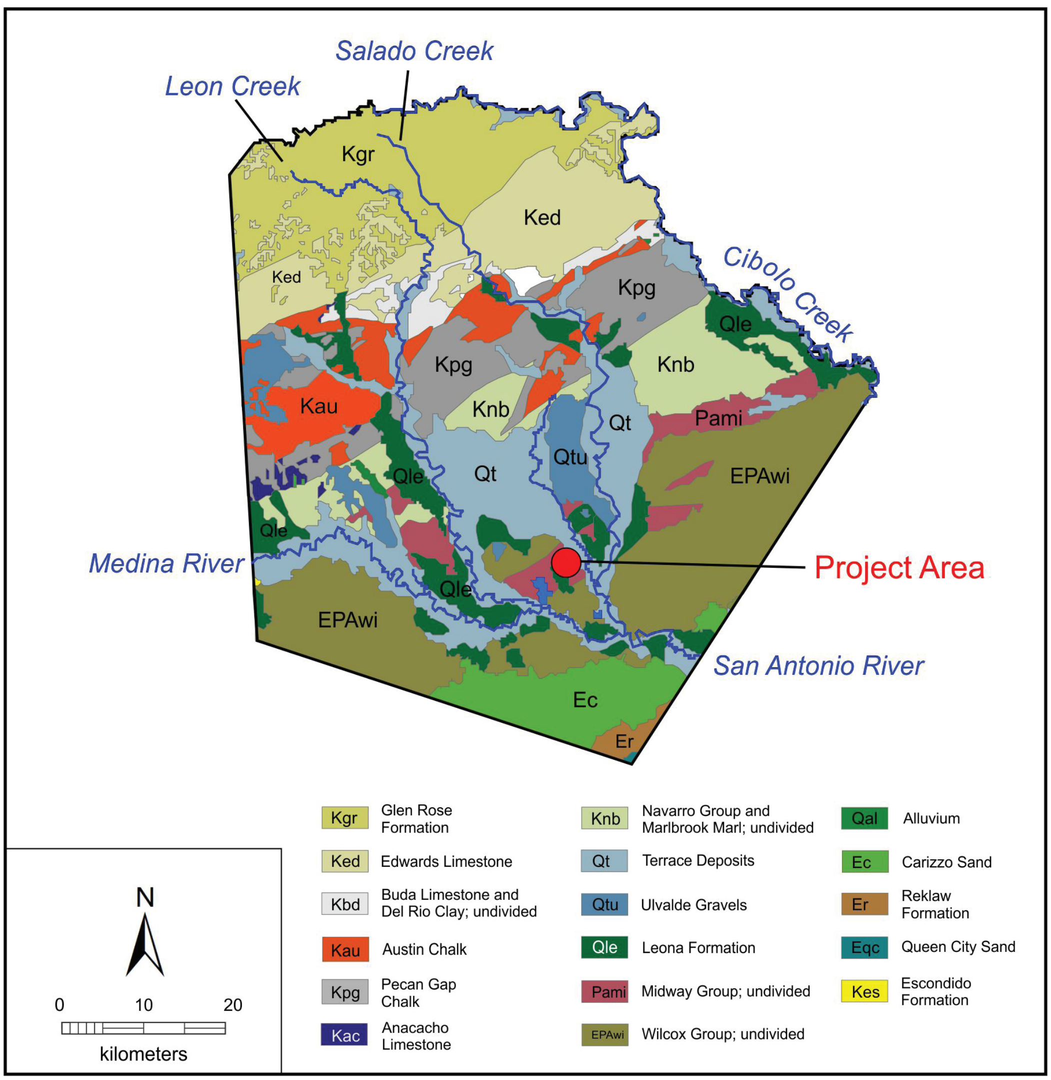

Figure 2-4. The geology of Bexar County (USGS 2017; after Smith et al. 2015) including major watercourses and the REDUS Project Area (red).

The geology of the area and the rainfall patterns discussed in the previous section are the principal determinants of the regional hydrology. As noted, the Edwards Plateau uplift to the north of the Survey Area is a limestone-dominated formation. As shown in Figure 2-5, that formation overlays the Edwards Aquifer. Rainfall on the plateau percolates into the aquifer and eventually outflows in springs and rivers, which are concentrated along southeastern face of plateau (see Barker et al. 1994; Woodruff and Abbott 1986). Historically, springs, such as San Pedro and San Antonio, provided a consistent source of water even during periods of extreme drought as they concentrated rainfall from a large catchment area (see Brune 1975; Eckhardt 2017; Votteler 2000). However, pumping from the Edwards Aquifer, which began in the late nineteenth century in response to urban needs (Porter 2011:99-128), has caused a significant lowering of the water table, resulting in the loss of numerous springs (see Eckhardt 2017).

Using groupings from Taylor et al. (1991), Figure 2-6 presents a summary of soils at the county level. The northern section of the county on the Edwards Plateau is dominated by Tarrant-Brackette (1 on Figure 2-6) and Crawford-Bexar (2) soil associations. These are clay dominated soils of shallow to moderate depths (Taylor et al. 1991:2-4). The central portion of the county is dominated by clay soils, with the Austin-Tarrant (3), Houston Black-Houston (4), and Lewisville-Houston Black (5) associations being the major groupings represented. These tend to be deep, clay soils with low permeability. The Lewisville-Houston Black deposits are often associated with terraces near drainages (Taylor et al. 1991:4-6). The southern portion of the county is dominated by the Hockley-Webb-Crockett (8), San Antonio-Crockett (7), and Eufaula (9) soil associations. Loams, sands, loamy sands, and sandy clays are the principal types. These soils are moderately deep, with higher permeability (Taylor et al. 1991:8). Finally, the Venus-Frio-Trinity association (6) is primarily along stream terraces. These deposits are clay dominated, with low permeability. As discussed subsequently, the REDUS Project Area is largely located in the Lewisville-Houston Black association, though the Venus-Frio-Trinity associations are also represented.

Biotic Provenience and Floral and Faunal Resources

Figure 2-7 shows that Bexar County lies at the junction of the Tamaulipan, Balconian, and Texan provinces, three of Blair's (1950) biotic divisions based on topographic features, climate, vegetation types, and terrestrial vertebrates. The

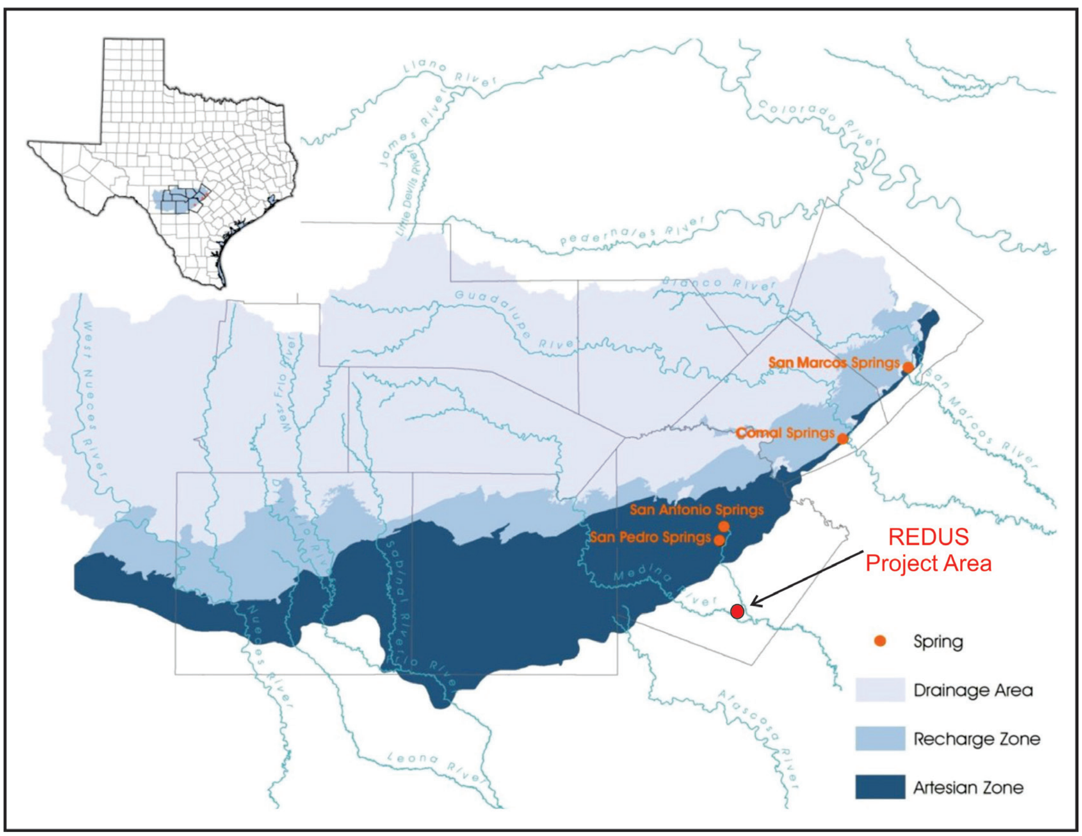

Figure 2-5. The REDUS Project Area in relationship to the primary springs and rivers that are generated by rainfall over the Edwards Aquifer (after Eckhardt 2017; Smith et al. 2015).

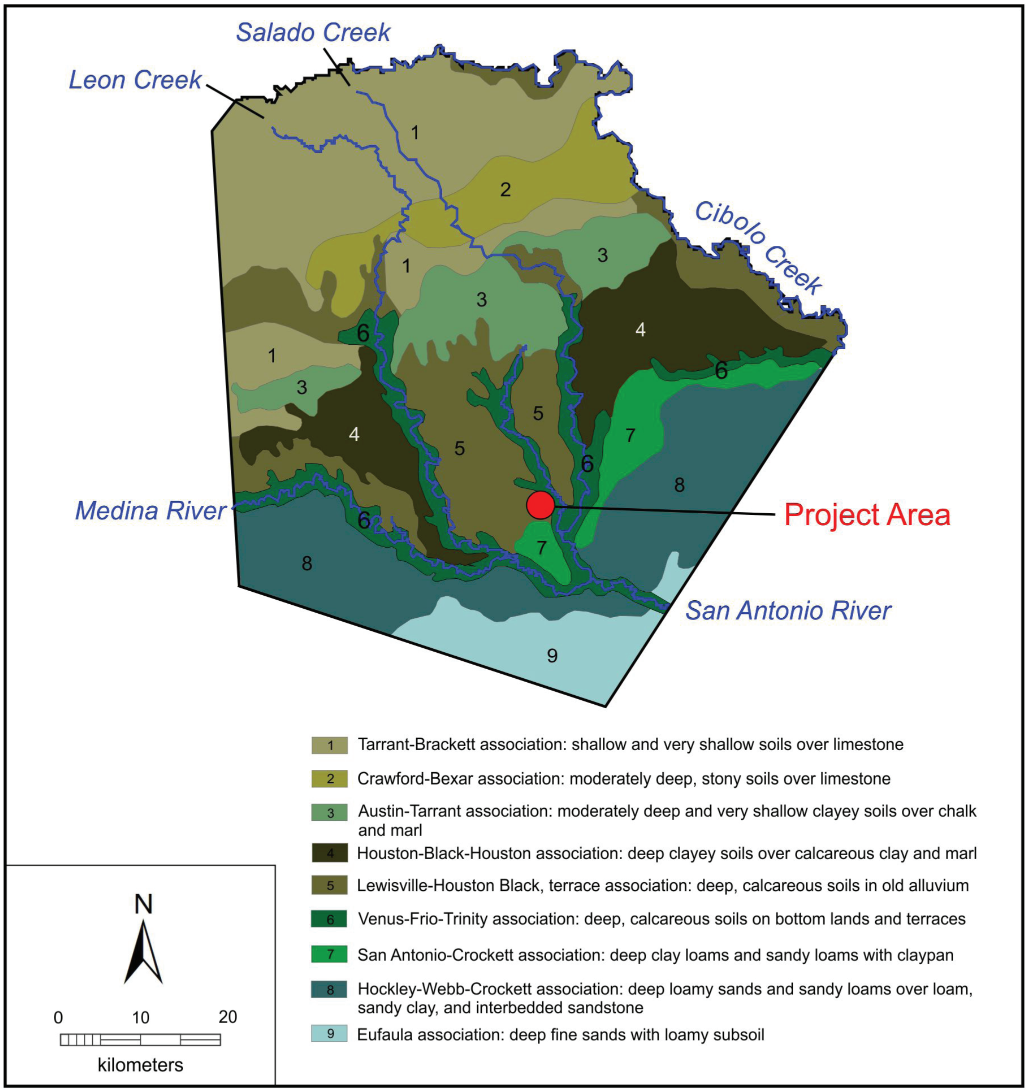

Figure 2-6. Soil associations within Bexar County (after Kemp and Mauldin 2018; Taylor et al. 1991), including major watercourses and the REDUS Project Area (red).

REDUS Project Area lies within the Tamaulipan province, and the current dominant vegetation of that province is described as thorn-scrub intermixed with grasses, cactus, and yucca (Blair 1950:103; Norwine et al. 2007). Prior to the introduction of European and Anglo ranching and the subsequent overgrazing by cattle, Norwine et al. (2007) describe the province to have been truer to a subtropical steppe dominated by tall grasses.

The Project Area also lies within the Blackland Prairie province (Figure 2-7), a relict tall grass prairie as defined by Gould et al. (1960; see also Hatch et al. 1990). It consists of either grass dominated prairies or forest/riparian vegetation along drainages. Historically, prairie grasses included little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), and Indiangrass (*Sorghastrum nutans*). The forested portions include oaks (*Fagaceae*), mesquite (*Prosopis*), sugar hackberry (*Celtis laevigata*), elm (*Ulmus*), eastern cottonwood (*Populus deltoides*), hickory (*Carya*), black walnut (*Juglans nigra*), and pecan (*Carya illinoinsis*; Griffith et al. 2004).

Within Bexar County, a wide variety of mammals (Davis and Schmidly 1997), fish, birds, and reptiles (see Dixon 2013; Kutac and Caran 1994) have been recorded. Mammal species of economic importance to past occupants include white-tailed deer (*Odocoileus virginianus*), coyote (*Canis latrans*), cottontail rabbit (*Sylvilagus floridanus*), and jackrabbit (*Lepus californicus*), among others (Davis and Schmidly 1997). Allen (1896) notes that antelope, black bear, wolf, lynx, ocelot, and bison were present in the region in the

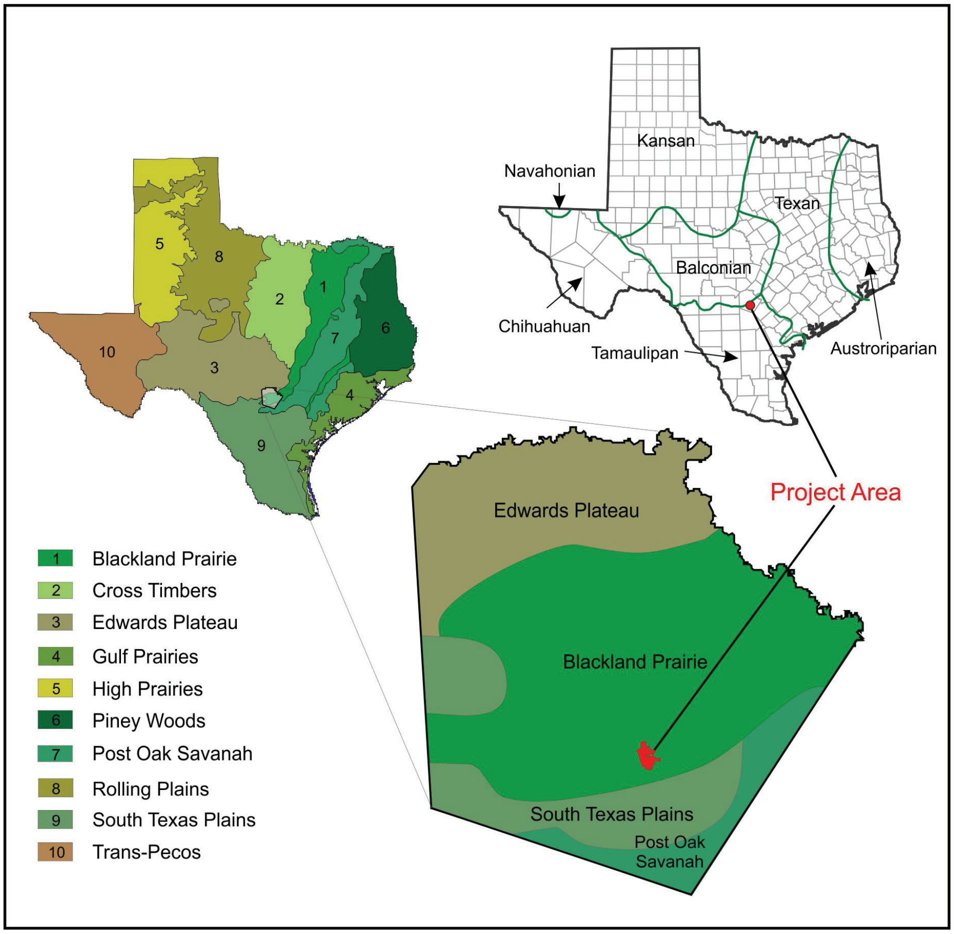

Figure 2-7. Biotic provinces (Blair 1950; Texas Parks and Wildlife Department 2017), ecoregions (Gould et al. 1960) of Texas, and ecoregions represented in Bexar County. Location of the Project Area is highlighted in red.

1800s. His observations are supported by historic accounts of early travelers, including accounts of early Spanish explorers (Foster 1995; Wade 1998) and of settlers who noted a diverse and abundant animal population (Doughty 1983; Weniger 1997). For example, one of the earliest accounts of the area comes from the Terán expedition (1691-1692). As summarized by Wade (1998, 2003), the expedition crossed the valleys of the Medina and San Antonio rivers. These settings were dominated by mesquite, oak, cottonwood, willow, cypress, mulberry, and pecan trees and were separated by grassland. Large numbers of bison, deer, and turkey, as well as abundant fish, were noted, and a generation later, the Ramon-Espinosa expedition (1716) recorded catfish, gar, and alligator in the San Antonio River (Wade 1998).

Project Specific Observations

The southern Bexar County setting of the project currently is used primarily for agriculture and livestock. Sorghum is the principal crop, though historically additional crops, including corn, cotton, feed grass, wheat, flax, and a wide variety of vegetables were grown in the fields irrigated by Spanish Colonial acequias that diverted water from the San Antonio River (see Cox 2005; Hutson 1898:45-46; Yturri Interview, Appendix C). As discussed in subsequent chapters, a portion of the Espada *Acequia* (41BX269), constructed in the early 1700s, is within the REDUS survey. In addition, there are two man-made reservoirs, the most prominent of which is Cassin Lake, constructed in the early 1900s (Handbook of Texas 2017). Figure 2-8 presents the local hydrology without reference to these reservoirs and irrigation facilities. The figure shows that the principal water source is the San Antonio River, which forms a portion of the eastern border of the Project Area. The Medina River is to the west, and the confluence of the Medina and the San Antonio rivers is roughly 8 km to the south. Minita Creek and associated minor drainages, including an unnamed drainage that initiates in the southern portion of the Project Area, were the principal natural water sources other than the San Antonio River (Figure 2-8).

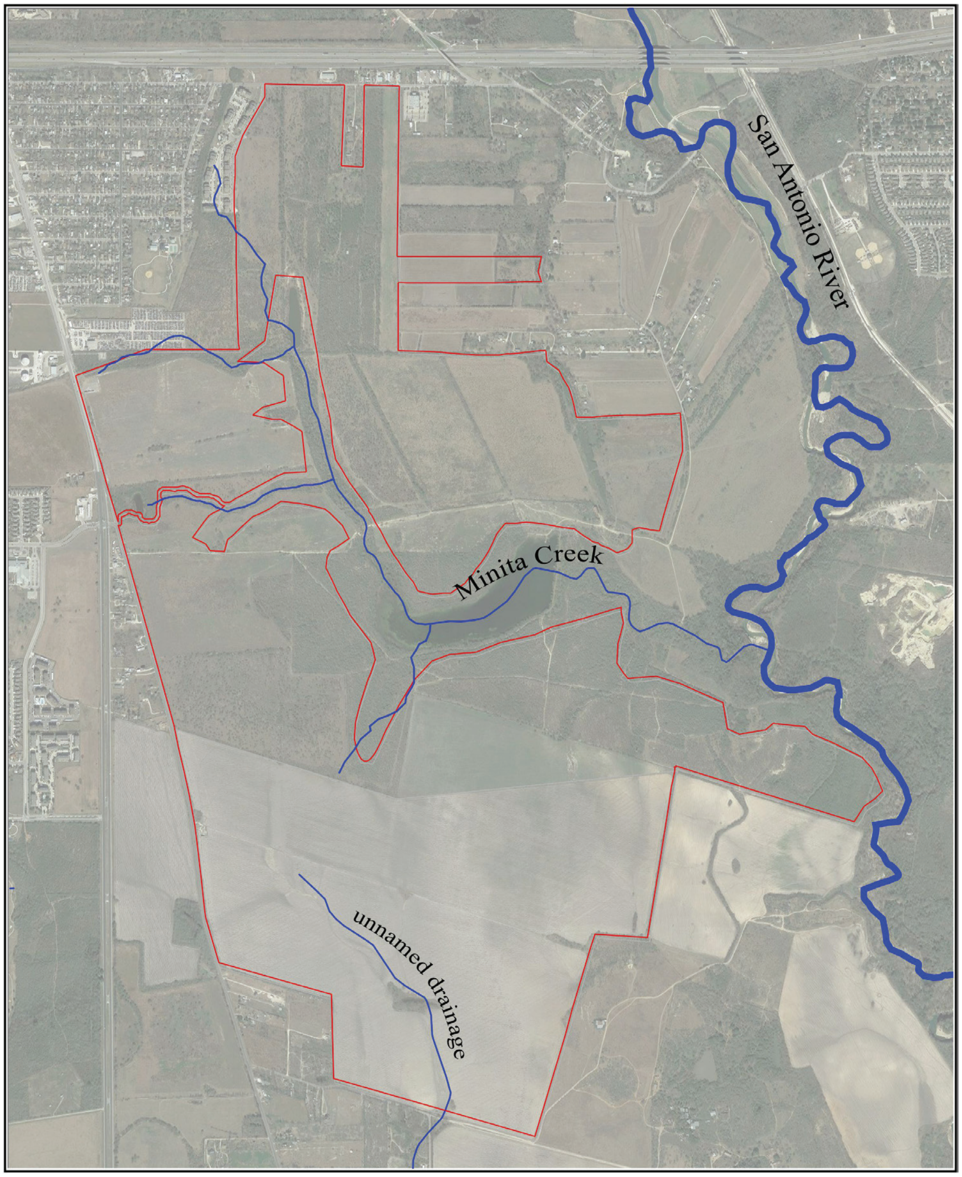

Figure 2-8. Natural hydrology overlain on a recent aerial photo with the REDUS survey identified in red. The San Antonio River drainage is derived from a 1929-1930 aerial map produced by Drought-Kargl surveys (Stoner System; see Gale 1984) and on file at CAR. Minita Creek and associated drainages are estimated from a 1953 USGS Southton 7.5-minute quadrangle map and the Giraud (1874) copy of an 1824 map of irrigable lands. Note that Minita Creek was dammed in 1907 to form Cassin Lake (see Padilla et al. 2017).

The San Antonio River and drainage patterns, presented in Figure 2-8, used a combination of sources to produce an estimate of the hydrological landscape at the turn of the century. Since that time, urban development, deep wells, and flood control measures (see Porter 2011:99-128) have caused significant changes to the San Antonio River system. Mr. John Yturri, a lifetime resident of the area born in 1931, describes the river as becoming wider and more gravelly over time, with greater water volume and increased velocity (Appendix C; see also Frederick et al. 2018). Mr. Yturri attributes these changes to upstream flood control measures, such as channelization, and urban development that likely decreased permeability and increased runoff. He notes that "as the city grows, more and more water is drained into the river and it gets to our area in hurry…[it] is destructive as it flows down…eroding the river banks" (J. Yturri, Appendix C).

In August of 2016, CAR Project Archaeologist Antonia Figueroa and archaeologist Leonard Kemp accompanied Mr. Yturri on a boat trip along a section of the San Antonio

River, from below Mission Espada to the REDUS property line (Figure 2-9; see Appendix D). The principal goal of the roughly 4.0-km trip was to look for, and eventually sample, any buried features associated with the REDUS property. Previous trips along this section of the river, conducted in association with CAR's Mission Reach Project (see Fredrick et al. 2018), had identified and sampled several features to the south of the REDUS property. However, at the time of those trips, CAR did not have permission to sample the REDUS property. Figure 2-9 shows the general route along with a selection of photographs that document aspects of the trip (see Appendix D). Two potential features, both identified as charcoal stains, were noted in August. In March of 2017, Kemp and CAR Assistant Director Raymond Mauldin returned to the Project Area in an attempt to relocate and sample these features. Only one of the features could be relocated.

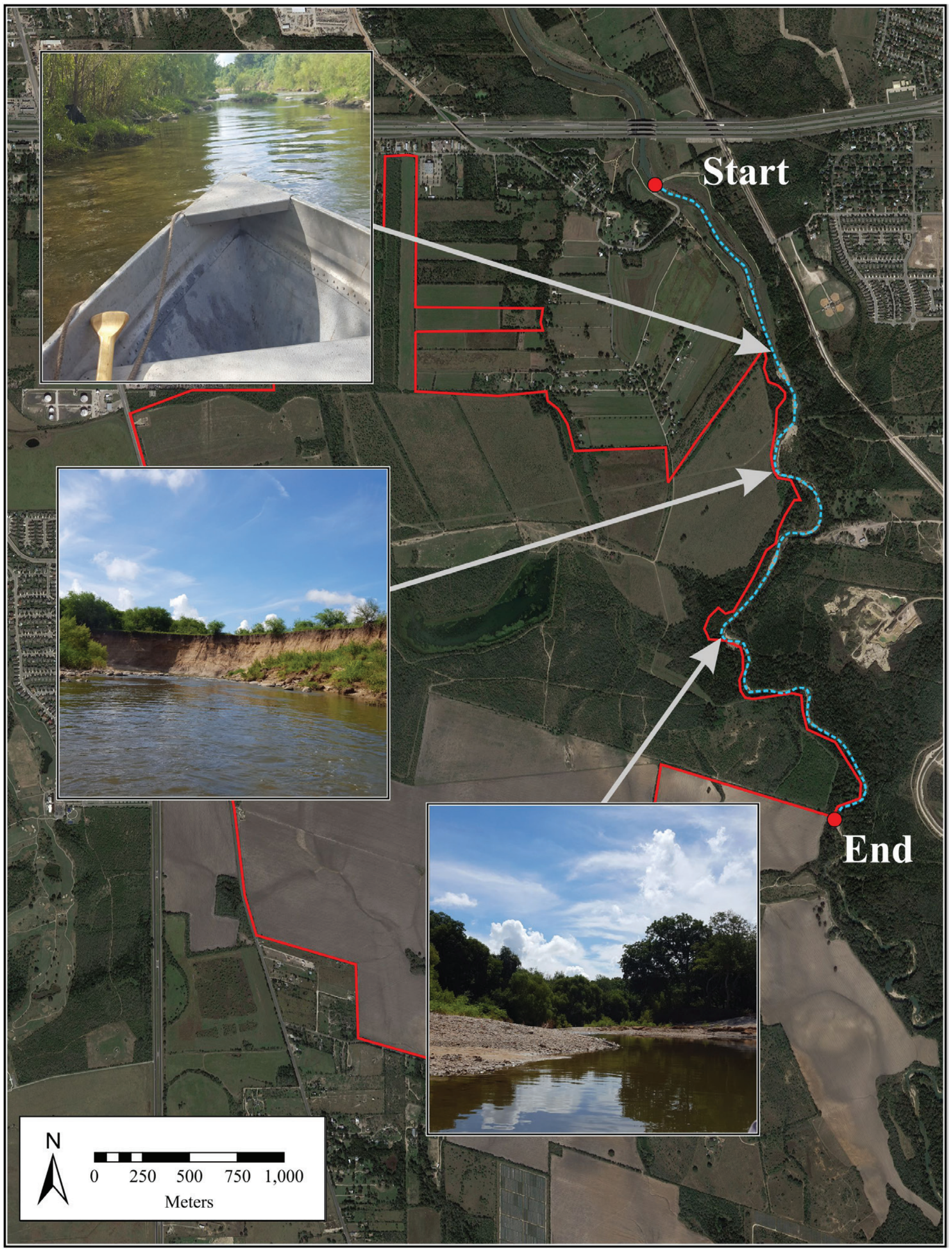

Figure 2-9. River trip, outlined in teal dashes, with inset photos. Top photo is coming out of the upper section that has been channelized. Middle photo shows steep bank on west side of river. A charcoal feature buried 1 m below the surface here returned a Late Archaic radiocarbon date and was assigned site trinomial 41BX2200 (see Chapter 7; Appendix E). Bottom photo shows several gravel bars common in this lower river area. Additional information is provided in Appendix D.

The feature, designated as a portion of 41BX2200, was exposed by the erosion of the west bank of the river. It consisted of a small charcoal stain exposed about 90 and 100 cm below the floodplain in a roughly 4.5-m high section of the west bank of the river (Figure 2-9, middle inset photo). The top of the stain was about 60 cm below a soil that may be associated with the modern ground surface. Subsequently, a radiocarbon data (3516 +/-34 RCYBP; see Chapter 7 and Appendix E) was obtained on charcoal extracted from the feature. Based on the date, the feature may be associated with the Qh3 alluvium, one of four Holocene age deposition sequences defined by Frederick et al. (2018) working along the river to the south of the REDUS property. Deposition defined as Qh3 appears to have started around 3,900 years ago and continued until around 1,000 years ago (Frederick et al. 2018).

As shown in Figure 2-10, the floodplain along this section of the San Antonio River is mapped as Loire clay loam (Fr). Loire clay loam is not well represented in the Survey Area, being confined to a couple of areas on the eastern edge. The most common soil type in the Survey Area is Branyon clays (HtA and HtB, Figure 2-10). They make up 47.6 percent of the 1,445-acre Survey Area. This soil type is generally found in the southern portion of the survey (Figure 2-10). These soils are found on stream terraces and are moderately well drained. They reach depths of more than 203 cm and are formed in calcareous clayey alluvium of Pleistocene age (Natural Resources Conservation Service [NRCS] 2017). The northern portion of the Project Area contains Houston Black clays (HsA, HsB), Lewisville silty clays (LvB), and Heiden clays (HnB, HnC2, HoD3). These soils comprise 31.4 percent of the APE. Houston Black clays found in the

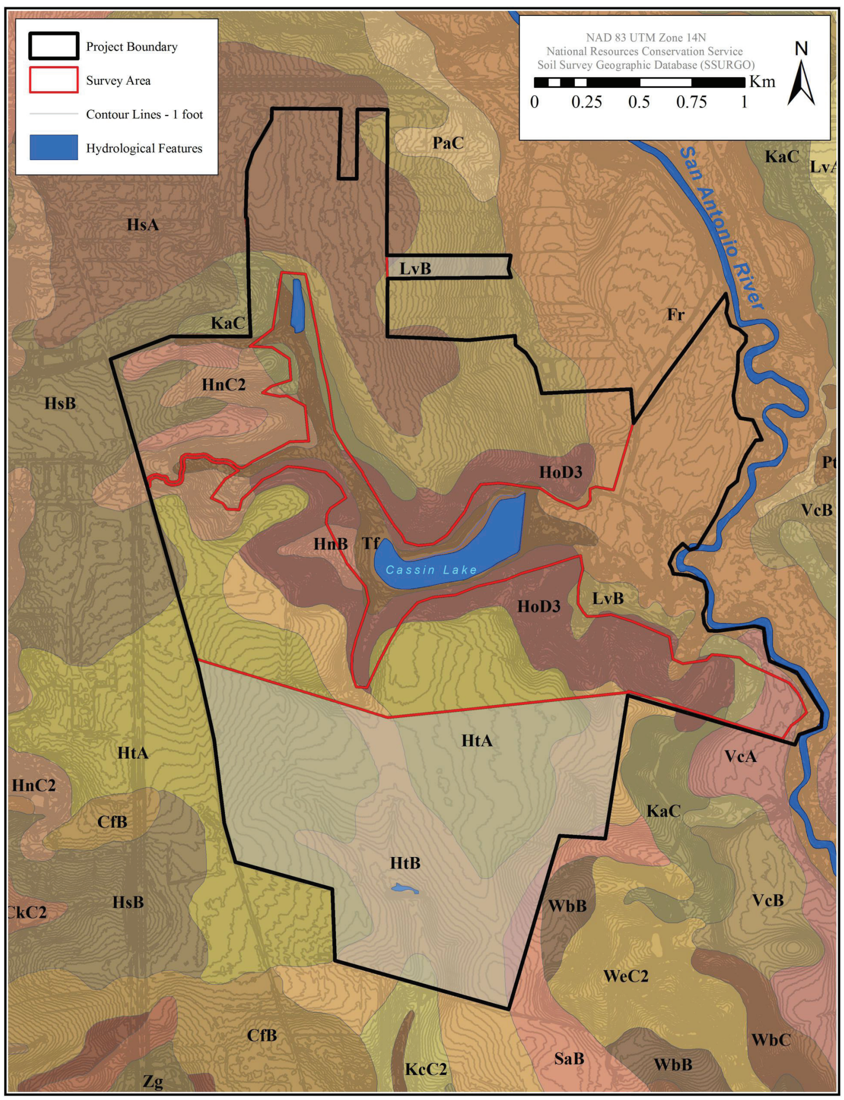

Figure 2-10. Soil series found within the Project Area (black outline) overlain on a 1-foot LIDAR based contour map. Intensive Survey Areas are shaded. LIDAR data are from San Antonio River Authority (SARA). Soil data are available at the NRCS (2017).

Project Area have slopes of 0 to 1 percent (HsA) and 1 to 3 percent (HsB). They are formed in clayey residuum of upper cretaceous age (NRCS 2017). Lewisville (LvB) silty clays are found in the northeastern portion of the Project Area. The LvB soils are common on stream terraces (NRCS 2017). Heiden clay is derived from weathered mudstones. Remaining soils comprise 21 percent of the acreage. As shown on Figure 2-10, these include the floodplain dominated Loire clay loam (Fr), the rock outcrop-Olmos complex (HgD), Atco loam (KaC), Atco clay loam, (KcC2), Tinn and Frio soils (Tf), Sunev clay loam (VcA), San Antonio clay loam (SaB), and severely eroded Heiden-Ferris complex (HoD3). Branyon, Houston Black, Lewisville, and Heiden clays tend to be moderately well-drained soils and are all considered prime farmlands (NRCS 2017).

Figure 2-11 shows two views of the southern portion of the Survey Area. Both views are shot from an area identified as San Antonio clay loam (SaB; see Figure 2-10). The top view is looking out onto the Branyon clay (HtB) dominated fields planted in sorghum (*Sorghum bicolor*). The bottom view shows a SaB area with high exposure. In both areas, fist-size cobbles and gravels are common on the surface. Collections from this area show that these tend to be primarily chert and quartzite cobbles, with small amounts of sandstone present. Several of the quartzite cobbles exceed 15 cm in diameter and may represent Uvalde Gravel deposits (see Byrd 1971).

Figure 2-12 provides a view of an eroding area located on the eastern edge of the project. This area is mapped as being within the severely eroded Heiden-Ferris complex (HoD3). Note

Figure 2-11. Two views of the southern Survey Area in late summer (see inset for location). Note the high frequency of cobbles in furrows (top) and exposed area (bottom). Dominated by quartzite, these may reflect Uvalde Gravels (see Byrd 1971).

Figure 2-12. An example of the severely eroded Heiden-Ferris (HoD3) complex (see inset for location). Note several lenses of gravels and cobbles exposed in the cut.

the high density of gravels and cobbles present in multiple layers in the photographs. Much of the erosion in this area may be associated with one of several gravel quarries that are shown on the 1992 Southton USGS quadrangle map. These gravel quarries are not shown on the 1953 USGS Southton quadrangle map. Images from Google Earth suggest that they were present and in active use in the early 2000s.

Geologically and hydrologically, it appears that this portion of the Project Area is highly active as can be seen by considering the roughly 225-cm deep cut shown in Figure 2-13. The cut is within the Heiden-Ferris complex (HoD3). This is part of a series of drainage cuts through the area highlighted in the inset. Several distinct depositional sequences are visible in the deep exposure, including multiple bands of gravel between 85-105 cm below the surface (cmbs) and a burned layer at about 55-60 cmbs. CAR staff obtained, processed, and submitted a radiocarbon sample from a complete, burned twig at 60 cmbs from within the burned area. The twig, which was intact and roughly 4 mm in diameter, produced a modern date with a percent modern carbon reading of 116.8 percent and an error of +/- 0.33 (see Appendix E). Because this particular sample was likely to be short-lived, CAR calibrated the date with the OxCAL post-bomb atmospheric Northern Hemisphere curve (Hua et al. 2013). The calibration produced two age ranges, with the most likely range (89.4 percent probability) being between the years of 1988 and 1990, suggesting the roughly 55 cm of deposition above the burned layer likely occurred within the last 30 years.

Summary

As several sections of this chapter demonstrate, the natural setting, both at the regional level and on the REDUS Project Area, is characterized by variety and variability. Prior to the mid-1800s, water resources in the area likely were abundant. Fed by rainfall on the Edwards Plateau, as well as local precipitation, the San Antonio River and associated local springs, streams, and creeks would have provided a consistent, high-quality source of water. The combination available water sources, long growing seasons, and mild climate indicated that a diverse and relatively abundant plant and animal resource base was present. This would have been especially apparent in the Project Area, with the Medina River to the west and south, and good, productive soils. If the cobbles of chert and quartzite observed on survey are indicative of the Project Area density, a relatively abundant source of raw materials is present. It is also the case, as demonstrated by high drought frequencies at the regional level, active shifts in the San Antonio River, and patterns of deposition and erosion at the local level, that the natural setting is far from stable. The degree of variability documented in this chapter would have been exacerbated by the populations that occupied the region. The following chapter provides a summary of some of the populations that used the region over the last 13,000 years.

Figure 2-13. A drainage cut in the Heiden-Ferris complex (see inset for location). Note the multiple gravel lenses and the burned layer defined by charcoal and reddened sediment. The dated burned layer is located 55-60 cmbs (see Appendix E).

Chapter 3: Cultural Setting

Raymond Mauldin and Clinton M. M. McKenzie

This chapter provides a brief review of the prehistoric and historic cultural sequences that have been developed for the region. For this discussion, the prehistoric sequence is separated into three broad temporal/adaptive divisions, and the historic sequence is separated into four divisions. The divisions will be referred as "periods," and BP (Before Present) will be used to describe time on the prehistoric sequence, with 1950 AD assumed to be year zero, and calendar dates (AD) for the historic sequence. The three prehistoric periods are the Paleoindian (13,500-8800 BP), Archaic (8800-1200 BP), and the Late Prehistoric (1200-350 BP). The historic sequence is divided into the Proto-historic (AD 1528-1700), Spanish Colonial (AD 1700-1821), Mexican/Texas Republic/Early State (AD 1821-1900), and Late Historic (AD 1900-1950) periods.

The Prehistoric Sequence

The Project Area is located in within the Central and South Texas archaeological regions. Several detailed descriptions of the prehistoric sequences for these areas are available, including general overviews by Collins (2004), Hester (2004, 2008), and Black (1989). The three periods used in this discussion (Paleoindian, Archaic, Late Prehistoric) are based, in part, on broad changes in technology and subsistence that likely reflect adaptations to large-scale changes in climate, resource structure, and population levels. These are often viewed as developmental stages (e.g., Willey and Phillips 1958). Within each of these periods, finer distinctions are made that are primarily based on changes in projectile points or other temporally distinctive tool types (e.g., Turner et al. 2011). While these smaller-scale distinctions are often thought to represent cultural historical relationships or distinct cultural groups (e.g., Johnson 1994; Prewitt 1981, 1985; Shaffer 1977), they are used here primarily as temporal indicators.

As shown in Chapter 7, much of the prehistoric material recovered on the REDUS survey could not be placed in any temporal period. The three prehistoric sites that were defined on survey (41BX2148, 41BX2190, and 41BX2191) lacked temporally diagnostic artifacts. Site 41BX2200, located within the Project Area but not within the Survey Area, did produce a radiocarbon date that places it in the early portion of the Late Archaic. In addition, three isolated finds can be assigned to the Archaic. The three include a Guadalupe tool that likely dates to the Early Archaic, a Martindale projectile point that also falls within the Early Archaic (see Turner et al. 2011), and a second point that is not typed but is likely Late Archaic. None of the material recovered from the Project Area could be assigned to the Paleoindian or Late Prehistoric periods.

The Paleoindian Period (13500-8950 BP)

While earlier occupations may be present (see Collins et al. 2014; Waters et al. 2011), the earliest widely recognized human occupation within the Central Texas area likely began sometime around 13,500 years ago at the close of the Pleistocene. Termed Paleoindian, the period is most commonly recognized by the recovery of parallel flaked, thin, and often fluted lanceolate shaped projectile points. Researchers distinguish between an Early and Late sub-period (e.g., Bousman et al. 2004), with the Early sub-period initially characterized by fluted Clovis and Folsom projectile points and some lanceolate forms (e.g., Plainview). Clovis material is widely distributed (Miller et al. 2014), and over 500 Clovis points have been recorded in Texas (Bever and Meltzer 2007). Produced by groups that were thought to be specialized hunter-gatherers focused on megafauna such as mammoth and mastodon (e.g., Sellards 1940, 1969; Wormington 1957), recent excavations have suggested a more diverse fauna was exploited, including small- and medium-size mammals, at least at some sites (Collins 2003:9). While the issue of dependence by Clovis on megafauna is complicated (see Grayson and Meltzer 2002; Surovell and Waguespack 2008) and is unlikely to be uniform across all environments, a review by Waguespack and Surovell (2003:341) found that mammoths and mastodons were present on 26 of 33 Clovis sites, with a minimum of 91 individual animals represented. Clovis seems to primarily date between 13,400 and 12,700 BP (Miller et al. 2014).

Folsom occupations, which fall slightly later in time than Clovis, seem to be heavily dependent on the exploitation of extinct bison (*Bison antiquus*). Folsom material has a more limited spatial distribution than shown by Clovis, with most material concentrated in basin and range settings where bison would be encountered (see Amick 1994; Andrews et al., 2008; Johnson and Holliday 1989; Largent 1995). Folsom and Clovis materials are well represented in Central and South Texas sites, including Gault (Collins 2003), Bonfire Shelter (Bement 1986; Dibble and Lorrain 1968), Pavo Real (Collins et al. 2003), Debra L. Friedkin (Jennings 2012), and others (see Bousman et al. 2004).

The Late Paleoindian sub-period is characterized primarily by lanceolate points, such as Golondrina/Barber and St.

Mary's Hall, and several poorly defined stemmed lanceolate forms (see Bousman et al. 2004; Turner et al. 2011). The distribution of any single point type appears to be more restricted relative to Early Paleoindian sub-period forms. This may indicate lower levels of mobility, which is consistent with shifts in the subsistence base. Late Paleoindian groups are increasingly viewed as having a more diverse subsistence base with an emphasis on small- and medium-size fauna and plant resources (see Bousman et al. 2004; Collins 1998). Late Paleoindian assemblages in Central and South Texas are relatively common, being well represented at the Wilson-Leonard site (Collins 1998), Baker Cave in the Lower Pecos (Hester 1983), and the Richard Beene site (Thoms et al. 1996) located a few kilometers south of the current Project Area, near the confluence of the San Antonio and Medina rivers.

The Archaic Period (8950-1200 BP)

The long Archaic Period reflects increased population levels, lower mobility, and a resulting focus on local resources, with groups using a wide array of plants and animals. Related to the diversification in resource structure are several technological shifts that occur over this time. The most visible shift is an expansion of the use of rock as heating elements in hearths (see Acuña 2006; Black 2003; Black and McGraw 1985; Collins 1998; Thoms 2008). There is also a proliferation of projectile point types, and a given type appears to have a more limited spatial distribution (see Turner et al. 2011). This, in combination with the increasing use of cemeteries over the period, has been interpreted as likely reflecting the development of territories (Black and McGraw 1985). Researchers commonly subdivide the Archaic into three broad sub-periods designated Early, Middle, and Late (e.g., Collins 2004; Johnson and Goode 1994). These divisions, which will be used here, are somewhat arbitrary, and there is diversity in approaches not adequately reflected in this tripartite division (see Black 1989; Bousman and Oksanen 2012; Carpenter and Hatnett 2011).

The Early Archaic (8950-6000 BP) is identified by the presence of several corner or basally notched projectile points, including Early Split Stem/Early Triangular, Gower, Martindale, Wells, and Uvalde types (see Collins 2004; Turner et al. 2011). Also present during this sub-period are several specialized bifacial tools, including items that have been termed Guadalupe and Clear Fork tools (see Black and McGraw 1985; Black and Tomka 2006; Hudler 1997; Turner et al. 2011). As noted, the use of rock as heating elements is increasingly common, and both rock dominated features and burned rock middens appear (e.g., Acuña 2006; Collins 1998). Burned rock middens suggest changes in the resources used, as well as the frequency with which locations and facilities are reused (see Black and Creel 1997; Mauldin et al. 2003; Thoms 2008). There are a number of sites with significant Early Archaic use in the region (see Bousman and Oksanen 2012; Houk et al. 2009; Quigg et al. 2008), including the Richard Beene site (Thoms et al. 1996).

A variety of projectile point forms are used to identify the Middle Archaic (6000-4200 BP). The early portion of this sub-period is dominated by thin, triangular, basally notched forms with rectangular stems and prominent barbs termed Andice and Bell point styles (Black 1989; Collins 2004; Johnson 1995; Lohse et al. 2014). Nolan and Travis points define the later part of the Middle Archaic sub-period (Black 1989; Collins 2004; Johnson 1995; Turner et al. 2011). Associated with the Calf Creek Horizon, the presence of Andice-Bell styles in Central and South Texas have been argued to reflect the movement of populations from North Texas, Oklahoma, Missouri, and Arkansas into the region in pursuit of bison (see Johnson 1995; Johnson and Goode 1994; Lohse et al. 2014). There may have been an increase in population during this period as indicated by an increase in the number of Middle Archaic components (Weir 1976), though Collins (2004) hints that this increase may result from higher levels of mobility, especially early in the sub-period. Subsistence appears to have involved some dependence on bison, deer, and a variety of plant resources, including nuts, bulbs, and roots (see Black et al. 1997; Collins 2004; Johnson and Goode 1994; Munoz et al. 2011). Middle Archaic sites with significant occupations in the region include the Gatlin site (Houk et al. 2009), Jonas Terrace (Johnson 1995), and the Granberg site (Munoz et al. 2011).

The Late Archaic sub-period (4200-1200 BP) sees a significant increase in the designation of projectile point types in Central Texas. Common styles identified and thought to be reflective of this period include Bulverde, Kinney, Pedernales, Williams, Marshall, Castroville, Montell, Marcos, Fairland, Frio, Ensor, and Darl (Collins 2004; Turner et al. 2011). Corner-tanged knives and other specialized bifacial tools (e.g., Britsol Bifaces, Kerrville Bifaces), cylindrical, decorated stone pipes, and marine shell ornaments are common (Collins 2004; Hall 1981; Hester 2005; Turner et al. 2011). According to Prewitt (1981, 1985; see also Weir 1976), population appears to have increased. This is consistent with the growth of cemeteries (see Lukowski 1988; Taylor and Highley 1995), though Black (1989) disputes that characterization. Midden use persists in the region, suggesting continued dependence of plant resources that require long-term baking (see Acuña 2006; Black et al. 1997; Black and McGraw 1985). Faunal resources are dominated by dependence on deer, though Lohse et al. (2014; see also Mauldin et al. 2012) identify two brief periods, between 3295 and 3130 BP and between 2700 and 2150 BP, where bison are present in Central Texas.

The Late Prehistoric Period (1200-350 BP)

In Central and South Texas, the Late Prehistoric is defined by the introduction of the bow and arrow as evidenced by shifts in projectile points (Black 1989; Collins 2004; Hester 2004; Turner et al. 2011). Traditionally, this period is divided into two sub-periods termed Austin (1200-750 BP) and Toyah (750-350 BP), a distinction originally proposed by Jelks (1962; see also Black 1986). With the exception of the introduction of Scallorn and Edwards arrow points (see Turner et al. 2011), Johnson and Goode (1994) suggest that the Austin sub-period shares many characteristics with the end of the Late Archaic (see also Prewitt 1981). This continuity with the preceding Late Archaic is not the case for the subsequent Late Prehistoric Toyah sub-period. Toyah seems to represent a radical departure from earlier cultural traditions. Some suggest that Toyah assemblages, which are dominated by Perdiz and Clifton arrow points (see Turner et al. 2011), beveled knives, gravers, drills, formal end scrapers, bone tempered ceramics, and with less emphasis on bifacial technology (see Black 1986; Kenmotsu and Boyd, eds. 2012), represent the influx of groups following bison herds down from the Great Plains into Texas (see Dillehay 1974; Johnson 1994; Prewitt 1985; Shafer 1977). Others (e.g., Black 1986; Ricklis 1994) suggest that Toyah represents the adoption of technology geared to bison exploitation, rather than reflecting a distinctive ethnic population or cultural tradition. What is clear is that Toyah assemblages are frequently associated with the remains of bison. For example, in a recent review of Toyah assemblages in Central and South Texas, Mauldin et al. (2012; see also Dillehay 1974; Huebner 1991) found that bison were present on 44 of 53 components (83 percent). Nevertheless, deer and other animal remains are often present in faunal remains on Toyah sites (e.g. Black 1986; Dering 2008), and plant resources, including some use of burned rock middens, are present (see Acuña 2006; Carpenter 2017; Dering 2008; Karbula 2003; Thoms 2008).

The Historic Sequence

The historic sequence in the region, briefly described here, begins with European contact in AD 1528 (see Favata and Fernandez 1993). The sequence covered just over 400 years and is divided into the Proto-historic Period (AD 1528-1700), the Spanish Colonial Period (1700-1821), The Mexican/Texas Republic/Early State Period (AD 1821-1900), and the Late Historic Period (AD 1900-1950). Several summaries are available for the region and provide details for a given period. These sources include Chipman and Joseph (2010), Foster (1998), Kenmotsu and Arnn (2012), and Wade (2003) for the Proto-historic, Almaráz (1989), Chipman and Joseph (2010), de la Tejas (1995), Habig (1968), and Weddle (1968) for the Spanish Colonial period, and Campbell (2003), Cox (1997, 2005), Fehrenbach (1968), Fisher (1996) and Long (2010) for overviews of both the Mexican/Texas Republic/Early State (AD 1821-1900) and the Late Historic (AD 1900-1950) periods in the region.

Additional information on several of these periods can be found in the following chapter, which summarizes archival work on the project, and in Chapter 7. On the REDUS project, CAR revisited the Espada *Acequia* (41BX269), which was built in the Spanish Colonial period. CAR staff identified four new historic sites on the survey (41BX2145, 41BX2146, 41BX2147, and 41BX2149) and revisited a previously defined irrigation ditch (41BX1796). All newly defined sites as well as 41BX1796 appear to date to the late 1800s or early 1900s. This would place them at the close of the Mexican/Texas Republic/Early State period and the beginning of the Late Historic period.

The Proto-historic Period (AD 1528-1700)

The AD 1528 start date for the Proto-historic is tied to the presence of a small number of shipwreck survivors from the Narvaez expedition who ended up on Galveston Island along the Texas Coast. The group, which eventually dwindled to four people including Cabeza de Vaca, spent the next six years living among various coastal and inland Native American populations. Chronicled by de Vaca following his return to Spain, the journey represented the first direct contact between Europeans and Native Americans in what was to become Texas (Bandelier, trans. 1972; Favata and Fernandez 1993; Krieger 2002).

While there is a roughly 75-year overlap between the start of the Proto-historic at AD 1528 and the termination of the Toyah interval of the Late Prehistoric at AD 1600 (350 BP), interactions following the initial contacts in the early 1500s are all but non-existent. Direct archaeological or archival evidence of interactions between Spanish and Native Americans in Central and South Texas is extremely rare prior to the late 1600s (see Foster 2008; Thoms and Ahr 1995). While diseases were likely introduced to Native American populations during the Proto-historic (see Ramenofsky 1987; Ramenofsky and Galloway 1997), contact appears to have been limited until the Bosque-Larios expedition in 1675. Crossing the Rio Grande above what is now Eagle Pass, Texas, the expedition moved north onto the Edwards Plateau with the goals of assessing the quantity and distribution of native populations and natural resources (Wade 2003:24-52). This was followed in 1683 and 1684 by the Mendoza-Lopez expedition that traveled from El Paso onto the Edwards Plateau as far as the Concho and San Saba River areas (Wade 2003:79-129). These two early efforts were followed by increasing interest in the region, especially following the arrival of the French at Matagorda Bay on the Texas coast in 1685.

The French, under Robert Cavelier de La Salle, attempted to establish a permanent settlement in 1685 at what was to be called Fort Saint Louis on the Gulf coast (Foster 1998). While the colony was unsuccessful, eventually being destroyed by Native Americans in 1689 (Foster 1998; Weddle 2001), the Spanish launched a series of expeditions in response to the French presence. These included several short undertakings by General Alonso de Leon as early as 1686 (see Wade 2003; Weddle 1991) and the Teran de los Rios expedition undertaken in 1691. The latter had the express purpose of establishing a barrier against what was perceived as French expansion into the region (Hatcher 1932; McGraw and Hindes 1987). The Teran de los Rios expedition provided the first description of the San Antonio River Valley in June of 1691.

> We marched five leagues over a fine country with broad plains – the most beautiful in New Spain. We camped on the banks of an arroyo, adorned by a great number of trees, cedars, willows, cypress, osiers, oaks and many other kinds. This I called San Antonio de Padua, because we had reached it on his day [Chabot 1937:10].

By 1700, there was a sustained Spanish presence in the region, represented by Mission San Juan Bautista near present day Eagle Pass/Piedras Negras (see Chipman and Joseph 2010; Weddle 1968).

The Spanish Colonial Period (AD 1700-1821)

The Spanish established missions, presidios, and supporting infrastructure in order to Christianize and assimilate Native American populations and to establish territorial claims (Weber 1992). Missions were a major component of these efforts. Missions consisted of the compound itself, farmlands for crops and gardens (*labores y huertas*), common lands (*ejidos*) that served a variety of purposes (e.g., pasturage for livestock, hunting grounds, collection areas for fuel and construction material), ranches (*ranchos*) that provided meat for the missions and their neophytes, and irrigation canals and dams (*acequias y presas*) for directing water to croplands, gardens, and orchards (Rock and Fox 1998:17). By 1700, missions were in place in El Paso and in what was to become New Mexico, and there had been earlier unsuccessful attempts to establish Missions in east Texas (see Weber 1992). However, Mission San Juan Bautista on the Rio Grande represented the first successful Spanish settlement in South Central Texas (Weddle 1968). Several additional missions and accompanying presidios were built in east Texas in the early 1700s in an attempt to establish a permanent Spanish presence and curtail the perceived French threat (see Chipman 1992).

Spanish expeditions into Central and East Texas, often launched through San Juan Bautista, were increasingly common after 1700. Spanish expeditions passed through the San Antonio area in 1709 (Espinosa-Olivares-Aguirre expedition; Tous, trans. 1930a) and again in 1716 (Domingo Ramon expedition; Tous, trans. 1930b). However, it was not until the Alarcon expedition in 1718 (Hoffman, trans. 1938), with the establishment of the *Villa de Bexar* and Mission *San Antonio de Valero* near San Pedro Springs (Cox 1997), that the Spanish stayed. Shortly after the founding of what was to become San Antonio, Mission S*an Jose Y San Miguel de Aguayo* was established (1720). Other missions followed, with Mission Concepción, Mission San Juan, and Mission Espada all established in San Antonio in 1731 (Almaráz 1989). That same year saw the population of the region bolstered by the influx of 15 families from the Canary Islands, a Spanish territory located almost 5,000 miles away off the Atlantic coast of North Africa (see Almaráz 1989; Cox 1901; de la Teja 1995; Poyo 1991). These new arrivals tended to be farmers (see Glick 1972).

The establishment of permanent settlements in the region relied, in part, on the introduction of domestic animals (e.g., cattle, sheep, and goats) and agriculture. Agriculture, in turn, required a consistent water source during certain times of the growing cycle. A component of the both the San Antonio missions, as well as the newly established Villa, therefore included the development of an irrigation and water distribution system. The system, consisting of a series of gravity fed canals (i.e., acequias) and dams, diverted water from the rivers and springs. In terms of agriculture, the

> … principal behind the operation of the canals was to take water from the river and then carry it at a slight grade through the countryside to the fields. By adhering to the general elevation contours as it passed down the river valley, the acequia itself would move farther and farther away from the river, thus leaving an increasing amount of land between itself and its source. As the intervening land lay at a lower level than the acequia, the irrigation water could flow down lateral ditches in the direction of the river and in this way irrigate the fields. Excess water either returned to the river directly from the fields or by way of an extension of the acequia dug specifically for that purpose [Baker et al. 1974:13].

Adjoining croplands were watered by means of opening and closing water gates and flooding the adjacent agricultural field (Cox 2005:4-6). This system also provided water for household and personal use (see Cox 2005; Porter 2011).

The development of infrastructure, including the acequia system, assured the Spanish of a sustainable presence in the San Antonio region, at least into the 1800s. However, at the close of the eighteenth century, tensions between Spain and its colonies increased. In part, the tension was related to increased economic demands from Spain on its colonies. One manifestation of these demands was the confiscation of a variety of Church assets by the Spanish Government in the early 1800s. A formal rebellion was declared in September of 1810 (Henderson 2009). Small and ultimately unsuccessful uprisings occurred, including several in South Texas and the San Antonio area. These included the Las Casas uprising (1811) and various encounters associated with the 1812-1813 Gutierrez-Magee expedition (see Fehrenbach 1968; Hatcher 1908; Henderson 1951; Warren 2010). Following several setbacks, Augustin de Iturbide led a rebel army into Mexico City in 1821, declaring independence, and essentially ending Spanish colonial rule (Chipman and Joseph 2010).

The Spanish Missions, which were a critical component of the Spanish Colonial rule, were clearly on the decline well before the fall of Spanish rule. For example, the population in Bexar in 1777 was estimated at 2,060 individuals, with 709 of these associated with the missions. By 1792, the population had dropped to 1,799 individuals, with most of that decline accounted for by a drop in mission populations to 269 individuals (Tjarks 1974:303). By the close of the eighteenth century, several of the San Antonio missions were essentially abandoned. For example, population data summarized for Mission Espada by Zapata et al. (2000:5) lists 207 individuals in 1762 and only 24 individuals in 1809. Moves towards secularization were underway by 1794, and all the San Antonio missions were secularized by 1824 (Carlson 1994; Cox 1997; Habig 1986).

The Mexican/Texas Republic/State Period (AD 1821-1900)

With the removal of the Spanish, Mexico implemented the constitution of 1824. One of the provisions of the constitution was that it enabled heads of households to claim land. This quickly resulted in an influx of settlers from the United States who wanted to acquire farmland (Cox 1997). By 1830, when the Mexican government prohibited immigration from the United States into Texas (Cox 1997), the Anglo American population in Texas was estimated to be about 10,000 individuals (Campbell 2003:108). The enforcement of this prohibition created increased tension between Mexico City and their northern frontier, resulting in several skirmishes (see Barker 1928; Fehrenbach 1968; Weber 1982).

In 1833, General Antonio Lopez de Santa Anna took control of the Central Government, and by 1835, he had officially revoked the 1824 Constitution (Barker 1928; Weber 1982). After brutally suppressing an uprising in the state of Zacatecas, Santa Anna sent troops under the command of General Cos to deal with the unrest on the northern frontier. Cos eventually occupied San Antonio, and in October of 1835, a rebel army under Stephen F. Austin surrounded the town. After several skirmishes, including the battle of Concepción (Barr 2010) and the removal of Austin as commander, the Texan forces attacked, and Cos eventually surrendered. However, in February of 1836, Santa Anna, accompanied by roughly 2,000 men, arrived at San Antonio. Texan forces in the town, which numbered less than 200, retreated to Mission San Antonio de Valero, or the Alamo (Hardin 1994). The Alamo fell after a short siege to the Mexican forces in early March. The following April, Santa Anna's forces were defeated by forces under the command of Sam Houston at the battle of San Jacinto, and the Republic of Texas was born (Campbell 2003; Cox 1997; Davis 2004).

The defeat of Santa Anna and the establishment of the Republic of Texas did not end hostilities with Mexico. While recognition of the new republic by the United States was relatively quick, Mexico refused to recognize Texas as independent, and a state of war existed between the two parties (Cox 1997). Beyond the question of independence, disputes centered on the Texas claim that the southern border of the Republic was the Rio Grande. Although no formal hostilities occurred during much of this period, San Antonio was occupied by Mexican forces on two different occasions in 1842 (Campbell 2003; Fehrenbach 1968) and a significant number of Texan forces were captured in northern Mexico near Guerrero (Campbell 2003:176-180). An armistice was established in 1843 that lessened hostilities for a brief period (Cox 1997).

Soon after the establishment of the Republic, Texas officials initiated discussions to join the United States. Annexation, however, was not forthcoming, as Texas had significant foreign debt and, having been populated primarily by families from the southern United States, supported slavery. However, in late December of 1845, Texas approved annexation following recommendations by the United States Congress, and Texas was admitted as the 28th state (Neu 2017; Texas State Library and Archivist Commission 2017).

Following the annexation of Texas, Mexico broke diplomatic relations with the United States. Skirmishes along the border increased, and while the United States issued a declaration of war against Mexico in May of 1846, hostilities were already well underway (Wallace 1965). The war was fought primarily on Mexican soil, effectively ending with the occupation of Mexico City by United States troops late in 1847. The war officially ended with the Treaty of Guadalupe-Hidalgo agreed to in February of 1848. The treaty established the Rio

Grande as the southern boundary of the United States, and ceded much of the west, including Arizona, California, New Mexico, Nevada, Colorado, Utah, and Texas, to the United States (Campbell 2003; Wallace 1965).

In the years that followed, the population of Texas exploded, increasing from roughly 142,000 at annexation to 600,000 in the census of 1860. Settlers from southern states, some of which owned slaves, as well as German and Czech immigrants, came to the state to take advantage of available farmland (Campbell 2003). The population in San Antonio more than doubled between 1850, when 3,488 individuals were recorded, and 1860, when the population was over 8,200 (Fehrenbach 2016; Texas Almanac 2017b). By 1860, over 180,000 slaves were in the state, with most involved in farming in east Texas (Campbell 1989, 2003). Not surprisingly, in 1861 at the start of the Civil War, Texas seceded from the United States and joined the Confederate States of America. There were few battles within the state, though Texas supplied significant numbers of soldiers to the Confederacy (Campbell 2003). Following the defeat of the Confederacy in 1865, Texas was under military rule until 1870, when it was readmitted to the United States (Moneyhon 2010; Ramsdell 1910).

The increased population that the state had experienced prior to the Civil War seems to have resumed and was fueled in part by the growth of farming and cattle ranching (Campbell 2003). By 1870, there were 12,255 individuals in San Antonio (Texas Almanac 2017b). Railroads arrived in San Antonio in 1877 (Cox 1997). They provided rapid access to goods outside of the immediate area as well as a way for regional farmers to move produce into the growing city and to non-local markets, including access to the port of Galveston. Dase et al. (2010:8) notes that the number of farms within Bexar County increased from 266 in 1870 to 1,136 by 1880, and cotton production increased 13 fold over this same period. Fruit and vegetable crops were commonly grown for sale and included “figs, pears, plums, peaches, cantaloupes, watermelons, strawberries, blackberries, cabbage, tomatoes, potatoes, carrots, and onions” (Dase et al. 2010:14). By 1890, the population had increased to over 37,000 (Fehrenbach 2016; Texas Almanac 2017b). With the rapid growth, efforts to improve transportation, flood control, and sanitation were undertaken (Cox 1997, 2005). At the close of the nineteenth century, the city population topped 53,000 (Fehrenbach 2016).

The Late Historic Period (AD 1900-1950)

The post-1900 period within the region was generally dominated by economic and population expansion. Much of this expansion was tied to historical events outside the region, including impacts from the Mexican Revolution (1910-1920) and the United States involvement in World War I (1917-1918) and World War II (1941-1945).

The city and the region experienced rapid growth during this 50-year period. Between 1900 and 1920, the population jumped from 53,000 to over 161,000, a threefold increase. While there was a slowing of growth associated with the Great Depression, the population within the city exceeded 400,000 by 1950 (Texas Almanac 2017b). San Antonio became the home of multiple military training bases, including Brooks, Randolph, and Kelly airfields and Lackland Air Force Base (Alcott 2010). A significant number of civilian jobs were created by this military expansion (Alcott 2010; Long 2010).

Responding to the increasing population, infrastructure also expanded in the early 1900s. Automobiles were increasingly common in the city, and road improvements, including the widening of roads to accommodate greater traffic, often resulted in impacts to historic buildings. These infrastructure changes, along with new construction associated with the significant growth experienced by the city, led to the formation of preservation organizations. The San Antonio Conservation Society, formed in 1924, was one of several early preservation advocates (Fisher 1996).

Efforts to control the devastation caused by flooding increased during the 1920s and 1930s. Construction on Olmos Dam was begun in the 1920s, in part as a response to the 1921 flood (see Ellsworth 1923) that caused widespread destruction and resulted in over 50 deaths in San Antonio (Salinas 2015). Additional flood control projects included efforts to straighten sections of the San Antonio River. New Deal/WPA projects in the 1930s included the restoration of La Villita and the construction of the San Antonio River Walk (Fisher 1996; Long 2010). In addition, several restoration projects focused on the San Antonio missions were undertaken during this period (Fisher 1996).

Summary

At a regional, level, the South Central Texas area has had some human presence for over 13,500 years, with much of that time taken up by Native American groups who subsisted on hunting a variety of animals and gathering plants. At the beginning of the prehistoric sequence, regional populations were likely low and groups are thought to have been more mobile. While climate shifts, resource dynamics, technological changes, and social interactions likely impacted the trend at various points in time, over the long prehistoric sequence it seems to be that case that populations increased, mobility decreased, and groups tended to focus subsistence on smaller animals and more localized plant resources that were extracted with increasingly costly technologies. That 13,000-year intensification trend was altered over the course of a few generations by the arrival and dispersal of European populations beginning less than 500 years ago. Native American cultural systems were overcome by disease, technology, and sheer numbers of people. The introduction of livestock and farming to the region, the establishment of permanent settlements, and the development of transportation and communication networks rapidly began to alter the cultural, as well as the physical landscape, in significant and irreversible ways.

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Chapter 4: History of the REDUS Project Area

Clinton M. M. McKenzie and Raymond Mauldin

This chapter provides a brief discussion of the historic uses of the REDUS Project Area. Archival research focused on the history of landowners from the 1800s, the development of the water system that has Spanish Colonial and historic origins, and early 1900s land use patterns. The research covers the period of historic use of the subject property beginning in 1731 with the founding of Mission *San Francisco de la Espada*. The supporting materials are taken from a wide variety of resources including the Bexar County Water Records, Bexar County Deed and Record files, Bexar Archives, Municipal Archives, CAR Archival collections, and secondary sources.

The history of the Project Area begins with the founding of Mission *San Francisco de la Espada* (Saint Francis of the Sword), which was moved to San Antonio from northeast Texas in 1731 (Almaráz 1989; Habig 1986; Zapata et al. 2000). The mission transformed the former prairie and woodlands into an area in which agriculture and ranching were the dominant economic drivers supporting the neophyte population. One factor necessary for the successful agrarian economy was harnessing the river through the development of the acequia system. The Espada *Acequia* system, built sometime before 1745 (Baker et al. 1974), consists of the Espada Dam, aqueduct, principal ditch, and associated canals. It diverts water from the San Antonio River using a dam constructed below Mission San Juan and sends it over a roughly 59-m long, 4.5-m high stone aqueduct spanning Piedras Creek, through Mission Espada, into the REDUS Project Area, and then back into the San Antonio River (see Baker et al. 1974; Cox 2005; Hutson 1898; Porter 2011). The mission compound and acequia, located just east of the REDUS Project Area, are shown on a section of the 1764 Munguia Map reproduced here as Figure 4-1. The success of the overall agricultural system is demonstrated in an inventory of Mission Espada in 1772, which cites corn, beans, cotton, and fruit orchards as the primary crops (Almaráz 1989), as well as the longevity of the enterprise. Other than a brief interruption in the late 1800s, the Espada *Acequia* has continued to flood fields to the present day. Writing of the Espada *Acequia* and associated lands in 1898, Hutson notes that

> The principal crops are 100 acres in corn, 150 acres in cotton, a considerable area in Johnson-grass meadows, and the rest in truck gardens for the city market.… The land is mostly an alluvial valley soil, very productive when watered. On irrigated fields it is customary to make at least a bale of cotton to the acre, while the average on unirrigated fields for the last five years has hardly been more than one-fourth of that. Truck farmers raise all kinds of vegetables, from early spring until frost, in the greatest profusion [Hutson 1898:46].

Figure 4-1. Close-up of a 1764 Map of the San Antonio area (Munguia 1764). North on the map is to the left. Mission Espada and a section of the Espada Acequia *are highlighted in the red circle.*

The use of the area in the Spanish Colonial period, then, was for farming and for common lands. Following the secularization of Mission Espada in 1794, the farmlands were divided and awarded to the remaining Native American converts (Almaráz 1989:51, 56). The eastern part of REDUS Project Area contained several of the original lots awarded in 1794. In 1824, 30 years after secularization, the Mexican Government held an appraisal of the properties within the former Mission Espada. The appraisal, conducted by José Antonio Saucedo, indicated that while many of the lots were sold to Spanish citizens several continued to be held by the original Native American recipients.

Figure 4-2 presents a section of a map prepared by François Giraud and dated June 16, 1874 (CAR Archives). The map depicts the apportionment of farmland belonging to claimants as reflected in Saucedo's 1824 appraisal (Castañeda 1937:100-103; Saucedo 1824). The REDUS Survey Area, highlighted in red on Figure 4-2, covered six lots, and all were held by Spaniards. Alexo Bustillo held a single lot, Domingo Bustillo held two lots, and José Antonio Sandoval held three lots (Saucedo 1824). The Bustillos were brothers from a family with roots in San Antonio stretching back to 1766 when their father José Antonio Bustillo y Ceballos immigrated from Ciudad Nuestra Señora de Guadalupe de la Corte, Mexico (Chabot 1937:197). Sandoval was originally from Coahuila and settled in San Antonio circa 1760 (Chabot 1937:207).

Much of the remaining portions of the Project Area, which had been part of the common lands of Mission Espada, reverted to the ownership of the Spanish Crown and, subsequent to the Mexican Revolution, to the Mexican Government (Almaráz 1989:57-58). In 1834, the Mexican Government sold a number of large tracts out of the former communal lands (*ejidos*). The remaining portions of the REDUS Survey Area were formerly held by three men. According to the Giraud map (Figure 4-2), Juan Manuel Urriegas held title to the western half of the middle third of the REDUS area. José Antonio Sandoval held title to the eastern portion of the lower third of the Survey Area. José Antonio de la Garza held the northern portion of the REDUS Survey Area and a majority of the lower third of the Survey Area (Figure 4-2).

José Antonio de la Garza was a prominent land holder who traced his lineage back to Geronimo de la Garza and Xaviera Cantu who both settled in San Antonio sometime around 1731

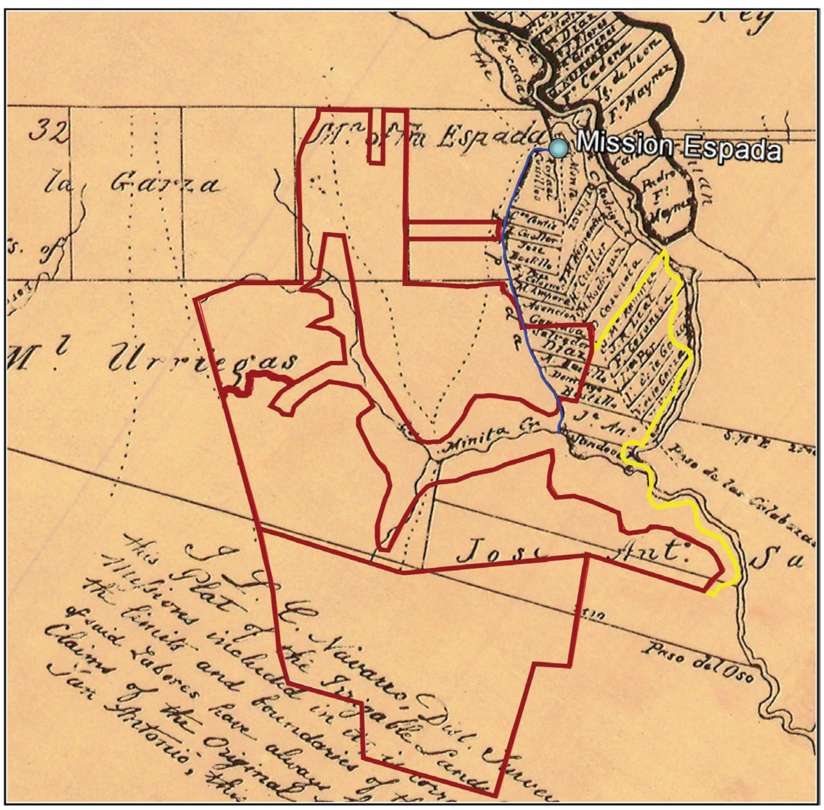

Figure 4-2. Copy of a section of the Map of the Original Claimants to the Irrigable Lands Comprised in the Labores of the Missions Concepción, San Jose, San Juan and La Espada *drawn by Francois Giraud, June 16, 1874 (CAR Archives). Overlain on the map is the REDUS Survey Area (red) and the eastern REDUS Project Area boundary (yellow). A section of the Espada* Acequia *is highlighted in blue, and the area of Mission Espada is noted in teal.*

(Chabot 1937:78). The Texas born (1804-1806) Urriegas was married to Maria Nieves Sanchez and lived in the Barrio de Norte according to the 1831 census. Sandoval was the same Sandoval who owned the lower three lots within the *labores de la Espada*. José Antonio de la Garza acquired the Urriegas tract sometime after 1834, consolidating his holdings, which included all of the property south of the current tracts to the confluence with the Medina River and the San Antonio River. The de la Garza family heirs retained control of the properties for the majority of the nineteenth century, with daughters and granddaughters inheriting portions of the original holdings. The lands comprising the lower section of the REDUS area remained under the control of the Yturri family, and Mr. John Yturri's great grandmother was the granddaughter of JoséAntonio de la Garza (see Appenix C for details). As such, these lands have been in the family for nearly 200 years. The lands that comprise the northern portion of the Survey Area were assembled by William Cassin in 1909, and they remained in the family's control until conveyed in the REDUS project (Bexar County Deed Records [BCDR] 1909:487-491).

The Cassin family appears to have settled in the San Antonio area sometime in the late 1800s, purchasing land along the San Antonio River in 1885 (Padilla et al. 2017:23). William Cassin, an Irish immigrant, was active in the Espada Ditch Company, serving various roles from as early as 1907 (Rivera 2000:81-85) until his death in 1917 (Padilla et al. 2017:23). Cassin was married to Charlotte N. Cassin (Newton) in 1885. They had four children, three of which survived into adulthood. According to Padilla et al. (2017:23; see also Handbook of Texas 2017), Cassin constructed the Minita Creek dam to form Cassin Lake in 1907 to irrigate his lands.

Also shown on Figure 4-2 is the principal route of the Espada *Acequia* below Mission Espada in the Project Area. The acequia takes water from the San Antonio River roughly 3.2 km above the mission compound and returns it to the San Antonio River 1.6 km below the mission (Cox 2005:32-33). The acequia fell into disrepair in for a short period following the 1860s, but in the winter of 1894-1895, the Espada Ditch Company was organized by the individual farmers and the acequia was cleaned, widened, and deepened (Hutson 1898:45-46; Rivera 2000). The main route of the early eighteenth-century acequia is, then, essentially intact, though branch ditches have been added and subtracted. Other landform modifications apparent across the property include the creation of a berm across Minita Creek to form what is now Cassin Lake (see Padilla et al. 2017). In addition, a number of twentieth-century irrigation canals traverse the property, many of which are tied to the Cassin family's use of the land. Archival research revealed a series of agreements between the Cassin family and nearby property owners (BCDR 1921:314-315) or the San Antonio Irrigation Water Company (BCDR 1918:372) documenting the creation of these features and their shared use. Irrigation agreements in the County records attest to Cassin and his neighbors digging canals for mutual benefit across the Project Area (BCDR 1918:372, 1921:314-315).

Figure 4-3 shows an aerial photo of the region, with the REDUS Project Area, the lower section of the 1824 path of the Espada *Acequia*, and Mission Espada highlighted. The date of the photo is not known, but it likely was shot in the late 1920s or early 1930s (see Gale 1984). The photo is a section that appears to have formed the basis of the Stoner System Maps of the region (copy on file at the CAR). Several farmsteads and ancillary buildings present on the property today are on this aerial, included multiple structures to the north of Cassin Lake. Also visible to the south of Mission Espada and to the west of the acequia are what appear to be multiple plantings in small fields. Much of the REDUS Project Area appears to be used for pasture or larger fields.

Summary

Beginning with the 1731 founding of Mission Espada, the Project Area appears to be closely tied to farming and ranching activities. In fact, it appears that all of the parcels within the REDUS Survey Area have been associated with agricultural and pastoral pursuits at some point over this period. The stability of the acequia system and the impact of that system on the patterns of land use can be most clearly seen in Figure 4-4, which compares the lot configurations in 1824 with those of 2017. Many of the divisions shown on the 1824 map are clearly visible almost 200 years later in the 2017 aerial.

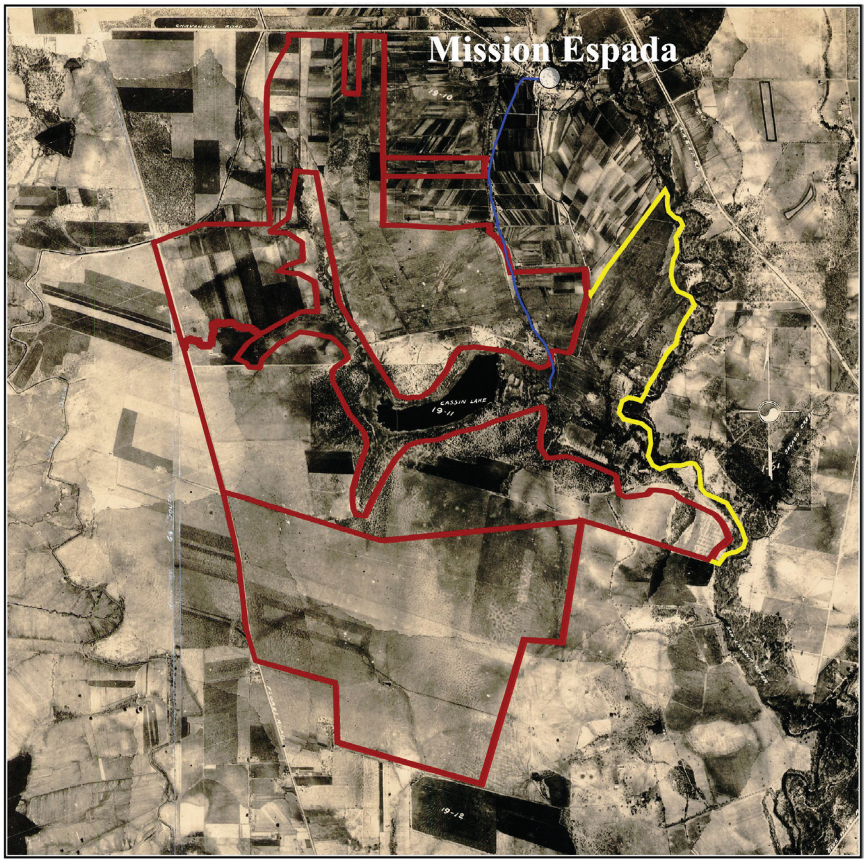

Figure 4-3. Early (ca. 1929-1930) Stoner System aerial photo of REDUS Project Area. Boundaries of the Survey Area are in red, with yellow highlighting the eastern border. Also identified are Mission Espada (white circle) and the lower section of what is presumed to be the 1824 path of the Espada Acequia *(blue).*

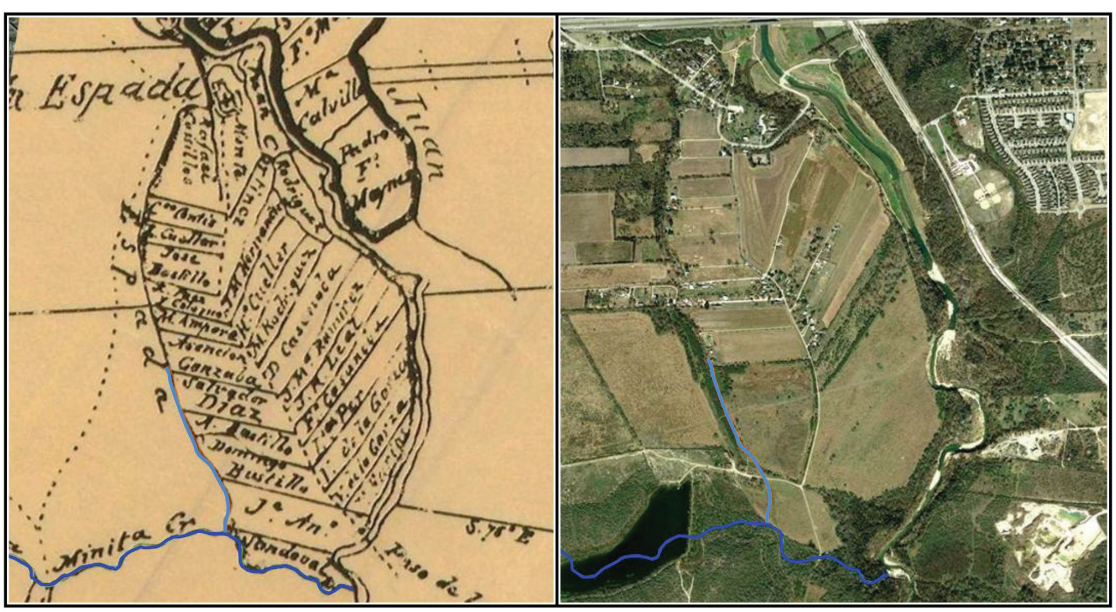

Figure 4-4. Comparison of a section of the 1874 Giraud map, depicting the pattern of lot apportionment in 1824 (left), and a 2017 plot (right) of the Survey Area. Minita Creek and the lower portion of the Espada Acequia *are highlighted on each figure to facilitate comparisons. Note that several of the 1824 allotments are essentially unchanged in 2017.*

Chapter 5: Previous Archaeological Research

Raymond Mauldin, Antonia L. Figueroa, and Clinton M. M. McKenzie

This chapter presents a short summary of the results of previous archaeological investigations both within the REDUS Project Area and in the immediate area surrounding it. The summary is the result of a review of site files in the Texas Archaeological Site Atlas and several related publications, including the Mission Parkway study (Scurlock et al. 1976), recent work undertaken by CAR along the San Antonio River (Frederick et al. 2018; Kemp and Mauldin 2018), and work by SWCA (Padilla et al. 2017) within the Project Area.

In all, 23 archaeological sites are present in a 3-km radius centered on Cassin Lake, including four sites located within the REDUS Project Area. Table 5-1 presents summary information for the sites reviewed. Figure 5-1 shows the site distributions, along with the area searched. Sites are clearly concentrated along the river, a distribution that in part likely reflects access to water but also reflects both where previous projects have been focused as well as exposure history. Five of the 23 sites have both historic and prehistoric components present, and several sites have multiple periods represented

Table 5-1. Previous Sites in/near the REDUS Project Area

Site	Description/Type	Temporal Period(s)	Reference	Figure 5-1 Location
41BX4	Mission Espada	Spanish Colonial (1731)	Habig 1968; Scurlock et al. 1976	15
41BX251	artifact scatter	Unknown Prehistoric; Historic (late 1800s)	Scurlock et al. 1976	6
41BX252	unknown/structures	Historic (early 1900s)	Scurlock et al. 1976	7
41BX255	lithic scatter; house	Unknown Prehistoric; Historic	Scurlock et al. 1976	1
41BX256	occupation	Prehistoric; Spanish Colonial; Historic	Padilla and Trierweiler 2012; Scurlock et al. 1976	2
41BX269	Espada *Acequia*	Spanish Colonial	Scurlock et al. 1976	17
41BX340	artifact scatter	Spanish Colonial (18th-19th Century)	Fox 1999; Smith and Mauldin 2018	13
41BX341	artifact scatter	Post-1900	Fox 1999; Smith and Mauldin 2018	11
41BX706	lithic scatter; Espada *Acequia* (lower); house	Unknown Prehistoric; Spanish Colonial; Historic	Fox 1999; Smith and Mauldin 2018; THC 2017	10
41BX1626	lithic scatter	Unknown Prehistoric	Peter et al. 2006	8
41BX1780	farmstead (dairy and house)	Historic	McWilliams and Boyd 2009	5
41BX1781	house (destroyed)	Historic	McWilliams and Boyd 2009	12
41BX1782	San Juan *Acequia* (lower)	Spanish Colonial	McWilliams and Boyd 2009	3
41BX1783	artifact scatter	Historic	McWilliams and Boyd 2009	14
41BX1784	house, cistern, other structures	Historic (1950s)	McWilliams and Boyd 2009	9
41BX1785	farmstead	Prehistoric (Multiple Prehistoric); Historic	Kemp and Mauldin 2018; McWilliams and Boyd 2009	4
41BX1796	ditch	Historic (Post-1880s)	THC 2017	16
41BX1903	lithic scatter	Unknown Prehistoric	Shafer and Hester 2011; THC 2017	20
41BX1905	lithic scatter	Unknown Prehistoric	Shafer and Hester 2011; THC 2017	23
41BX2113	buried features	Prehistoric (Late Paleoindian, Early Archaic)	Frederick et al. 2018; THC 2017	21
41BX2114	buried features	Prehistoric (Middle Archaic, Late Archaic)	Frederick et al. 2018; THC 2017	22
41BX2143	lithic scatter	Unknown Prehistoric	Padilla et al. 2017; THC 2017	19
41BX2144	farmstead	Historic (early to mid-1900s)	Padilla et al. 2017; THC 2017	18

Redacted Image

Figure 5-1. Previous sites within the immediate area of the REDUS Project Area. Circle represents a 3-km radius centered on Cassin Lake. Other locations identified are discussed in the text.

(e.g., Late Paleoindian; Early Archaic) within the prehistoric or historic sequence. In all, there are 17 sites with historic components and 11 sites with prehistoric components.

The 17 historic components include six that likely have some evidence of Spanish Colonial Period use. These are Mission Espada (41BX4), the Espada *Acequia* (41BX269), a section of the lower branch of the Espada *Acequia* (41BX706), the lower San Juan *Acequia* (41BX1782), and two scatters of artifacts that contain Spanish Colonial ceramics (41BX256 and 41BX340, see Table 5-1). In addition to these sites, Figure 5-1 highlights two other areas that potentially have relevance for the Spanish Colonial period. These are the Espada Cemetery, located to the west of Mission Espada (15 on Figure 5-1; see also Appendix C), and the Paso de las Calabazas river crossing and the Presidio-Rio Grande Road. While the dates on the cemetery are not known, given the association with the mission, it is likely that some of the interments are within the Spanish Colonial period. In addition, Padilla et al. (2017) note that a section of a historic trail identified as a branch of the Presidio Rio Grande Road cuts through the eastern portion of the area. This seems to be the same location identified as a river crossing (Paso de las Calabazas) that are referenced on several early maps (NPS 2013:24-25).

The remaining 11 historic components include elements that reflect farming and ranching activities from the late 1800s and early 1900s, several historic period artifact scatters, and a historic ditch (41BX1796) that may reflect late nineteenth-century activities or may be related to the Espada *Acequia* (THC 2017). In addition to these sites, Figure 5-1 shows the location of the Cassin Dam and Spillway, an irrigation feature built in 1907 (see Padilla et al. 2017). Information regarding the majority of the sites with prehistoric components identified in Table 5-1 is limited. Seven of the components (41BX251, 41BX255, 41BX706, 41BX1626, 41BX1903, 41BX1905, and 41BX2143) are recorded as lithic scatters with no temporally diagnostic artifacts recovered. The quantity of material varies from two flakes at 41BX1903 (Shafer and Hester 2011:8) to what appears to be several hundred chipped stones items on the surface of 41BX2143 (Padilla et al. 2017:23). The four remaining sites all have some temporal information (see Frederick et al. 2018; Kemp and Mauldin 2018; Mauldin et al. 2018; Osburn et al. 2007; Padilla and Nickels 2010; Peter et al. 2006). Site 41BX256, which contained a Spanish Colonial component, also contained a large number of prehistoric features, including two sets of features identified as possibly representing structures. Multiple radiocarbon dates on features, as well as diagnostic artifacts, suggest prehistoric occupation from the Early Archaic through the Late Prehistoric and into the Historic period (Mauldin et al. 2018). Site 41BX1785 was similar to 41BX256 in that components recovered represented both Historic and prehistoric time periods, with the prehistoric occupations containing a moderate number of features, some of which are characterized by burned clay with impressions that may reflect prehistoric structures. The prehistoric time frame documented at 41BX1785 included occupations dating from the Early Archaic into the Late Prehistoric (Kemp and Mauldin 2018). Sites 41BX2113 and 41BX2114 were both observed in the bank of the San Antonio River by Frederick et al. (2018). Site 41BX2114 has six dates, with radiocarbon assays from two fire-cracked rock (FCR) features, a date from a mussel shell and FCR lens, a buried surface, a basin shaped feature, and an isolated piece of charcoal. The dates span the period from about 2100 cal BP, in the Late Archaic, back to 5477 cal BP in the Middle Archaic, with most dates clustering in the Middle Archaic Period. Finally, site 41BX2113 has several features and three radiocarbon dates placing the site in the Early Archaic and the Late Paleoindian periods. One FCR cluster had a median calibrated date of 6700 cal BP, while a second dated to 9624 cal BP. A third radiocarbon date, on charcoal from near the second FCR feature, returned a date of 9900 cal BP (Frederick et al. 2018).

There are four sites listed in Table 5-1 that are within the REDUS Project Area. These are 41BX269, 41BX1796, 41BX2143, and 41BX2144. Site 41B2143 is a described as a prehistoric lithic scatter with no temporally diagnostic material or features observed. The site, located near Cassin Lake (Figure 5-1) and recorded by Padilla et al. (2017), appears to lack buried cultural material based on five shovel tests. There is, as noted above, a moderate density of material on the surface, with over 200 items present. Padilla et al. (2017) have suggested that the site has little data potential, and that 41BX2143 is therefore not eligible for listing on the National Register of Historic Places (NRHP).

Padilla et al. (2017) also recorded site 41BX2144. This is a historic artifact scatter uncovered by shovel testing. Like 41BX2143, the site is near Cassin Lake (see Figure 5-1). They suggest that the site is associated with a 1950s structure shown on the Southton 1953 topographic map. Padilla et al. (2017), noting the lack of features and the limited diversity and quantity of artifacts, suggest that 41BX2144 is not eligible for listing on the NRHP. They recommend no additional work at the site.

As discussed in the previous chapter, a significant section of site 41B269, the Espada *Acequia*, runs through the REDUS Project Area. While shown as a single location on Figure 5-1, the acequia actually travels for a significant distance coming into the Project Area from the north and terminating into the San Antonio River in the Minita Creek area. As noted, the acequia is a Spanish Colonial irrigation feature, likely dug in the 1740s. Recorded by Scurlock et al. (1976), the feature satisfies multiple criteria for NRHP listing and is on the National Register (Baker et al. 1974). In addition, it is a component of the World Heritage Designation for the San Antonio Missions (NPS 2016; UNESCO 2017).

Site 41BX1796 was recorded by Raba-Kistner in a 2009 survey associated with a pipeline through the REDUS Survey Area (THC 2017). The site was identified as a historic ditch that may be related to the Espada *Acequia* or to other ditches constructed in the 1890s (THC 2017). The ditch is roughly 2-m wide, and it is not lined. According to the Texas Sites Atlas form, 95 percent of the feature was remaining, and no cultural material was associated with the section that was observed. Raba-Kistner recommended avoidance along with further testing and in-depth archival and historic research (THC 2017).

Finally, the Cassin Dam and Spillway, which was constructed in 1907, was also recorded by Padilla et al. (2017). As discussed in Chapter 4, the dam was constructed by William Cassin, a prominent farmer. Padilla et al. (2017) suggest that the dam and spillway have good integrity and local significance. They recommend that the facility is eligible for NRHP listing and further recommend that any future work in the area avoid impacts to the dam and spillway (Padilla et al. 2017).

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Chapter 6: Field and Laboratory Methods

Antonia L. Figueroa, Leonard Kemp, and Raymond Mauldin

The reviews presented in the previous three chapters provide context for CAR's investigation of the REDUS property. This chapter presents the field and laboratory methods used during that investigation. Prior to the start of the project, in consultation with REDUS and the COSA Office of Historic Preservation, a scope of work was prepared to define procedures associated with the archaeological investigations and historical research work. That scope forms the basis of this chapter.

Field Methods

As noted in Chapter 1, the current land determined the most appropriate type of archaeological survey. Pre-field observations suggested two major categories of land use: recently plowed fields and unplowed or old, fallow fields. CAR staff used 2016 Google aerial imagery and ArcGIS to create maps of the Project Area based on the land-use criteria. The Project Area was delineated into eleven smaller survey units based on land use, roads, and other geographic features to facilitate access and project management. Figure 6-1 shows the designated plowed fields, fallow areas, and survey units. In recently plowed fields, where ground cover was minimal and plowing had the potential to expose previously buried material, CAR conducted an intensive reconnaissance survey in which surveyors walked transects spaced 15 m apart. Shovel tests were excavated to explore surface finds at the discretion of the Project Archaeologist. In fallow and unplowed areas where ground cover and secondary growth significantly reduced surface visibility, pedestrian survey methods consisted of transects spaced at 30 m with shovel testing. During fieldwork, the Project Archaeologist maintained a daily field log. In addition, all field activities and discoveries were documented and supported by digital data, including photographs, where appropriate.

Survey Methods

In the plowed areas, the high visibility and the propensity of plowing to bring previously buried material to the surface made reconnaissance survey an effective discovery method. These areas (Figure 6-1) accounted for 518 acres (2.1 km^2). The Project Archaeologist and three field technicians walked transects spaced at 15 m in the plowed areas and carried Trimble Juno 3B GPS units with a preloaded transect shape file to facilitate complete coverage of the Survey Area. Crew members attempted to identify and recorded the type and location of prehistoric and historic artifacts found on the surface with the Juno unit as isolated finds (IF). Any of the surface artifacts that were temporally diagnostic or unique were collected and returned to the CAR laboratory for further analysis. When diagnostic prehistoric artifacts were observed, shovel tests were excavated in the vicinity of the find to look for additional material.

Shovel Testing

Approximately 927 acres (3.75 km^2) of the Survey Area were delineated as fallow or unplowed areas. Dense vegetation restricted visibility. These areas, designated as survey units 5 through 10 and part of unit 4 on Figure 6-1, were subject to systematic shovel testing. A crew of four archaeologists, including the Project Archaeologist, walked transects spaced 30 m apart. Shovel tests were excavated every 100-200 m on transects. In several cases, this interval was not feasible as heavy rains inundated some area, and in other areas, secondary growth was simply too dense.

Shovel tests were about 30 cm in diameter and excavated to a maximum depth of 60 cmbs. Shovel tests were terminated prior to 60 cmbs if excavators encountered large rock(s), extensive disturbances, or other impediments. Shovel tests were excavated in arbitrary 10-cm levels, and all soil matrixes were screened through one-quarter inch hardware cloth. All artifacts found in the shovel test were collected, tagged, and returned to the laboratory for further analysis. Archaeologists completed a standard shovel test form and recorded the location and attribute data on the Juno 3B.

Site Recording and Collection Policy

For the purposes of this survey, an archaeological site was defined as containing cultural materials or features that were produced prior to 1950. The definition of a site used for this project was as follows: (1) five or more surface artifacts within a 15-m radius, a minimum density of at roughly 1 artifact per 141 m^2; (2) a single cultural feature, such as a hearth, observed on the surface or exposed in shovel testing; (3) a positive shovel test containing at least three artifacts within a given 10-cm level; (4) a positive shovel test containing at least five total artifacts; or (5) two positive shovel tests located within 30 m of each other.

If the minimum site criteria were met, shovel tests were excavated at close intervals to define the extent and distribution of archaeological material. Shovel tests were

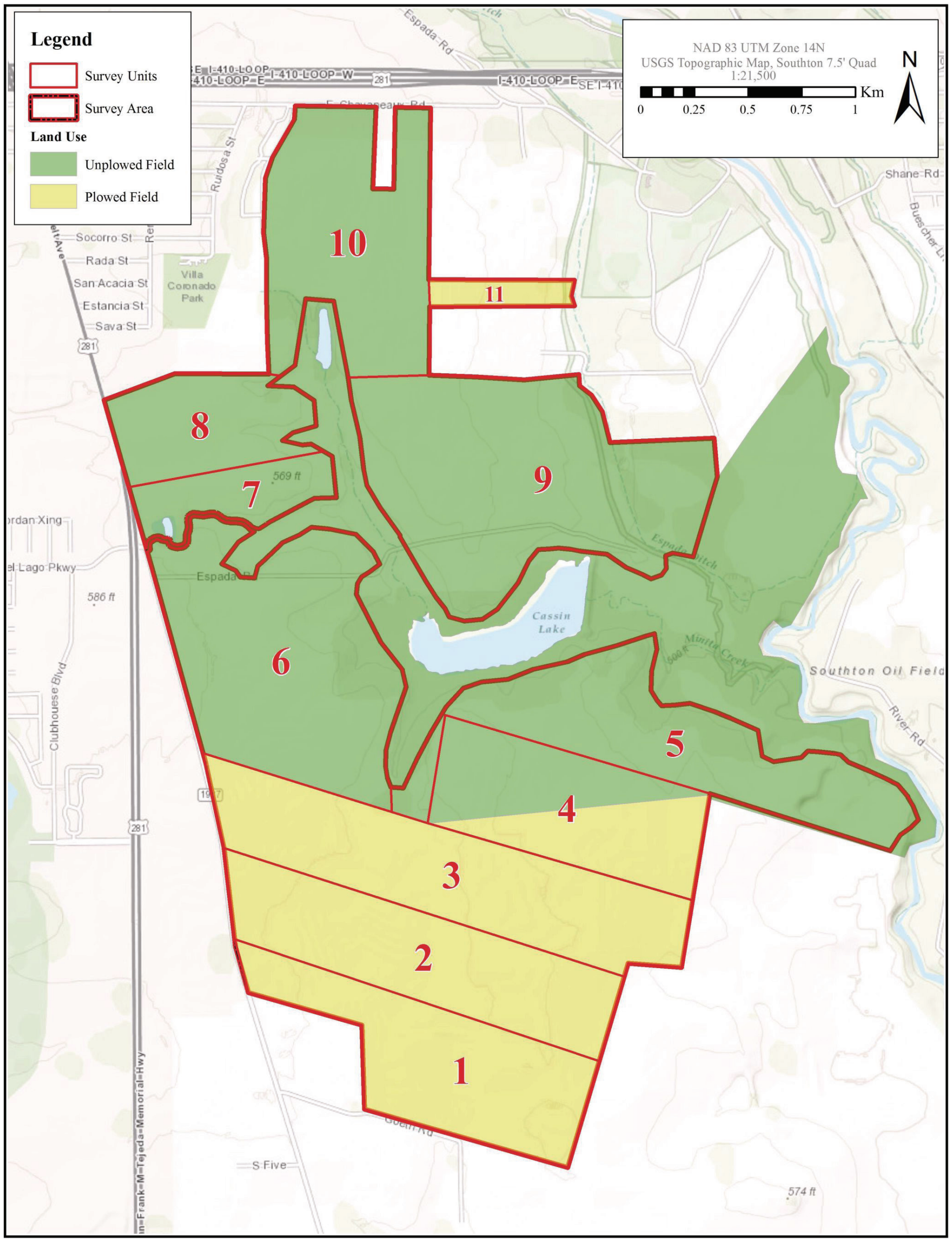

Figure 6-1. Survey Area with the smaller survey units identified. The 11 units provided divisions for project tracking and are referenced in discussions in subsequent chapters.

excavated to define each site boundary. Each site's boundary was plotted on an aerial photograph and recorded using a Trimble GeoXT with survey-grade, sub-meter accuracy. Digital photographs were taken of each site.

During the field investigations, CAR archaeologists recorded all water management features. In addition, CAR used current and past aerial images to define water management features not easily observable in the field. CAR staff documented their existence on the ground and recorded multiple GPS points along all irrigation features.

Some surface artifacts were collected. These included all temporally diagnostic items that could not be easily identified in the field, as well as some chipped stone bifaces and a handful of other unique items.

Site Revisits and Additional Field Investigations

Using the methods described, CAR completed a 100 percent archaeological survey, using either intensive reconnaissance or survey with shovel testing, of the 1,445-acre area.

Following the fieldwork, CAR archaeologists Leonard Kemp and Raymond Mauldin, accompanied by Project Archaeologist Antonia Figueroa, revisited several previously defined sites and clusters of isolated finds to further assess the locations.

In May 2016, Project Archaeologist Antonia Figueroa conducted an interview with local landowner Mr. John Yturri, a local landowner whose family has a long association with the region. Portions of that interview are transcribed as Appendix C. Additional information on the family history is provided based on that interview (see Appendix C).

In August of 2016, CAR Project Archaeologists Antonia Figueroa and archaeologist Leonard Kemp, accompanied by Mr. John Yturri, took a boat trip along a section of the San Antonio River, from below Mission Espada to the REDUS property line (see Appendix D). The principal goal of the roughly 4-km trip was to look for, and eventually sample, any buried features associated with the REDUS property.

Finally, in March of 2017, CAR archaeologists Kemp and Mauldin returned to the Project Area and sampled a single feature observed in the wall of the river. This feature formed the basis of site 41BX2200.

Laboratory Methods

All cultural materials and records obtained and/or generated during the project were prepared in accordance with federal regulation 36 CFR part 79 and THC requirements for State Held-in-Trust collections. Artifacts processed in the CAR laboratory were washed, air-dried, and stored in 4-mm, zip-locking, archival-quality bags. Organic materials and materials needing extra support were double-bagged. Acid-free labels were placed in all artifact bags. Each laser-printed label contains provenience information and a corresponding lot number. A paper label containing the site number and a catalog number or an accession number was applied to selected artifacts, such as lithic tools and decorated ceramics, using a clear acrylic coat as an adhesive and protected by another clear acrylic coat. In addition, a small sample of unmodified debitage from each lot was labeled with the appropriate provenience data.

Artifacts were separated by class and stored in acid-free boxes. Digital photographs were printed on acid-free paper, labeled with archival appropriate materials, and placed in archival-quality sleeves. All field forms were completed with pencil. All field documentation was printed on acid-free paper and placed in an archival folder. A copy of the report was printed on acid-free paper, and all digital data associated with the investigation and analysis were transferred to an archival-rated computer disk. The report and the computer disk are stored in an archival box and curated with the field notes and documentation. No artifacts collected on the project were discarded. However, samples collected for description of sediment were the only class of material discarded. Upon completion of the project, and in accordance with an agreement from the landowner, all collected artifacts and records were permanently curated at CAR, a State-Held-in-Trust facility. The material is curated as Accession No. 1947.

Finally, following completion of the project, CAR submitted Texas Archeological Sites Atlas forms for all newly discovered archaeological sites. In addition, CAR completed updates on extant sites within the Project Area.

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Chapter 7: Project Results

Raymond Mauldin, Leonard Kemp, Antonia L. Figueroa, and Clinton M. M. McKenzie

The REDUS survey project was conducted between January of 2016 and October of 2017. The majority of the fieldwork occurred between February and June of 2016. Following that initial phase of work, it was determined that additional field investigation was necessary to place shovel tests in areas that were inaccessible due primarily to standing water associated with summer rains. CAR archaeologists also revisited several areas with high densities of isolated finds and areas that were of geomorphic interest. These additional shovel tests and revisits were conducted in February and April of 2017, and the analysis, report production, and curation occurred over the summer and into the winter of 2017. In all, CAR conducted either an intensive reconnaissance or survey with shovel testing on 1,445 acres (5.84 km^2) within the REDUS Project Area. Within this area, CAR staff collected artifacts from 54 non-site contexts (see Appendix A), excavated 214 shovel tests (see Appendix B), recorded seven new sites in the Survey Area (41BX2145, 41BX2146, 41BX2147, 41BX2148, 41BX2149, 41BX2190, and 41BX2191), and an eighth site (41BX2200) in the Project Area along the San Antonio River. In addition, CAR made observations on two previously recorded sites in the Survey Area, the Espada *Acequia* (41BX269) and another irrigation ditch (41BX1796). This chapter presents a summary of these findings.

Intensive Reconnaissance and Survey

As discussed in Chapter 6, work within the REDUS Survey Area used two methods based on recent land use practices. These were an intensive reconnaissance with 15-m transect spacing in active fields, and a 30-m transect spacing with shovel testing in areas that had not been recently plowed. Plowed fields investigated by reconnaissance covered roughly 518 acres (2.1 km^{2,} 36 percent of the Survey Area), and included Areas 1, 2, 3, and 11, as well as the lower portion of Area 4 (see Figure 6-1). While plowing may disturb deposits as deep as 40 cmbs and result in both artifact damage and lateral displacement (Ammerman 1985; Lewarch and O'Brien 1981; Mallouf 1982; Shott 1995), plowing will also bring buried objects to the surface, obviating the need for extensive shovel testing. In the areas that were not actively used for fields, CAR archaeologists completed a shovel testing survey using 30-m transects. The fallowed sections included Areas 5, 6, 7, 8, 9, 10, and the northern-most portion of Area 4 (see Figure 6-1) and were characterized by dense vegetation. The shovel testing survey totaled 927 acres (3.75 km^2, 64 percent of the Survey Area).

Isolated Surface Finds

The locations of artifacts that did not meet the criteria for a site were recorded as isolated surface finds (IFs). Ideally, and consistent with the scope of work, non-site artifacts were to be collected only if they had a temporally diagnostic characteristic. However, in the field the collection criterion was expanded to include unique items, with several bifaces, a marble, and fragments of glass and ceramic among the items collected. Fifty-four locations with 55 isolated surface artifacts were recorded (Figure 7-1; see also Appendix A). Twenty-two of these artifacts were collected.

Figure 7-1 plots the locations of historic (blue dots, n=31) and prehistoric (yellow dots, n=23) items within the REDUS Survey Area on a map of survey type. Note that the density of locations with artifacts is significantly higher in the recently plowed areas. Forty-three locations with artifacts outside of defined sites were observed on the 518 acres in the plowed areas, a density of 0.083 locations per acre. This is over 7 times higher than the 0.0118 per acre for non-site artifact locations in the fallowed areas. This is a reflection of the dramatic exposure differences, different transect spacing used to record the plowed and unplowed areas, and the soil turnover in the plowed fields. Some of the isolated finds appear to be associated with areas of high exposure, including washed-out areas and along roads that surround the Survey Area. As will be noted subsequently, sites are also in similar locations.

Figure 7-2 shows examples of some of the historic material recovered (see Appendix A). Historic non-site artifacts dated to the late 1800s and into the 1900s. They consisted of ceramics and glass. The ceramics were primarily white earthenware, common in the region after the mid-1800s (Fox 2000). Glass types encountered as isolated finds were fragments of bottles that were olive, aqua, amber, milk, or purple in color. Olive green glass is associated with early wine bottles, while other glass colors and forms indicate medicinal or cosmetic vessels. A combination of chemicals used in the glass production and exposure to sunlight can result in purple and aqua glass colors (see Lockhart 2006).

Several chipped stone tools were recorded as isolates (see Appendix A). Figure 7-3 shows a fragment of a Guadalupe tool that was among the isolated finds in the plowed fields.

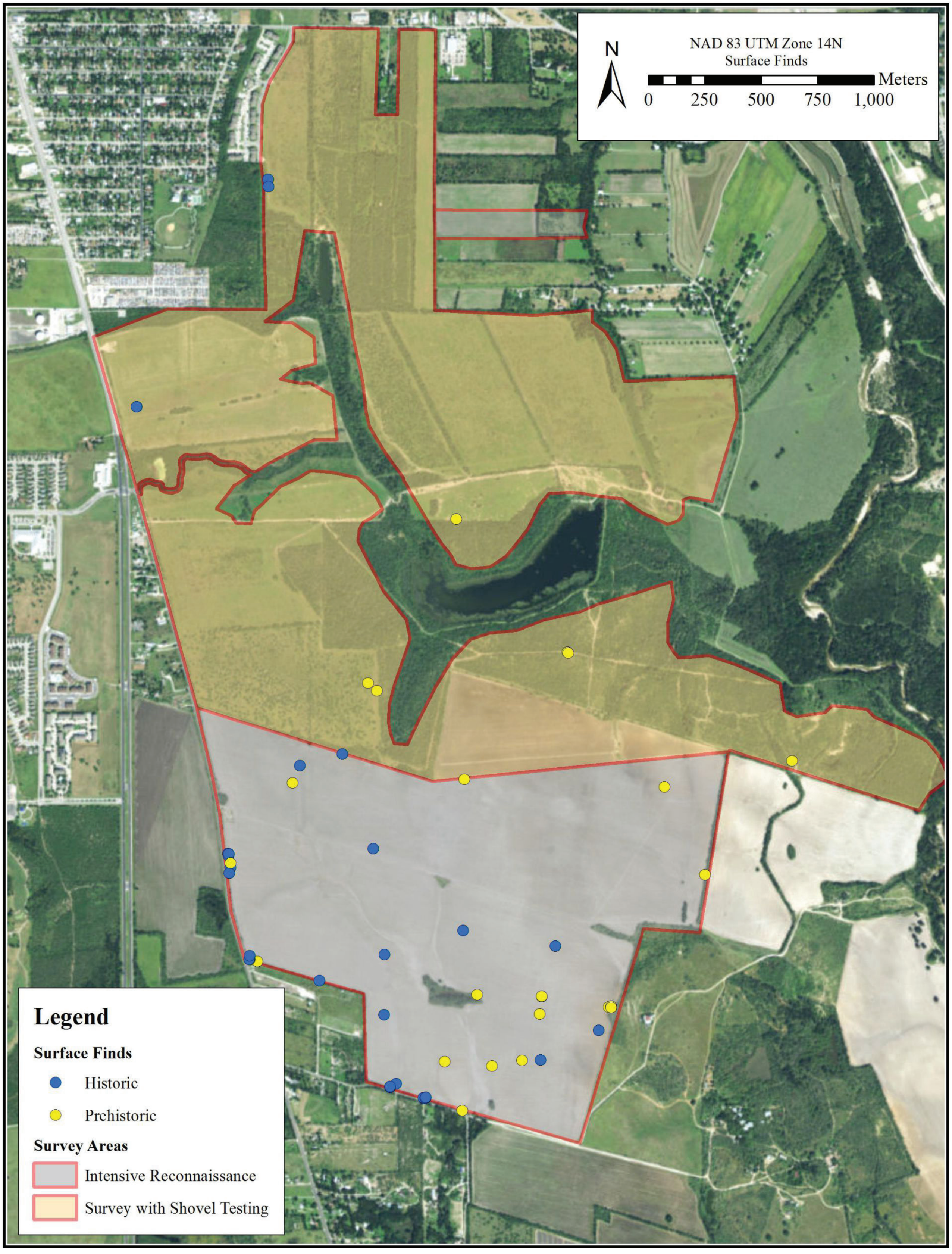

Figure 7-1. Map of isolated surface finds coded by broad temporal periods. Also shown are the survey types. Note the higher density of items in the previously plowed areas.

Figure 7-2. Examples of historic period isolated surface finds in the REDUS Survey Area. From left to right: white transferware, glass marble, milk glass, and white earthenware rim.

Figure 7-3. Fragment of a Guadalupe tool found in the plowed fields on the southern portion of the REDUS Survey Area. The item is made of a dark chert.

According to previous research (Black and Tomka 2006), this type of tool may have been used as an axe. These tools date primarily to the Early Archaic period (see Turner et al. 2011).

Also among the chipped stone tools were a core, a retouched item, and several bifaces, including two Archaic Period projectile points (Figure 7-4). The point on the lower left (Figure 7-4) is consistent with an Ensor point form that dates to the close of the Late Archaic (200 BC to AD 600; Turner et al. 2011). The second point is likely a Martindale type that according to Turner et al. (2011) dates to the Early Archaic (6000 BC). Figure 7-5 shows additional items, including three cores and a biface. Note that the majority of tools are broken, and many of the items appear to have been damaged, almost certainly resulting from impacts of repeated plowing of the area.

Figure 7-4. Examples of prehistoric isolated surface finds in the REDUS Survey Area. From left to right, the top row shows a retouched tool and a biface, the middle row shows a biface and a core, and the bottom row shows a Late Archaic projectile point (possibly an Ensor) and an Early Archaic Martindale form.

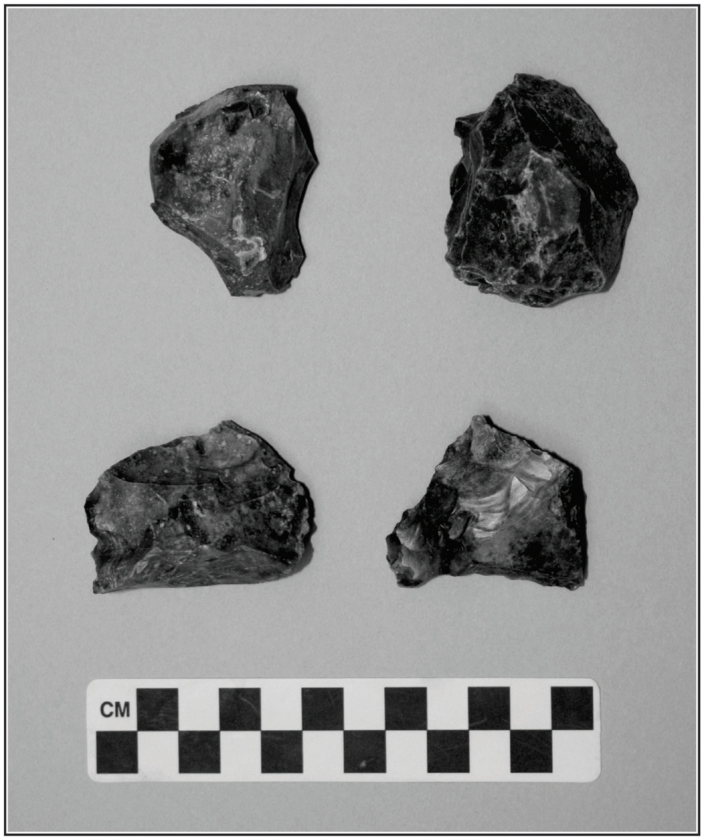

Figure 7-5. Examples of isolated surface finds in the REDUS Survey Area. Top row and lower left are cores, while the bottom right is a biface. Note that pieces are heavily damaged, likely from plowing impacts.

Isolated surface finds were primarily concentrated in the plowed fields, along roads, and in eroded areas. The history of land use, including extensive plowing, not only exposed previously buried artifacts but also likely resulted in a higher frequency of damage and possibly some dispersion.

Shovel Testing Results

Figure 7-6 presents the locations of the 214 shovel tests excavated during the project. Additional information can be found in Appendix B. As shown in Figure 7-6, shovel tests were excavated throughout the fallowed areas on 30-m transects and with a minimum of 100 m between tests. Additional shovel tests were placed to explore any areas that had positive shovel tests and to define site content and boundaries. Shovel tests were also placed at the discretion of the Project Archaeologist. These tended to be excavated to explore diagnostic surface finds (SFs). Of the 214 shovel tests excavated on the project, 177 were excavated in the 927-acre fallowed area, or roughly one shovel test for every 5.25 acres. Most shovel tests on the project were excavated to the target depth of 60 cm. Only 17 shovel tests were terminated early, with an overall average depth for the 214 tests being 58.86 cmbs.

Overall, only 18 of 214 shovel tests (8.4 percent) were positive. Ten of these 18 were in the fallowed areas; therefore, of the 177 shovel tests in this area, only 5.6 percent were positive. The eight remaining positive shovel tests were in the plowed fields. While the rate of positive tests was much higher in the plowed areas (21.6 percent), the 37 shovel tests tended to be placed on sites that had been defined by surface concentrations. This on-site testing should inflate the overall return rate, as all eight positive tests in the plowed fields were on defined sites. Only two positive shovels tests were ultimately determined not to be associated with a site. These were Shovel Test (ST) 106, which produced a single flake from Level 1 (0-10 cmbs), and ST 180, which produced a piece of heavy-gauge wire from Level 2 (10-20 cmbs). Additional information on the on-site shovel tests is provided in the individual site discussion later in this chapter.

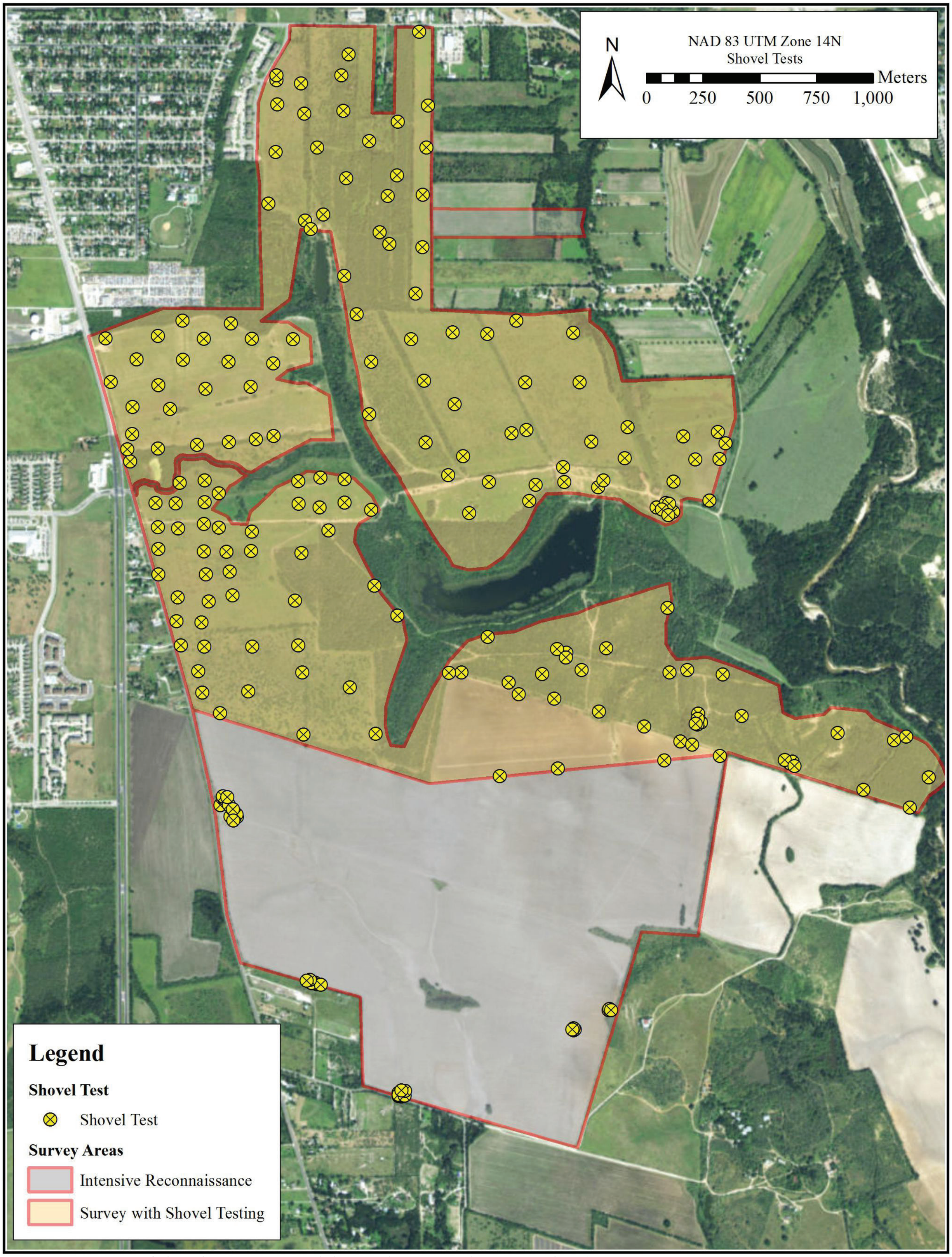

Figure 7-6. Map of shovel tests excavated during the project (see Appendix B).

At the project level, only 31 (2.5 percent) of the 1,263 levels excavated in shovel tests were positive. Historic material was most common and included glass, ceramics, faunal material, brick, metal, and charcoal. Twenty of the 31 positive levels were historic in age, with 17 of the 20 levels being within the upper 30 cm. No historic material was recovered below Level 5 (40-50 cmbs), with Level 2 having the highest number of positives (n=7). Prehistoric material was confined to a biface, chipped stone, and burned rock. The 11 positive prehistoric levels were distinctly bimodal, with five occurrences in Level 1 (0-10), no recovery from Levels 2 and 3, and five positives below 30 cm. Three positives were recovered from Level 6 (50-60 cmbs), consisting of debitage and burned rock. The sample size of only 31 positive levels is quite small, and historic material dominates the upper 30 cm, while prehistoric material is more common below 30 cm.

Sites Summaries for the REDUS Project Area

The REDUS survey work summarized above, consisting of both the intensive reconnaissance and the shovel test survey, was conducted primarily from April through June of 2016. Using the site definition criteria outlined in the previous chapter, five archaeological sites (41BX2145, 41BX2146, 41BX2147, 41BX2148, and 41BX2149) were recorded. At the time of the initial fieldwork, the Project Area experienced multiple days of heavy rainfall, and standing water had limited access to several places. Consequently, following CAR's initial work in the Survey Area, revisits were initiated to assure adequate coverage, collect additional information on the five new sites, and revisit the Espada *Acequia* (41BX269) and the previously recorded irrigation ditch (41BX1796). These revisits took place over the late spring and into the summer of 2017. During these revisits, CAR archaeologists recorded two new sites, 41BX2190 and 41BX2191.

In August of 2016, CAR Project Archaeologist Antonia Figueroa and archaeologist Leonard Kemp, accompanied by Mr. John Yturri, took a boat trip along a section of the San Antonio River from below Mission Espada to the end of the REDUS property (see Appendix D). The goal was to look for, and eventually sample, any buried features associated with the REDUS property that were exposed in the riverbank. Two charcoal stains were noted during the trip. Kemp and CAR Assistant Director Mauldin returned to these locations in March of 2017, though they could only relocate one of the original two features. A radiocarbon date from a sample collected from that feature and artifacts found along the riverbank below the exposed feature formed the basis of an eighth site designated 41BX2200.

At the close of the project, then, there were eight new sites, seven of which were in the Survey Area. Figure 7-7 presents the distribution of these eight new sites. While each of the sites, along with the Espada *Acequia* (41BX269) and 41BX1796, are discussed below, an examination of Figure 7-7 shows that four (41BX2145, 41BX2146, 41BX2147, and 41BX2190) of the seven sites in the Survey Area are located along the survey boundary. The boundary is defined by fence lines and ditches that are consistently associated with dirt roads that have high exposure and are often eroded. In addition, the boundaries of sites 41BX2146 and 41BX2190 are primarily defined by the width of the roads in which they are exposed. Site 41BX2148 is associated with an open area that, on earlier aerial photos, is shown as being extensively used by trucks likely associated with a gravel quarry to the west of the site. Site 41BX2149 is associated with the Cassin Ranch, with multiple roads and standing structures. Site 41BX2191 is the only new site in the Survey Area that is not associated with a road or an area of high exposure. However, this site is in an eroding area associated with a small drainage cut, which suggesting that erosion and exposure can be principal determinants of site discovery.

41BX2145

Site 41BX2145 was recorded on the western side of the property during intensive reconnaissance. The site is located in Areas 2 and 3 (see Figure 6-1). The site was initially identified by a surface scatter of historic artifacts. Ten shovel tests were excavated in order to delineate this site, with three tests being positive for cultural material (Figure 7-8). No shovel tests were excavated to the northwest, which was partially under water, therefore, the site boundary in this area is approximate. The site area as currently defined is roughly 3,560 m^2. Site 41BX2145 has a mixture of historic and possibly prehistoric material present, and no features were recorded. The historic artifacts at the site likely span from the mid-to-late 1800s into the early 1900s. The site has been impacted by plowing and possibly grading activity associated with the construction of a fireworks stand to the south of the site (see Figure 7-8).

The three positive shovel tests produced a mixture of glass sherds, ceramics, metal, faunal material, burned rock, and chipped stone debitage. Of the 58 levels that were excavated, eight were positive (Table 7-1). Historic material in shovel tests consisted of clear glass (n=2), a metal staple, European earthenware ceramics (n=2), and a single faunal fragment identified as a medium-size mammal. These items tend to occur in the upper 30 cm (see Table 7-1). In addition, several small pieces of FCR were collected that could be either historic or prehistoric. Two pieces of chipped stone debitage

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Figure 7-7. New sites identified on the REDUS Project Area.

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Figure 7-8. Aerial map of site 41BX2145 showing location of shovel tests and site boundary.

Table 7-1. Shovel Test Results at 41BX2145

Depth (cm)	**ST 36**	**ST 37**	**ST 38**	**ST 39**	**ST 40**	**ST 41**	**ST 42**	**ST 203**	**ST 204**	**ST 205**
0-10	Glass	-	-	-	-	-	-	-	-	-
10-20	-	Cer*	-	-	-	-	-	-	-	-
20-30	Metal	Glass	-	-	-	-	-	-	-	-
30-40	-	FCR	-	-	-	-	-	-	-	-
40-50	Bone, Cer	-	-	-	-	-	FCR	-	-	-
50-60		FCR**, Deb**	-	-		-	-	-	-	-

*Cer=ceramic; Deb=debitage; FCR=fire-cracked rock
**Noted on form only and not in collections.

and associated FCR were noted on Level 6 of ST 37, but these were apparently not collected and therefore cannot be verified. FCR does occur below 30 cm in both STs 37 and 42 (Table 7-1) at depths where impacts from plowing likely would be reduced, suggesting the possibility that an earlier component may be present at depth.

The majority of the material recovered from site 41BX2145 was found on the surface (Figure 7-9). Table 7-2 provides information on several of the items collected from the surface, and Figure 7-10 shows several examples of these collected artifacts. Overall, the surface material is dominated by ceramics, with 14 sherds. A concentration of 10 ceramics, primarily European earthenware (transferware and stoneware) was noted, along with several scattered sherds and two figurine fragments (see Figures 7-9 and 7-10, Table 7-2). One of the figurine fragments (SF 92) is from a penny doll or “Frozen Charlotte” that likely dates no earlier than the 1850s (Fox et al. 1997:61).

The site has been impacted by plowing, as is the case with most sites on the project. In addition, the construction of a road and grading activities associated with the fireworks stand likely impacted the surface. There are no features or structural elements present, and a review of the 1953 USGS topographic map shows no buildings in the area. The site appears to be a low-density scatter of late-1800s and early 1900s material. While there is a possibility that deeper, prehistoric deposits exist below the plow zone, CAR cannot confirm that existence. Therefore, CAR does recommend that impacts below 40 cm be avoided in this area. If it is not possible to avoid deeper impacts in this area, then CAR would recommend that additional shovel testing be conducted to assure that deeper deposits are not present at 41BX2145.

41BX2146

Site 41BX2146 was recorded in the southern portion of the Project Area during the intensive reconnaissance. The site is located within Area 1 (see Figure 6-1). It was initially recorded as a surface scatter of historical material consisting of a small quantity of ceramics and glass. Eight shovel tests were excavated to delineate the site and determine the depth of cultural material (Figure 7-11). Shovel Tests 43 and 47 were positive and revealed the shallow depths of the deposits (10-20 cmbs). The site covers an area of roughly 355 m^2 and is

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Figure 7-9. Aerial map of site 41BX2145 showing location of surface material and site boundary.

Table 7-2. Cultural Material Recovered or Documented from the Surface of 41BX2145

Surface Find	Material	Count	Description
91	Glass	1	container, cobalt blue
92	Ceramic	1	doll figurine
93	Glass	1	container, amethyst
94	Glass	1	container (neck), aqua
95	Glass	1	container, aqua
96	Ceramic	1	wheel-thrown stoneware
97	Glass	1	container, cobalt blue
98	Metal	1	horseshoe
99	Glass	1	container (rim), amethyst
100	Glass	1	container (rim), amethyst
101	Ceramic	1	European earthenware (spongeware)
105	Ceramic	1	semi-porcelain figurine
106	Ceramic	1	European earthenware (edgeware)
107	Glass	1	container (design present), milk
108	Ceramic	1	Western stoneware (stoneware)

Figure 7-10. Artifacts recovered from 41BX2145. Clockwise: decorated white earthenware from ceramic cluster, ceramic figurine (penny doll, SF 92), horseshoe (SF 98), and purple glass bottle necks (SFs 99 and 100).

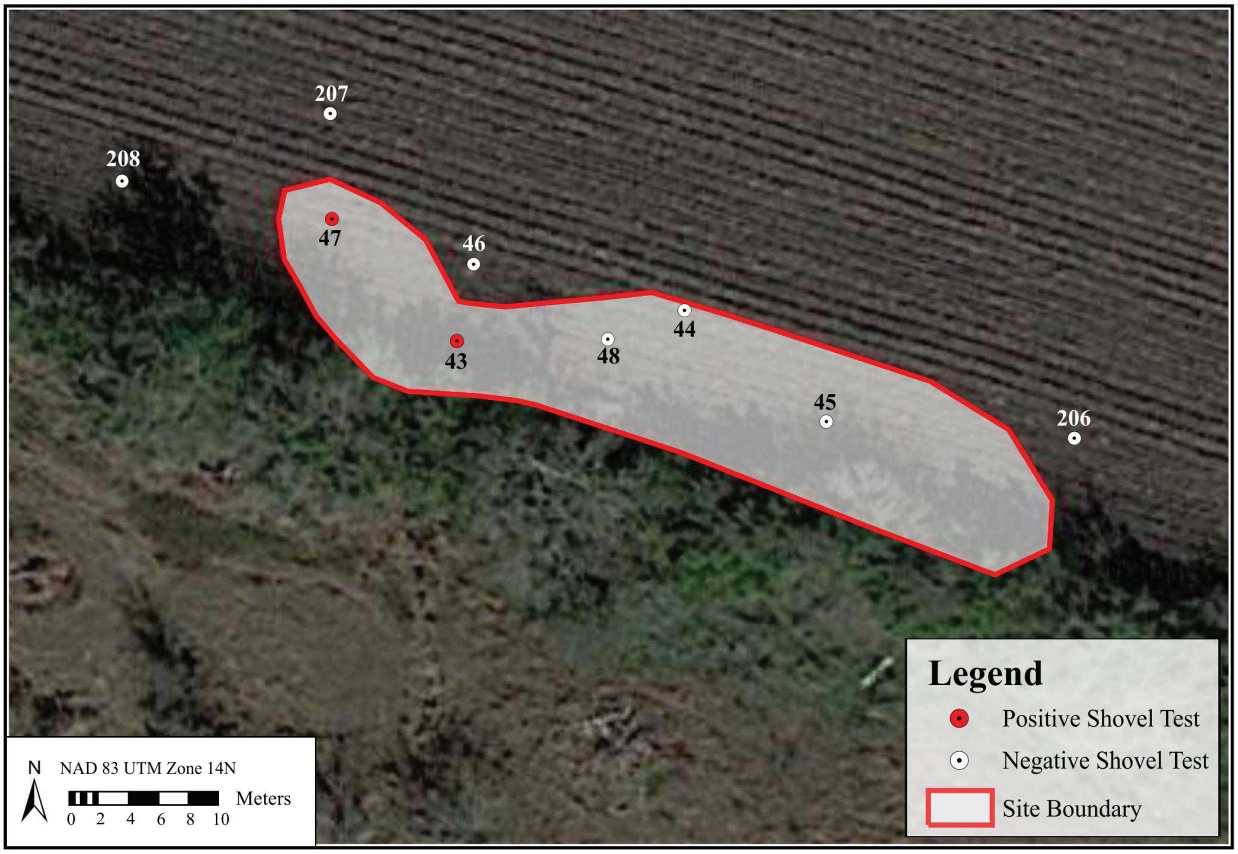

Figure 7-11. Aerial map of site 41BX2146 displaying shovel tests and site boundary.

exposed in a roadway. No features were observed, and based on a small number of ceramics, the material appears to date to the historic period, possibly from the late 1800s to the early 1900s. The site has been impacted by the road and plowing.

Table 7-3 shows the recovery for all shovel tests at 41BX2146. The two positive shovel tests produced a stoneware ceramic fragment and a metal fence staple. Only two of the 48 levels excavated were positive. All material recovered was within 20 cm of the surface.

Figure 7-12 presents the distribution of surface artifacts observed, while Table 7-4 provides additional details. Only one artifact, a stoneware ceramic (SF 16), was collected from the surface of 41BX2146.

The site is primarily confined to the surface and has been exposed and impacted by the construction and use of the road. No features or structural elements were identified on this low-density surface scatter. CAR does not recommend any additional work on the site, given the shallow depth, low artifact density, poor temporal control, questionable integrity, and low artifact variety.

41BX2147

Site 41BX2147 is a low-density surface scatter of historic materials that likely dates to the late 1800s through early 1900s. The site is in the southern section of the Survey Area and was found during intensive reconnaissance. Site boundaries were established based on the surface distribution and nine shovel tests (Figure 7-13). Only two of the shovel tests were positive. The site covers an area of roughly 500 m^2, though the eastern edge of the site is not well defined. No features were noted, and the site has been impacted by plowing. A dirt track associated with a fence line is on the southern edge of the site, and the site is in an eroding area associated with several small drainage channels.

Materials in the two positive tests were only found in the upper two levels (0-20 cm; Table 7-5). There were only two positive levels out of the 51 levels excavated in the immediate area. A single piece of FCR (ST 50) and a piece of brown glass (ST 209) were the only subsurface artifacts observed.

Figure 7-14 presents the surface distribution of artifacts at 41BX2147. The surface assemblage is dominated by container glass (Table 7-6). A horseshoe (SF 21) and a

Table 7-3. Shovel Tests Results at 41BX2146

Depth (cm)	ST 43	ST 44	ST 45	ST 46	ST 47	ST 48	ST 206	ST 207
0-10	-	-	-	-	Metal	-	-	-
10-20	Cer*	-	-	-	-	-	-	-
20-30	-	-	-	-	-	-	-	-
30-40	-	-	-	-	-	-	-	-
40-50	-	-	-	-	-	-	-	-
50-60	-	-	-	-	-	-	-	-

*Cer=ceramic

Figure 7-12. Aerial map of site 41BX2146 displaying locations of surface finds and site boundary.

Table 7-4. Cultural Material Recovered and Documented from the Surface of 41BX2146

Surface Find	Material	Count	Description
15	Glass	1	olive glass (not collected)
16	Ceramic	1	stoneware
26	Glass	1	unknown (not collected)
28	Glass	1	aqua (not collected)
32	Ceramic	2	undecorated white earthenware (not collected)
83	Ceramic	1	unknown (not collected)

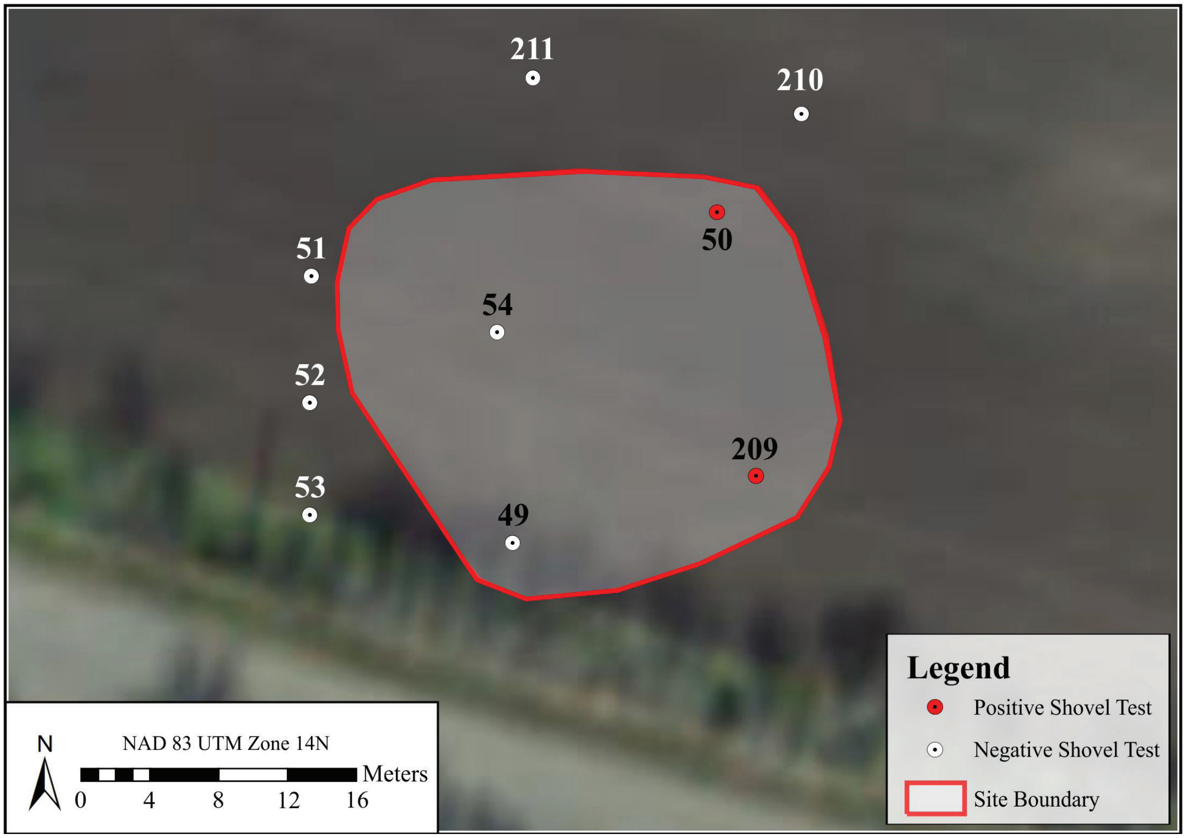

Figure 7-13. Aerial map of site 41BX2147 displaying shovel tests and site boundary.

Table 7-5. Shovel Test Results at 41BX2147

Depth (cm)	ST 49	ST 50	ST 51	ST 52	ST 53	ST 54	ST 209	ST 210	ST 211
0-10	-	FCR*	-	-	-	-	-	-	-
10-20	-	-	-	-	-	-	Glass**	-	-
20-30	-	-	-	-	-	-	-	-	-
30-40	-	-	-	-	-	-	-	-	-
40-50	-	-	-	-	-	-	-	-	-
50-60	-	-	-	-	-	-	-	-	-

*FCR=fire-cracked rock
**Noted on shovel test form but not collected.

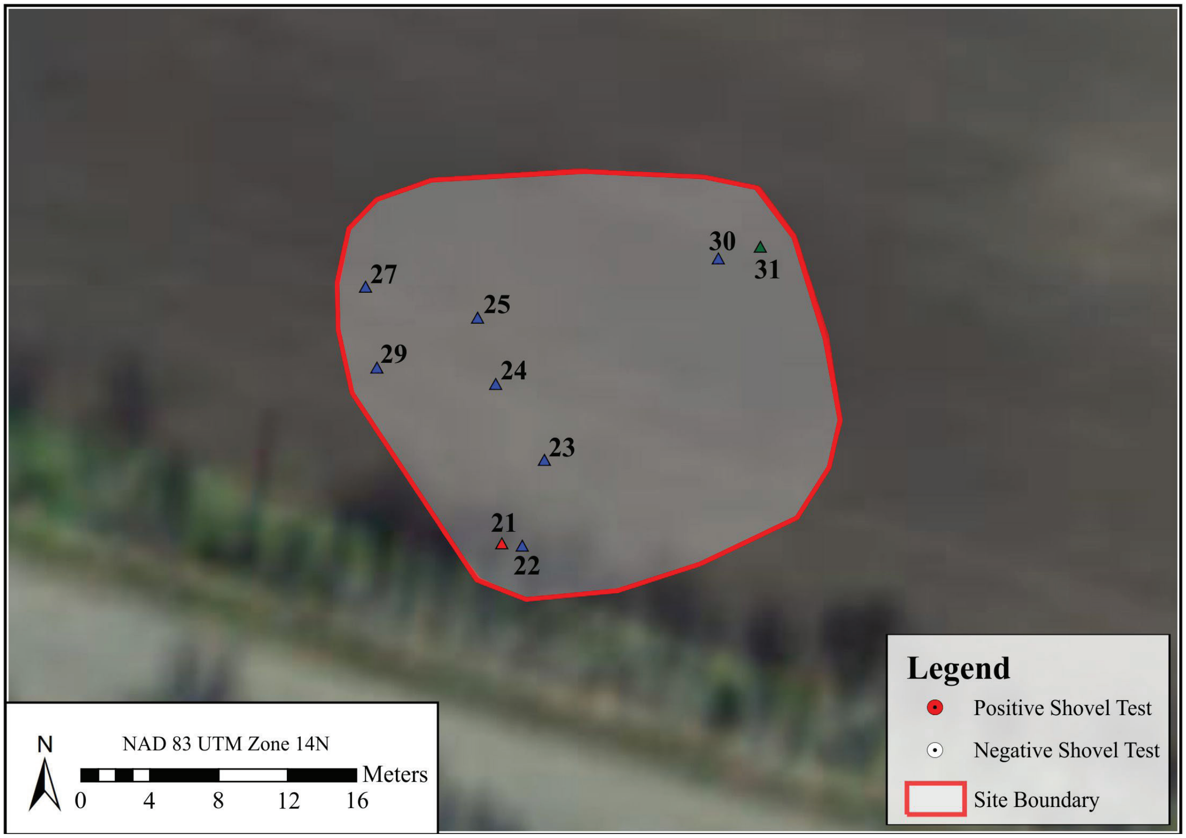

Figure 7-14. Aerial map of site 41BX2147 displaying surface artifacts and site boundary.

Table 7-6. Cultural Material Recovered and Documented from the Surface of 41BX2147

Surface Find	Material	Count	Description
21	Metal	1	horseshoe (not collected)
22	Glass	1	container, amber
23	Glass	1	container (bottleneck), brown
24	Glass	1	container (embossed) fragment, dark brown/olive
25	Glass	1	container, aqua (not collected)
27	Glass	1	container, aqua (not collected)
29	Glass	2	container, aqua (not collected), container, purple (not collected)
30	Glass	1	container, olive (not collected)
31	Ceramic	1	undecorated white earthenware (not collected)

sherd of undecorated white earthenware (SF 31) were also observed. Of the 10 items observed on the surface, only three were collected (see Table 7-6).

Like site 41BX2146, site 41BX2147 has been affected by plowing. In addition, the site has been impacted by erosion as a result of water drainage in the area. The site lacks buried material and features. The density and diversity of items is low, and the high level of erosion has likely reduced site integrity. CAR does not recommend any further work on site 41BX2147.

41BX2148

Site 41BX2148 is a low density prehistoric scatter located in the central area of the survey in Area 5 (see Figure 6-1). The site was discovered during shovel testing. As shown in Figure 7-15, it consists of a low-density scatter of material, with a biface (SF 84), debitage (SF 85), and several pieces of scattered burned rock noted on the surface. No features were defined. The excavation of four shovel tests, all to 60 cm, produced an additional biface in Level 1 of ST 102 (Figures 7-15 and 7-16). This was the only recovered item of the 24 levels excavated. As defined, the site covers about 500 m^2, though the western boundary is not clearly identified.

The site is in an eroded area, with what appeared to be several old trails cutting through the northern and southern ends. Figure 7-17, a USGS Google Earth image from 2004 with the site boundaries plotted, shows that the area has been extensively impacted previously. The roads and associated impacts appear to be related to gravel mining activity conducted in the area during this period. Given these impacts, the lack of any substantial subsurface material, and the overall low density of the surface material, CAR does not recommend any additional work at 41BX2148.

41BX2149

Site 41BX2149 is a historic site consisting of a surface scatter of artifacts, a main structure (residential), and at least four outbuildings, some of which are modern. The main structure and surface artifacts are located in Area 9 (see Figure 6-1) on a small rise just northeast of Cassin Lake (Figure 7-18). The

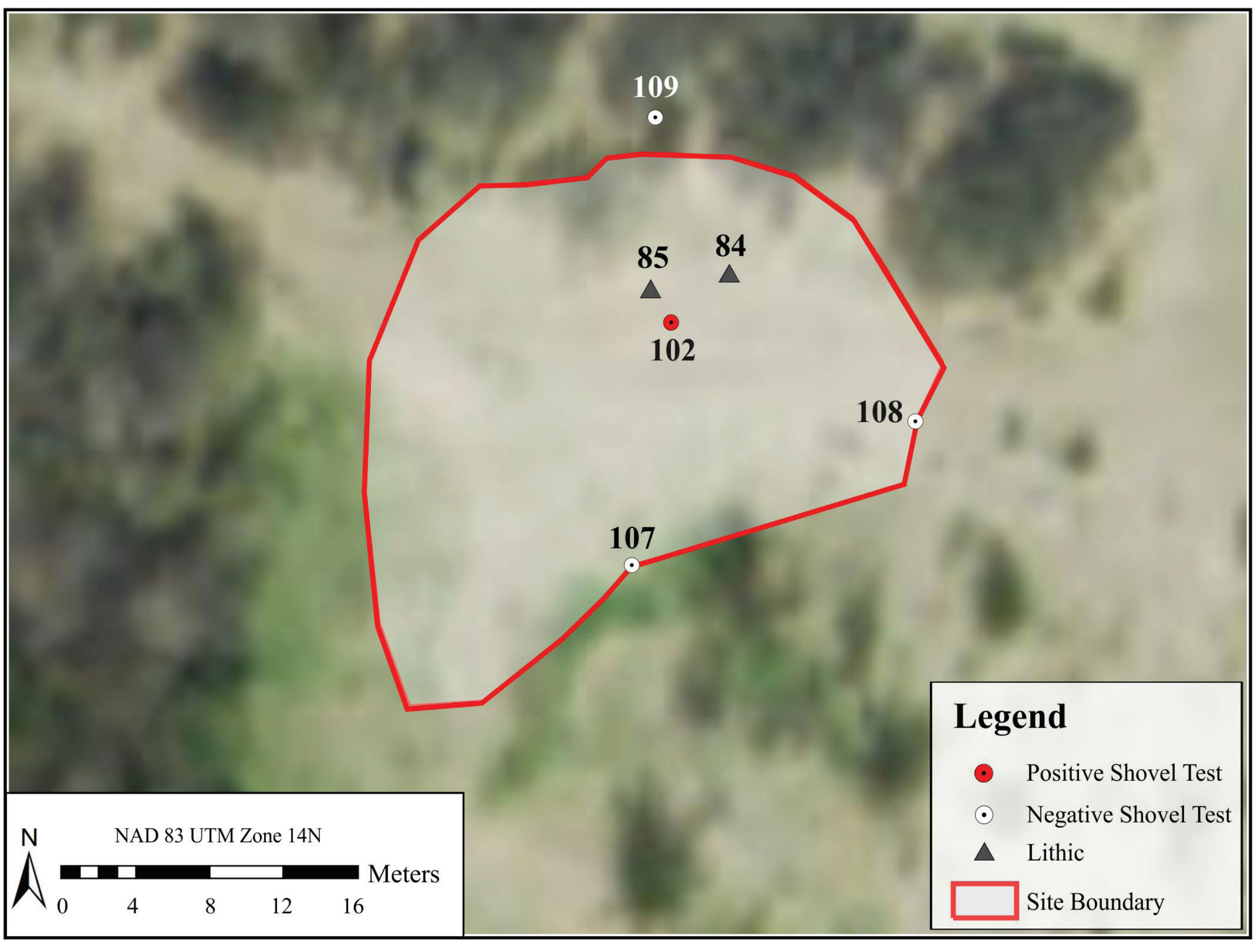

Figure 7-15. Aerial map of site 41BX2148 displaying shovel tests and surface artifacts.

Figure 7-16. Tools recovered from 41BX2184. Left is a biface (SF 84). Right is a biface recovered from Level 1 (0-10 cmbs) in ST 102 (see also Figure 7-15).

Figure 7-17. Site boundary of 41BX2148 plotted on a 2004 aerial image from the USGS and Google Earth showing extensive road and truck traffic through the site area.

Redacted Image

Figure 7-18. Aerial map of site 41BX2149 displaying shovel tests and site boundary. The residential structure (A) is in the lower left and is surrounded by shovel tests.

area around the site was heavily modified, much of which seems to have occurred when Cassin Lake was created in the early 1900s. Eight shovel tests were excavated to explore site content.

Site boundaries were determined based on the distribution of buildings and associated surface material. At present, there are four main structures on the site, along with fences, a corral, a water tank, and several smaller enclosures (Figure 7-18). Six of the eight shovel tests were used to gather data around the main structure that has been associated with the Cassin family who originally occupied the area in the late 1800s (Padilla et al. 2017; see also Chapter 4). Several of the structures on the site are collapsing, including the main residential structure (A on Figure 7-18) in the southeast portion of the site and a barn (B). Two structures (C and D) are currently in use.

The site, as currently defined, covers roughly 23,700 m^2. However, this estimate only covers the buildings and associated infrastructure observed on aerial photos. It is not based on shovel test results. In addition, the southern end of the site is defined by the boundary of the Survey Area. Note that ST 92, which was positive for glass in Level 1, is not included in the current site boundary. The shovel test is located roughly 45 m to the west of the current boundary and roughly 40 m to the east of site 41BX2144 as defined by Padilla et al. (2017). It is likely that with additional shovel tests and surface observations site 41BX2144 and site 41BX2149 could be combined to form a single site.

Table 7-7 presents the distribution of artifacts recovered or observed in the eight shovel tests excavated on or in the vicinity of 41BX2149. In all, 14 of the 48 levels contained artifacts, with STs 86, 87, and 90 containing multiple positive levels with a wide variety of historic material. Glass (n=29) was the most commonly recovered item from the shovel testing. Other than four pieces of flat/window glass, container glass dominated the assemblage, and clear glass was the most common. Six pieces of ceramic were recovered, including undecorated white earthenware, porcelain, and hand-painted sherds. Wire nails were the most common metal, though cut nails were also recovered. A metal fence staple and a bullet casing were recovered, along with red brick fragments. Charcoal, burned rock, and faunal material were also present, along with a single flake recovered from the 50-60 cm level in ST 89. This could reflect a prehistoric occupation at depth, though additional testing would be necessary to confirm its presence.

The artifacts that were documented on the surface were concentrated north of the main structure (Figure 7-19). Overall, the glass collected from the surface of the site (n=8) reflected containers, while the ceramics (n=9) were primarily white earthenware (Table 7-8). However, only a small portion of the site surface was inspected, with collections focused on the residence (Figure 7-19).

Table 7-7. Shovel Test Results Associated with 41BX2149

Depth (cm)	ST 86	ST 87	ST 88	ST 89	ST 90	ST 91	ST 92*	ST 169
0-10	Cer**, Glass	Brick, Metal	-	-	Bone, Brick, Glass, Metal	-	Glass	-
10-20	Cer, FCR, Glass	-	-	-	Cer, Metal	Glass	-	-
20-30	Cer, Char, Glass, Metal	Brick, Char, Glass, Metal	Glass	-	-	-	-	-
30-40	-	Bone, Brick, Glass, Metal	-	-	FCR	-	-	-
40-50	-	Brick, Glass, Metal	-	-	-	-	-	-
50-60	-	-	-	Deb	-	-	-	-

*Not in site (see text for details).
**Cer=ceramic; Char=charcoal; Deb=debitage; FCR=fire-cracked rock

Redacted Image

Figure 7-19. Aerial map of site 41BX2149 displaying surface artifacts recorded.

Table 7-8. Cultural Material Recovered and Documented from the Surface of 41BX2149

Surface Find	Material	Count	Description
59	Ceramic	1	European earthenware (Ironstone), partial maker's mark
61	Glass	1	container, olive green (no intra-site location)
62	Glass	2	container, purpled (no intra-site location)
63	Glass	1	container, olive green (no intra-site location)
64	Glass	1	container (medicine), clear (no intra-site location)
65	Ceramic	1	undecorated European earthenware, partial maker's mark
66	Ceramic	1	European earthenware (Transferware)
67	Ceramic	1	European earthenware (Transferware)
68	Ceramic	1	European earthenware (Transferware)
70	Ceramic	1	European earthenware (Ironstone), partial maker's mark
71	Ceramic	1	European earthenware (flow blue)
73	Glass	1	container (base)
74	Ceramic	1	undecorated European earthenware, partial maker's mark
75	Ceramic	1	Chinese porcelain (blue on white)
110	Glass	1	container, milk (no intra-site location)
111	Glass	1	other glass (insulator), aqua (no intra-site location)

Figure 7-20 shows the site 41BX2149 boundary plotted on the 1929-1930 Stoner aerial map. Of the current structures, only the barn (B in Figure 7-20), which is currently collapsing, exists. In addition, there are buildings present on the photo that are no longer extant, including a large building to the southeast. An examination of a section of the 1953 USGS Southton map (Figure 7-21) shows all four of the currently identified structures are present by this time. The primary residential structure (A on Figure 7-18) was constructed sometime between 1930 and 1953. Several additional structures are present, including two structures that roughly correspond with the location of 41BX2144 (Padilla et al. 2017). By 1953, the large building to the southeast visible on the 1929-1930 aerial had been demolished.

Two structures (A and B on Figure 7-18) currently on the site likely date prior to 1950. However, both are badly deteriorating. Neither appears to be eligible for listing on the NRHP, due to their collapsed and deteriorating condition. The site likely contains some material that dates as early as the late 1800s, though nothing of this age was uncovered on the current survey. There is the possibility, based on the recovery of a single flake in Level 6 of a ST 89, that prehistoric material may be encountered at depth. CAR recommends any future subsurface work in this area be monitored.

41BX2190

Site 41BX2190 was discovered and recorded in the summer of 2017 during site revisits. The site was encountered in a dirt road along the eastern edge of the Survey Area. It consists of a prehistoric lithic scatter of unknown age. CAR archaeologists observed four chert flakes and several spalls of burned rock on the surface. The site is roughly 12 m east-west, which is essentially the width of the dirt road, and about 40 m north-south (Figure 7-22). It covers an area of roughly 530 m^2. Site 41BX2190 is located in soil mapped as Branyon Clay. As shown in Figure 7-23, 41BX2190 is adjacent to a field planted in sorghum. No shovel tests were excavated at the site, and no collections were made. It is likely that the site extends both east and west into the plowed field and into a mesquite dominated tree line that separates this field from an adjacent field to the east outside the Survey Area.

While shovel testing will be required for a complete assessment, the low artifact density, lack of features, lack of diagnostic artifacts, and recovery context suggest that the site is unlikely to contain significant deposits. Nevertheless, subsurface impacts should be avoided on the site and in the immediate vicinity, as there is a possibility that subsurface deposits are present. If avoidance is not possible, CAR recommends that shovel testing to determine the subsurface nature of the deposits.

41BX2191

Site 41BX2191 was discovered in the summer of 2017 during reconnaissance a revisit to site 41BX2148. The small site consists of a prehistoric lithic scatter of unknown age. It is in an eroding area that is created by the confluence of two small drainages. CAR observed two cores, five flakes,

Redacted Image

Figure 7-20. Site 41BX2149 boundary plotted on the ca. 1929-1930 Stoner aerial photo. Note that only the barn (B in Figure 7-18) exists at that date. There are additional buildings present on the photo that are no longer extant.

Redacted Image

Figure 7-21. Section of 1953 USGS Southton 7-5-minute quadrangle map with 41BX2149 boundary (black outline) and current four structures (red circle) identified.

Figure 7-22. Approximate boundary of site 41BX2190.

Figure 7-23. Site 41BX2190, looking south from northern boundary of site.

and several pieces of burned rock. Artifacts were primarily present in the drainages. They are probably being exposed rather than transported as the drainages are local and would carry a small volume of water. There were also several flakes on the surface sloping down into the drainage. The site boundary was defined as roughly 12 m north-south and 6 m east-west, although the primary cluster of burned rock and flakes were within a much smaller area at the confluence (Figure 7-24). The site is mapped as being in the Heiden-Ferris soil complex and classified as severely eroded. Gravels and nodules are present in the area. No shovel tests were excavated. No collections were made. No features were defined, though burned rock is present. Vegetation on the site itself is primarily grass, with mesquite, juniper, and other trees surrounding the area (Figure 7-25).

It is likely that the site extends in all directions and is simply being exposed by the drainages. Shovel testing will be required for a complete assessment of 41BX2191. The site has a moderate density of artifacts and burned rock, though no features were defined. No diagnostic artifacts were uncovered. Subsurface impacts should be avoided on the site and in the immediate vicinity, as there is a moderate probability that subsurface deposits are present. If avoidance is not possible, CAR recommends that shovel testing to determine the subsurface nature of the deposits.

41BX2200

The final site defined on the project is site 41BX2200. The feature that formed the basis for the site was originally observed during the August 2016 reconnaissance of the San Antonio River (see Appendix D) as a stain exposed in the west bank. In March of 2017, CAR archaeologists Kemp and Mauldin returned to the Project Area and relocated and sampled the feature. That feature, designated as a portion of 41BX2200, consisted of a small charcoal stain, roughly 12 cm in cross section and 5 cm in thickness, that was exposed about 90 and 100 cm below the floodplain in a roughly 4.5-m high section of the west bank of the river (Figures 7-26 and 7-27). The feature appears to be eroded, with only a small portion of the stain remaining at the time of sampling. A chert core and several pieces of FCR that are likely associated with the deposit were observed below the feature along the lower bank.

Radiocarbon data was obtained on charcoal extracted from the feature. As presented in Appendix E, charcoal from the stain returned an AMS date of 3516 +/-34 RCYBP, which calibrates in OxCal (version 4.3) to a date range of 3884 to 3696 cal BP (1935-1747 cal BC) at 95.4 percent probability (Bronk Ramsey 2009). The date places the feature in the early portion of the Late Archaic. The feature appears to be associated with the Qh3 alluvium, one of four Holocene-

Figure 7-24. Boundary of 41BX2191.

Figure 7-25. Site 41BX2191. Looking north. Recorder (Kemp) stands at the confluence of the two drainages that exposed the cultural material.

Redacted Image

Figure 7-26. Location of site 41BX2200, a buried feature and associated artifacts along the San Antonio River.

Figure 7-27. Small charcoal stain exposed roughly 100 cm below the surface in the west bank of the San Antonio River. The stain appears to be a small section of a hearth that has been eroded into the river, as evidenced by FCR found below the exposure on the bank. Charcoal removed from the stain produced a Late Archaic date.

age deposition sequences defined by Frederick et al. (2018) working along the river to the south of the REDUS property. Depositions defined as Qh3 appear to have started around 3,900 years ago and continued until around 1,000 years ago (Frederick et al. 2018).

The presence of the Late Archaic date at a depth of 100 cm, along with artifacts resting below the feature, suggests that there is likely to be additional material in this area. The site is outside of the formal REDUS Survey Area but within the Project Area. While no shovel tests were excavated to define the potential distribution, the depths of these deposits are such that shovel tests are unlikely to provide a reliable indicator. Given that both additional features and artifacts are likely to be present, and that the site has produced a Late Archaic date, CAR recommends that if future work is planned in this area backhoe trenches and test units be used to explore the area prior to any ground disturbance to identify potentially significant deposits.

41BX269 and 41BX1796

During the current survey, CAR encountered segments of two previously recorded sites. These are the southern branch of the Espada *Acequia* (41BX269), and site 41BX1796, a more recent drainage. CAR archaeologists inspected sections of both of these sites and reviewed the 1953 USGS Southton topographic map, the 1929-1930 Stoner aerial photo, the 1874 Giraud map of the 1824 lot apportionments around Mission Espada (see Chapter 4), and available Google Map aerial photos for the area dating back to 1995. Figure 7-28 depicts various irrigation and water management elements, as well as principal drainages, in the Project Area based on the review of these maps.

As noted in previous chapters, the Espada *Acequia* (41BX269) delineates a portion of the eastern boundary of the project and cuts through the Survey Area above Minita Creek (Figure 7-29). While the original Espada *Acequia* system, including

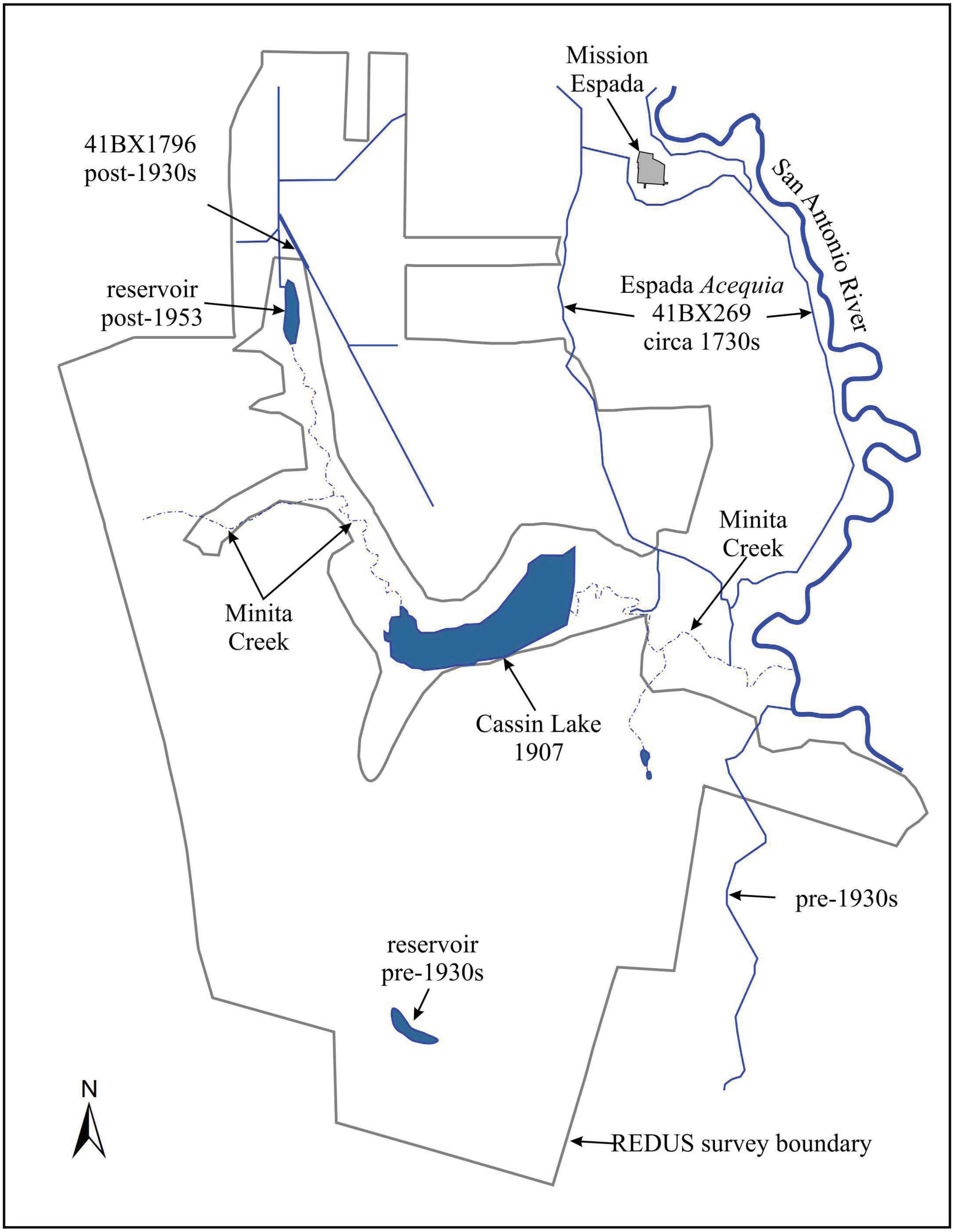

Figure 7-28. Reservoirs, acequias, creeks, and rivers recorded within the REDUS Survey Area. The dates are derived from the several sources, including the 1953 USGS 7.5-minute topographic map, the 1929-1930 Stoner aerial photo, and the Giraud (1874) map.

Figure 7-29. A section of site 41BX269, the Espada Acequia*, with standing water. View is to the northeast.*

the upper dam and ditches, the stone aqueduct, and the lower canals in the Project Area, was constructed during the Spanish Colonial period sometime before 1740, the exact date of construction is not known. The system has, however, been expanded and altered, as it still functions to deliver irrigation water to the surrounding lands for agricultural purposes (see Baker et al. 1974; Cox 2005; Hutson 1895; Porter 2011). Site 41BX 269 meets the NRHP requirements under multiple criterion listed in 36 CFR 60.4, including association with events that made a significant contribution to history (criteria A) and the likelihood that the site has yielded, and is likely to yield, information important in history (criteria D). In addition, as part of the San Antonio Mission system, the site is included in the World Heritage Designation for that system (see NPS 2016; UNESCO 2017). As such, any potential impacts to the Espada *Acequia* should be avoided.

As shown on Figure 7-30, a second previously documented irrigation feature, designated site 41BX1796 (THC 2017), was encountered during the current REDUS project. The extent of the feature was documented and site forms updated. The feature consists of an irrigation ditch (Figure 7-28) that appears on the 1953 USGS topographic map. However, the feature could not be located on the 1929-1930 aerial photo of the region, indicating that the feature post-dates 1930. In addition, other features, including Cassin Lake and several smaller reservoirs, are identified on Figure 7-28 with information on their construction period.

Summary and Recommendations

Between January of 2016 and October of 2017, CAR conducted a variety of activities in the REDUS Project Area. These included an intensive reconnaissance, a survey with shovel testing, site recording, revisits of areas with high densities of isolates and areas that were of geomorphic interest, and observations along the portion of the San Antonio River that bordered the Project Area. Fifty-four isolates and eight new sites were recorded in the course of excavating 214 shovel tests and surveying 1,445 acres. Four (41BX2145, 41BX2146, 41BX2147, and 41BX2149) of the new sites are historic, and four (41BX2148, 41BX2190, 41BX2191, and 41BX2200) are prehistoric.

With the exception of site 41BX2149, the historic sites reflect shallow, low-density scatters dominated by container glass, European ceramics, and small amounts of metal. These seem to date no earlier than the late 1800s or early 1900s. No features or structures were present on these sites. No clearly defined subsurface deposits were uncovered. No clearly defined temporal range is present. While the nature of potential impacts to these areas remains unknown, it is unlikely that these locations contain significant information that will prove to be important in history.

Site 41BX2149 is more complicated. It is associated with the Cassin family, who settled in the area around 1885. William Cassin was active in the Espada Ditch Company and

Figure 7-30. Site 41BX1796, a post-1930s ditch, in the northwestern section of the Survey Area. View is to the northwest.

constructed Cassin Lake by damming Minita Creek in 1907 (Padilla et al. 2017). Padilla et al. (2017) suggest that the dam and spillway, located to the south of site 41BX2149, are significant features. Site 41BX2149 has subsurface deposits, associated surface structures, and corrals, and the site likely has material that dates to the late 1880s. However, CAR's research suggests that only two of the extant structures date to before 1953, and both of these are badly deteriorated. Neither appears to be eligible for listing on the NRHP, due to their collapsed condition and modifications. Nevertheless, there is a possibility that additional historic and prehistoric material may be encountered, especially at depths below 60 cm. Should subsurface work occur in this area, CAR recommends that the work be monitored for any buried features or subsurface artifact concentrations.

Site 41BX2148 consists of a low-density scatter of prehistoric material, including two tools, debitage, and scattered FCR. No temporal designation was possible, and no features were defined. Shovel testing suggests the site is a surface scatter. As recently as 2004, aerial photographs show that the area was severely impacted by truck traffic, and the integrity of any deposits in the area is questionable. CAR suggests that it is unlikely that this site contains significant data and does not recommend any additional work at 41BX2148.

Two other prehistoric sties, 41BX2190 and 41BX2191, have not been shovel tested as they were discovered during revisits to the region. Site 41BX2190 was exposed in a dirt road and is a low-density scatter of chipped stone of unknown age. No features are present. While shovel testing will be required for a complete assessment, the low artifact density, lack of features, lack of diagnostic artifacts, and recovery context suggest that the site is unlikely to contain significant deposits. Nevertheless, subsurface impacts on the site should be avoided until the potential for subsurface deposits is addressed.

Site 41BX2191 was exposed as a small site with material noted in a small drainage cut during revisits. Though no features or diagnostic artifacts were recorded, the site has a moderate density of prehistoric material, including FCR. Like 41BX2190, subsurface impacts should be avoided in this area until the potential for subsurface artifacts has been clarified.

Site 41BX2200 was recorded along the San Antonio River and defined primarily by a single feature buried approximately 90 to 100 cmbs. Charcoal from the feature was radiocarbon dated to the early portion of the Late Archaic, and burned rock and artifacts, which likely eroded out from the feature level, were recorded along the riverbank. While the extent of the site remains unknown, additional features and artifacts are likely to be present at depths below 60 cm. CAR recommends that if future work is planned in this area backhoe trenches and test units be used to explore the area prior to any ground disturbing activities in order to document any potentially significant deposits.

Finally, CAR encountered and updated two previously recorded sites, the Espada *Acequia* (41BX269) and site 41BX1796. The acequia should be avoided, as it meets several NRHP requirements, and is a component of the World Heritage Designation for the San Antonio Missions (see NPS 2016; UNESCO 2017). Site 41BX1796 appears to represent a post-1930 addition to the Project Area.

Chapter 8: Summary and Discussion

Raymond Mauldin, Leonard Kemp, and Antonia L. Figueroa

This final chapter provides a short summary of the REDUS project findings and explores possible explanations for the low recovery rates on the project. The survey methodologies used on the project and the context of recovery for sites and artifacts are reviewed. CAR suggests that there is a high likelihood that artifacts and features are present at depths below 60 cm, at least in some locations on the project. This, in turn, has implications for any future ground disturbing activities in the Project Area.

Project Summary

In 2016 and 2017, CAR conducted an intensive reconnaissance survey (518 acres; 2.1 km^2) and a pedestrian survey with shovel testing (927 acres; 3.75 km^2) in southern Bexar County. The work was done under contract with REDUS Texas Land, LLC. Within this roughly 1,445 acres (5.84 km^2), field crews excavated 214 shovel tests to a maximum depth of 60 cmbs; however, only 18 of these tests were positive. CAR defined four new historic sites (41BX2145, 41BX2146, 41BX2147, and 41BX2149) and three new prehistoric sites (41BX2148, 41BX2190, and 41BX2191) within the Survey Area and made observations on the Espada *Acequia* (41BX269) and a previously recorded ditch (41BX1796). All sites found on survey were initially recorded as surface sites. A fourth prehistoric site, 41BX2200, was recorded along the San Antonio River bank outside of the Survey Area but within the Project Area. It is represented by a Late Archaic age feature and scattered material likely associated with that feature. CAR archaeologists also recorded 54 isolated finds that were not related to any site, including an Early Archaic Guadalupe biface, two Late Archaic dart points, and a variety of other prehistoric and historic artifacts.

As summarized in the previous chapter, with the exception of sites 41BX269 (Espada *Acequia*) and the Late Archaic deposits on 41BX2200, none of the sites appear likely to contain significant data. However, two of the sites (41BX2190 and 41BX2191) have not been shovel tested, as they were discovered during site revisits. Until shovel testing is conducted, subsurface impacts in these two areas should be avoided. In addition, the area around 41BX2200 has not been explored. While this site is outside of the Survey Area, it is within the Project Area, and subsurface impacts should be avoided until the site is better defined.

Methodological Considerations

The low density of archaeological material on the surface and in shovel testing in the Survey Area was unexpected. The area has documented historic use, as outlined in Chapters 3 and 4, and as the project is located adjacent to the San Antonio River, it had been expected that prehistoric occupations would be common, but this was not the case. Therefore, after the completion of the fieldwork, CAR staff reconsidered the survey methodology. Is the pattern of low density a result of inadequate methodology?

As discussed in Chapter 6, the CAR survey employed two different survey methods based primarily on recent land-use practices. In plowed fields, CAR archaeologists used transects spaced at 15 m with shovel testing done primarily in areas that had suggestions of archaeological sites based on surface artifact recovery. In fallow areas, CAR used a more traditional survey method, with 30-m transects and shovel testing conducted, in part, at the discretion of the Project Archaeologist. These two methods were designed following CAR's initial visits to the area and took into account the probability that recent plowing would potentially transport previously buried items to the surface and provide excellent surface visibility. Conversely, areas not actively planted were dominated by secondary growth and ground cover that obscured surface visibility. Shovel tests were concentrated in these areas with low surface visibility.

Closer transects, plowing, and higher surface visibility did produce higher surface densities. Forty-eight isolates were recorded in the 518 plowed acres (2.096 km^2), a density of only 0.083 isolated artifacts per surveyed acre. In the unplowed or fallow areas, CAR recorded only 11 isolated artifacts for a density of just under 0.0118 artifacts per acre. This pattern of higher surface density in the plowed areas relative to the fallow areas is consistent with impacts of plowing, as well as differential surface visibility and observations related to transect spacing (15 m versus 30 m). Surface artifact density is roughly seven times greater in the plowed areas when compared to the fallow areas. Note, however, that even in the plowed areas, the density of 0.083 surface artifacts per acre in non-site settings is surprisingly low. While this density is reduced by ignoring the slightly higher surface densities of the three sites in the plowed fields, the 0.083 density translates into one artifact for every 12 acres (0.0486 km^2) of survey.

In the unplowed areas, ground visibility below 10 percent was common. Consequently, CAR excavated 177 shovel tests in these areas, a shovel test rate of one shovel test for every 5.24 acres (0.0212 km^2). Of the 177 tests, 165 were not associated with the new sites discovered in this area. Only two of the

165 non-site shovel tests were positive, with recovery of a single flake in Level 1 in ST 106 and a piece of wire in Level 2 of ST 180. The remaining positive tests were all on the two sites (41BX2148 and 41BX2149) recorded during the 30-m transect survey, and both of these were initially defined by surface material, with 41BX2149 (Cassin Ranch) containing above ground structures and 41BX2148 being located in an eroded area with good visibility. The results suggest that subsurface artifact densities, as revealed by shovel testing, are extremely low in the unplowed areas. Assuming that shovel tests are 30 cm in diameter and using the recorded depths, the 165 non-site shovel tests removed and screened roughly 6.87 m^3 of sediment and produced two artifacts. The rate of testing, with one shovel test every 5.24 acres, and the observation that shovel tests were, with only a few exceptions, dug to 60 cm suggests adequate coverage rates. SWCA (Padilla et al. 2017) had similar results in the area during its recent Espada Hike and Bike Trail Survey. Padilla et al. 2017 excavated 69 shovel tests, with only a single positive recovery in the upper 25 cm on what was designated as site 41BX2144. Using either the surface density in the plowed fields, the subsurface density in the CAR shovel tests in the fallow areas, or the SWCA shovel test results, it is apparent that cultural material in the REDUS Project Area is not common.

Depositional and Erosional Patterns

Shovel testing on this project was limited to the upper 60 cm of deposits, and the SWCA tests were often terminated above 40 cm. Depending on patterns of deposition, archaeological material can be buried well below these depths. As noted in previous chapters, there are indicators that archaeological materials in the Project Area are present below 60 cm. These include the observation of prehistoric material on some sites in shovel tests at 50-60 cmbs (see Tables 7-1 and 7-7), the deposition of 55-60 cm of sediment in at least one area within the last 28 years (see Figure 2-13 and Appendix E, Figure E-1), and the 90-100 cm depth of the Late Archaic feature at 41BX2200. The previous chapter has detailed that most of the sites recorded on the project were in eroded areas or exposed in roads. Clearly, these observations suggest that there has been significant deposition in some settings within the Project Area, as well as areas that have been eroded. These processes obviously have implications for observing archaeological material.

Figure 8-1 presents a 2,900-m cross section of the Project Area, with an exaggerated vertical axis. As shown on the accompanying map, the cross section represented is just to the north of Cassin Lake, and the eastern end of the cross section terminates at the San Antonio River, near the location of site 41BX2200. The elevation data on the figure is an approximation derived from a Google Earth aerial photo, with soil overlays, hydrological features, and project and survey boundaries identified. Overall, Figure 8-1 shows a decline in elevation over the length of the cross section from roughly 178 m on the western edge of the project to roughly 156 m at the San Antonio River bank on the eastern project edge. There are several soils represented along the cross section (see Chapter 2 and Figure 2-10). Clay soils dominate, with Lewisville silty clay (LvB), Houston black clay (HsA), and Heiden clay (HnB, HnC2) accounting for most of the soils that the cross section cuts across. A variety of soils are noted around the Minita Creek drainage. Atco loam (KaC) and Tinn and Frio soils (Tf), which are frequently flooded, and Loire clay loam (Fr), which is occasionally flooded, dominates most of the soils as the cross section approaches the San Antonio River (NRCS 2017). Flooding, whether frequent or occasional, has the potential to cover, and likely preserve, archaeological deposits. While the specific depositional context of 41BX2200 needs to be investigated, the Late Archaic feature in the exposed riverbank could represent overbank flooding.

As briefly discussed in Chapter 5, Frederick et al. (2018) recorded a number of features in similar settings below the REDUS boundary. They observed multiple features in the San Antonio River bank that were between 1.5 and 8.9 m below the current ground surface (see Frederick et al. 2018). Radiocarbon dated to as early as 10,000 cal BP (Frederick et al. 2018), deposits at these depths are clearly not accessible by shovel testing. Backhoe trenching is the only viable alternative to begin to assess the potential for buried deposits this deep. As part of their recent investigations, SWCA (Padilla et al. 2017) excavated eight short trenches in the Project Area, with depths to below 1.5 m in all eight cases. No cultural material was recovered in any of these trenches (Padilla et al. 2017:35-42), bolstering the case for low levels of use.

Nevertheless, SWCA (Padilla et al. 2017) did record site 41BX2143, a prehistoric lithic scatter near Minita Creek. The site consisted of “an estimated 50 primary flakes, 50-75 secondary flakes, 50 tertiary flakes, 40–50 modified flakes, 20-30 fragments of cultural shatter, one distal biface fragment… and one medial and distal projectile point fragment” (Padilla et al. 2017:24). Five shovel tests produced no subsurface recovery in a location where there were close to 200 items on the surface. Interestingly, photographs show a high density of what appear to be lag gravels on the site (Padilla et al. 2017:26). These patterns are consistent with high levels of erosion. As Figure 8-2 shows, site 41BX2143 is located in the Heiden-Ferris Complex (HoD3), described as having 5-10 percent slopes and characterized as severely eroded (NRCS 2017). Also shown in Figure 8-2 are the locations of four additional sites within this same soil, including three

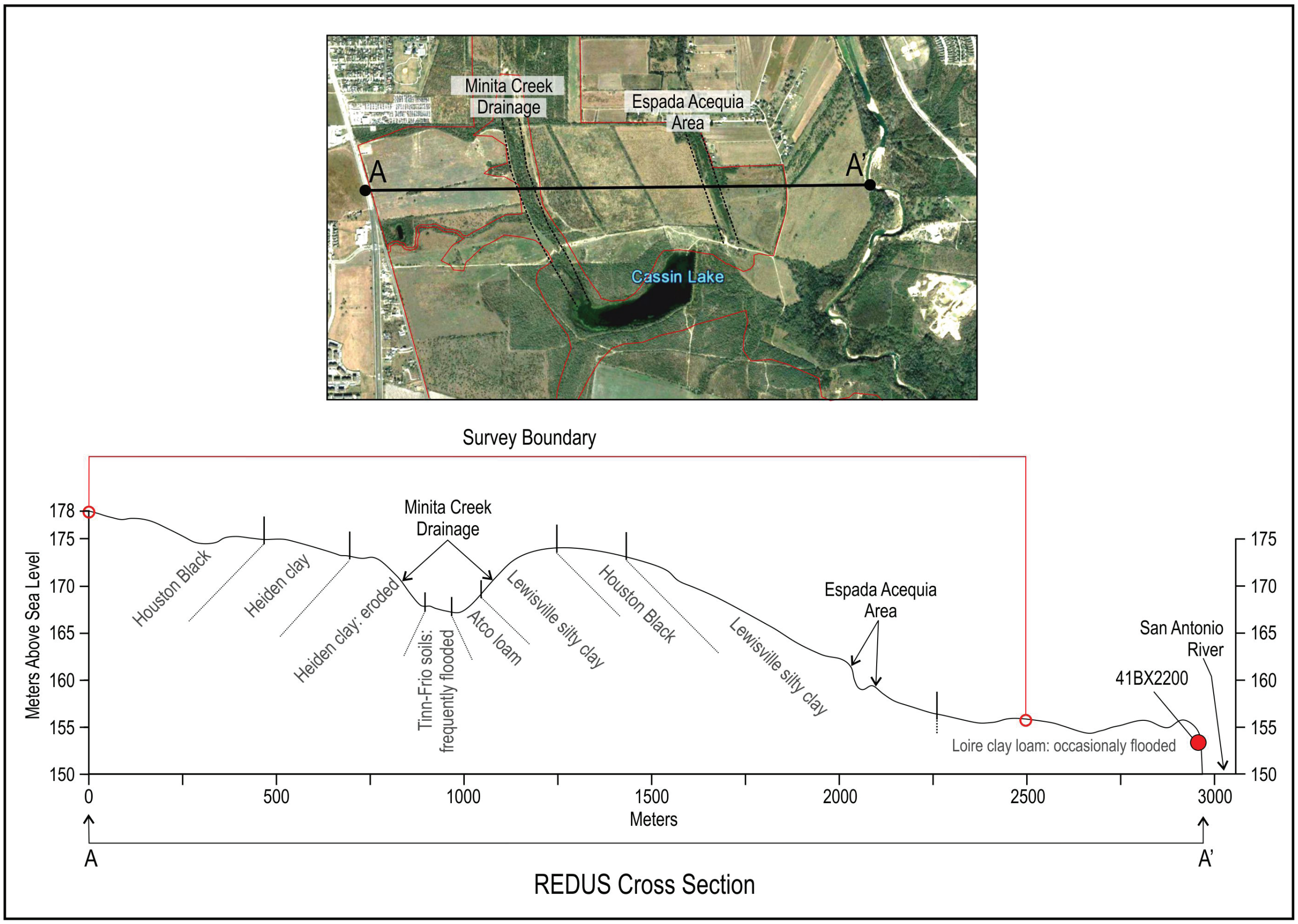

Figure 8-1. Cross section of REDUS Project Area, above Cassin Lake. Data are from Google Earth and are approximate. Vertical elevations exaggerated. Soil data from NRCS (2017).

Redacted Image

Figure 8-2. Distribution of the Heiden-Ferris Complex (HoD3, described as having 5-10 percent slopes and being severely eroded (NRCS 2017) within a portion of the Project Area and sites identified within this soil. Base image is from Google Earth.

identified during the current survey. This soil complex, which made up 13.6 percent of the 1,445 acres, accounted for roughly 43 percent of the survey sites. It is not surprising that this erosional setting would have an increased frequency of archaeological material or that the archaeological material recovered would likely not be intact.

Finding intact deposits is unlikely in the HoD3 settings, but the fact that archaeological material is exposed by severe erosion in these settings is consistent with the observation that material is likely buried, and possibly intact, in other parts of the REDUS Project Area. This would especially be the case in depositional areas, such as areas adjacent to the San Antonio River in the Lorie Clay loam (Fr) soils and possibly along upper sections of Minita Creek. CAR suggests that backhoe trenching is the method most likely to reveal the presence or absence of archaeological deposits in any future investigations. If future impacts are planned that would exceed 60 cm in depth, CAR recommends additional testing using backhoe trenches to look for archaeological material in all areas outside of the HoD3 settings.

Finally, the Espada *Acequia* (41BX269) meets several NRHP requirements and is eligible for listing. In addition, it is a component of the World Heritage Designation for the San Antonio Missions (see NPS UNESCO 2017). Therefore, any future work in the REDUS Project Area should avoid this feature.

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Appendix A:
Isolated Surface (Non-site) Finds

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Table A-1. Isolated Surface Finds (Non-site)

Surface Find	Type	Description	Period	Easting	Northing	Survey Type
1	Glass	Aqua	Historic	551888	3240814	Intensive
2	Lithic	Stone Tool - Core	Prehistoric	551860	3240747	Intensive
3	Glass	Olive	Historic	552052	3240859	Shovel Test
4	Ceramic	no data	Historic	552173	3240495	Intensive
5	Lithic	Core	Prehistoric	552524	3240764	Intensive
6	Lithic	Other Prehistoric	Prehistoric	553457	3240401	Intensive
7	Lithic	Stone Tool - Core	Prehistoric	553298	3240738	Intensive
8	Lithic	Stone Tool - Core	Prehistoric	551622	3240437	Intensive
9	Ceramic	White earthenware	Historic	552522	3240182	Intensive
10	Glass	no data	Historic	552880	3240123	Intensive
11	Lithic	Projectile Point	Prehistoric	553087	3239890	Intensive
12	Lithic	Biface	Prehistoric	553096	3239889	Intensive
13	Lithic	Debitage	Prehistoric	553096	3239893	Intensive
14	Lithic	Debitage	Prehistoric	553096	3239888	Intensive
17	Lithic	Stone Tool - Core	Prehistoric	551727	3240060	Intensive
18	Ceramic	Transferware	Historic	552219	3240089	Intensive
19	Ceramic	White earthenware	Historic	552219	3239856	Intensive
20	Glass	Aqua	Historic	552267	3239591	Intensive
33	Glass	Purple	Historic	552242	3239577	Intensive
34	Glass	Aqua	Historic	552242	3239580	Intensive
35	Glass	Purple	Historic	551697	3240067	Intensive
36	Glass	Aqua	Historic	551697	3240067	Intensive
37	Glass	Aqua	Historic	551695	3240067	Intensive
38	Glass	Aqua	Historic	551697	3240081	Intensive
39	Lithic	Biface	Prehistoric	552454	3239676	Intensive
40	Ceramic	White earthenware	Historic	552373	3239535	Intensive
41	Ceramic	White earthenware	Historic	552371	3239537	Intensive
42	Ceramic	White earthenware	Historic	552380	3239536	Intensive
43	Glass	Marble	Historic	552382	3239539	Intensive
44	Lithic	Biface	Prehistoric	552522	3239489	Intensive
45	Lithic	Tested cobble	Prehistoric	552636	3239660	Intensive
46	Lithic	Core	Prehistoric	552578	3239935	Intensive
47	Lithic	Debitage	Prehistoric	552753	3239684	Intensive
48	Lithic	Guadalupe Tool	Prehistoric	552820	3239862	Intensive
49	Ceramic	Stoneware	Historic	552827	3239928	Intensive
50	Lithic	Stone Tool - Core	Prehistoric	552827	3239931	Intensive
51	Glass	Aqua	Historic	552825	3239685	Intensive
52	Glass	Purple	Historic	553048	3239800	Intensive
53	Glass	Aqua	Historic	551612	3240474	Intensive
54	Glass	Aqua	Historic	551614	3240466	Intensive
55	Glass	Amber	Historic	551615	3240473	Intensive
56	Glass	Aqua	Historic	551622	3240420	Intensive
57	Glass	Aqua (3 pieces)	Historic	551618	3240399	Intensive

Table A-1. Isolated Surface Finds (Non-site), continued....

Surface Find	Type	Description	Period	Easting	Northing	Survey Type
58	Lithic	Projectile Point	Prehistoric	552923	3241253	Shovel Test
60	Lithic	Debitage	Prehistoric	552921	3241255	Shovel Test
76	Ceramic	White earthenware	Historic	551251	3242192	Shovel Test
77	Ceramic	no data	Historic	551250	3242192	Shovel Test
78	Ceramic	White earthenware	Historic	551756	3243070	Shovel Test
79	Lithic	Debitage	Prehistoric	552150	3241133	Shovel Test
80	Lithic	Debitage	Prehistoric	552185	3241104	Shovel Test
81	Lithic	Fire Cracked Rock	Prehistoric	552489	3241765	Shovel Test
82	Glass	Embossed milk glass	Historic	551757	3243042	Shovel Test
83	Ceramic	no data	Historic	551968	3239986	Intensive
109	Lithic	Debitage	Prehistoric	553791	3240840	Shovel Test

Appendix B: Shovel Testing Data

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Table B-1. Shovel Test Data, Including Terminal Depth and Recovery

Shovel Test	Terminal Depth (cmbs)	Recovery (1=yes; 0=no)	Survey Type	Soil Type (see Figure 2-10)	UTM Easting	UTM Northing	Survey Area (see Figure 6-1)
1	60	0	Shovel Testing	HnC2	551436	3241902	6
2	60	0	Shovel Testing	HnC2	551421	3241824	6
3	60	0	Shovel Testing	HnC2	551532	3241912	6
4	60	0	Shovel Testing	HnC2	551587	3241863	6
5	60	0	Shovel Testing	HnC2	551534	3241828	6
6	60	0	Shovel Testing	HnC2	551343	3241824	6
7	60	0	Shovel Testing	HtA	551353	3241733	6
8	60	0	Shovel Testing	HtA	551431	3241728	6
9	60	0	Shovel Testing	HnC2	551531	3241745	6
10	40	0	Shovel Testing	HnC2	551588	3241731	6
11	60	0	Shovel Testing	HoD3	551893	3241911	6
12	60	0	Shovel Testing	HoD3	551978	3241925	6
13	60	0	Shovel Testing	HoD3	552071	3241919	6
14	60	0	Shovel Testing	HoD3	552174	3241802	6
15	60	0	Shovel Testing	HtA	551894	3241825	6
16	60	0	Shovel Testing	HoD3	552071	3241830	6
17	45	0	Shovel Testing	HtA	551976	3241811	6
18	60	0	Shovel Testing	HtA	551355	3241648	6
19	60	0	Shovel Testing	HsB	551356	3241552	6
20	50	0	Shovel Testing	HsB	551430	3241465	6
21	60	0	Shovel Testing	HtA	551427	3241373	6
22	60	0	Shovel Testing	HtA	551443	3241280	6
23	60	0	Shovel Testing	HtA	551511	3241181	6
24	60	0	Shovel Testing	HtA	551526	3241100	6
25	60	0	Shovel Testing	HtA	551596	3241023	6
26	60	0	Shovel Testing	HtA	551534	3241277	6
27	60	0	Shovel Testing	HtA	551523	3241369	6
28	60	0	Shovel Testing	HtA	551550	3241450	6
29	60	0	Shovel Testing	HtA	551540	3241553	6
30	60	0	Shovel Testing	HnC2	551530	3241640	6
31	60	0	Shovel Testing	HnC2	551618	3241640	6
32	60	0	Shovel Testing	HtA	551630	3241564	6
33	60	0	Shovel Testing	HtB	551642	3241473	6
34	60	0	Shovel Testing	HtA	551712	3241643	6
35	60	0	Shovel Testing	HnC2	551715	3241718	6
36	48	1	Intensive Recon	HtA	551599	3240670	3
37	60	1	Intensive Recon	HtA	551613	3240697	3
38	60	0	Intensive Recon	HtA	551632	3240672	3
39	60	0	Intensive Recon	HtA	551638	3240627	2
40	50	0	Intensive Recon	HtA	551661	3240635	3
41	60	0	Intensive Recon	HtA	551663	3240626	3
42	60	1	Intensive Recon	HtA	551608	3240705	3
43	60	1	Intensive Recon	HtA	551953	3239991	1

Table B-1. Shovel Test Data, Including Terminal Depth and Recovery, continued...

Shovel Test	Terminal Depth (cmbs)	Recovery (1=yes; 0=no)	Survey Type	Soil Type (see Figure 2-10)	UTM Easting	UTM Northing	Survey Area (see Figure 6-1)
44	60	0	Intensive Recon	HtA	551966	3239992	1
45	60	0	Intensive Recon	HtA	551974	3239986	1
46	60	0	Intensive Recon	HtA	551954	3239995	1
47	60	1	Intensive Recon	HtA	551946	3239998	1
48	60	0	Intensive Recon	HtA	551962	3239991	1
49	60	0	Intensive Recon	HtB	552300	3239559	1
50	60	1	Intensive Recon	HtB	552310	3239575	1
51	60	0	Intensive Recon	HtB	552289	3239572	1
52	60	0	Intensive Recon	HtB	552289	3239566	1
53	60	0	Intensive Recon	HtB	552289	3239560	1
54	60	0	Intensive Recon	HtB	552299	3239569	1
55	60	0	Intensive Recon	SaB	553100	3239898	2
56	50	0	Intensive Recon	SaB	553097	3239892	2
57	50	0	Intensive Recon	SaB	553105	3239892	2
58	60	0	Shovel Testing	Fr	553475	3241843	9
59	60	0	Shovel Testing	Fr	553514	3242004	9
60	60	0	Shovel Testing	Fr	553536	3242064	9
61	60	0	Shovel Testing	Fr	553507	3242107	9
62	60	0	Shovel Testing	Fr	553420	3242001	9
63	60	1	Intensive Recon	HtB	552961	3239823	1
64	60	0	Intensive Recon	HtB	552966	3239819	1
65	60	0	Intensive Recon	HtB	552961	3239815	1
66	60	0	Intensive Recon	HtB	552957	3239819	1
67	60	0	Shovel Testing	HoD3	552009	3241723	6
68	60	0	Shovel Testing	HnB	552187	3241513	6
69	60	0	Shovel Testing	HnB	552277	3241399	6
70	60	0	Shovel Testing	HtA	552834	3241177	5
71	60	0	Shovel Testing	HtA	552524	3241183	5
72	34	0	Shovel Testing	HoD3	552625	3241318	5
73	60	0	Shovel Testing	HtA	552706	3241144	5
74	60	0	Shovel Testing	HtA	552882	3241083	5
80	60	0	Shovel Testing	HtA	552926	3241241	5
81	60	0	Shovel Testing	HtA	552928	3241260	5
82	60	0	Shovel Testing	HtA	552891	3241273	5
83	60	0	Shovel Testing	HtA	552986	3241194	5
84	60	0	Shovel Testing	HoD3	553080	3241277	5
85	40	0	Shovel Testing	HoD3	553315	3241433	5
86	60	1	Shovel Testing	HoD3	553308	3241834	9
87	60	1	Shovel Testing	HoD3	553292	3241810	9
88	60	1	Shovel Testing	Fr	553318	3241788	9
89	60	1	Shovel Testing	Fr	553335	3241800	9
90	60	1	Shovel Testing	HoD3	553272	3241816	9
91	60	1	Shovel Testing	HoD3	553320	3241831	9

Table B-1. Shovel Test Data, Including Terminal Depth and Recovery, continued...

Shovel Test	Terminal Depth (cmbs)	Recovery (1=yes; 0=no)	Survey Type	Soil Type (see Figure 2-10)	UTM Easting	UTM Northing	Survey Area (see Figure 6-1)
92	60	1	Shovel Testing	HoD3	553067	3241919	9
93	60	0	Shovel Testing	HoD3	553047	3241893	9
94	60	0	Shovel Testing	HoD3	552912	3241970	9
95	60	0	Shovel Testing	HoD3	552916	3241912	9
96	60	0	Shovel Testing	HoD3	552806	3241901	9
97	60	0	Shovel Testing	HoD3	552781	3241840	9
98	60	0	Shovel Testing	LvB	552626	3241911	9
99	60	0	Shovel Testing	HoD3	552550	3241792	9
100	60	0	Shovel Testing	HtA	553053	3241035	5
101	60	0	Shovel Testing	HoD3	553228	3240979	5
102	60	1	Shovel Testing	HoD3	553434	3240999	5
103	60	0	Shovel Testing	HoD3	553435	3241029	5
104	60	0	Shovel Testing	HoD3	553529	3241180	5
105	60	0	Shovel Testing	HoD3	553603	3241020	5
106	60	1	Shovel Testing	HoD3	553789	3240840	5
107	60	0	Shovel Testing	HoD3	553432	3240988	5
108	60	0	Shovel Testing	HoD3	553446	3240995	5
109	60	0	Shovel Testing	HoD3	553433	3241009	5
110	60	0	Shovel Testing	HoD3	553800	3240848	5
111	60	0	Shovel Testing	HoD3	553770	3240853	5
112	55	0	Shovel Testing	HoD3	553808	3240830	5
113	60	0	Shovel Testing	VcA	554073	3240740	5
114	60	0	Shovel Testing	VcA	554252	3240674	5
115	60	0	Shovel Testing	VcA	554324	3240789	5
116	60	0	Shovel Testing	HgD	554190	3240931	5
117	60	0	Shovel Testing	VcA	554237	3240945	5
118	60	0	Shovel Testing	HoD3	553973	3240958	5
119	60	0	Shovel Testing	HsB	551148	3242454	8
120	50	0	Shovel Testing	LvB	552470	3241937	9
121	60	0	Shovel Testing	HnB	551351	3242464	8
122	60	0	Shovel Testing	HnB	551444	3242523	8
123	60	0	Shovel Testing	HnB	551631	3242513	8
124	60	0	Shovel Testing	HnC2	551711	3242455	8
125	60	0	Shovel Testing	HnB	551527	3242454	8
126	60	0	Shovel Testing	HsB	551268	3242375	8
127	60	0	Shovel Testing	KaC	551870	3242454	8
128	60	0	Shovel Testing	HnC2	551623	3242366	8
129	60	0	Shovel Testing	HnC2	551447	3242374	8
130	60	0	Shovel Testing	HsB	551170	3242287	8
131	60	0	Shovel Testing	HnC2	551794	3242361	8
132	60	0	Shovel Testing	HnC2	551352	3242276	8
133	60	0	Shovel Testing	HsB	551534	3242262	8
134	60	0	Shovel Testing	HnC2	551708	3242271	8

Table B-1. Shovel Test Data, Including Terminal Depth and Recovery, continued...

Shovel Test	Terminal Depth (cmbs)	Recovery (1=yes; 0=no)	Survey Type	Soil Type (see Figure 2-10)	UTM Easting	UTM Northing	Survey Area (see Figure 6-1)
135	60	0	Shovel Testing	HsB	551253	3242192	8
136	60	0	Shovel Testing	HsB	551397	3242185	8
137	60	0	Shovel Testing	HsA	551806	3243352	10
138	60	0	Shovel Testing	HsA	551800	3243170	10
139	60	0	Shovel Testing	KaC	551773	3242971	10
140	60	0	Shovel Testing	LvB	551983	3242931	10
141	40	0	Shovel Testing	HsA	551960	3243187	10
142	60	0	Shovel Testing	HsA	552341	3242631	10
143	60	0	Shovel Testing	LvB	552367	3242807	10
144	60	0	Shovel Testing	HsA	552367	3243009	10
145	60	0	Shovel Testing	HsA	552381	3243188	10
146	60	0	Shovel Testing	HsA	552385	3243349	10
147	60	0	Shovel Testing	HsA	552349	3243632	10
148	60	0	Shovel Testing	KaC	552164	3242167	9
149	60	0	Shovel Testing	LvB	552171	3242369	9
150	60	0	Shovel Testing	LvB	552115	3242551	9
151	56	0	Shovel Testing	HsA	552324	3242456	9
152	60	0	Shovel Testing	HsA	552375	3242298	9
153	60	0	Shovel Testing	LvB	552382	3242061	9
154	60	0	Shovel Testing	LvB	552526	3242010	9
155	60	0	Shovel Testing	HsA	552493	3242208	9
156	60	0	Shovel Testing	HsA	552484	3242482	9
157	60	0	Shovel Testing	LvB	552712	3242098	9
158	60	0	Shovel Testing	LvB	552770	3242111	9
159	60	0	Shovel Testing	HsA	552618	3242477	9
160	60	0	Shovel Testing	HtB	551718	3241277	6
161	60	0	Shovel Testing	HtA	551705	3241106	6
162	60	0	Shovel Testing	HtB	551912	3241180	6
163	60	0	Shovel Testing	HtA	551917	3240941	6
164	60	0	Shovel Testing	HtB	551895	3241283	6
165	60	0	Shovel Testing	HoD3	551882	3241454	6
166	60	0	Shovel Testing	HtB	552094	3241124	6
167	60	0	Shovel Testing	HtB	552194	3240946	6
168	60	0	Shovel Testing	HoD3	551907	3241636	6
169	60	0	Shovel Testing	HoD3	553336	3241916	9
170	60	0	Shovel Testing	Fr	553373	3242089	9
171	42	0	Shovel Testing	LvB	553149	3242005	9
172	55	0	Shovel Testing	LvB	553159	3242123	9
173	60	0	Shovel Testing	HsA	552268	3243083	10
174	60	0	Shovel Testing	HsA	552239	3242820	10
175	60	0	Shovel Testing	HsA	552202	3242864	10
176	60	0	Shovel Testing	HsA	552232	3243003	10
177	60	0	Shovel Testing	HsA	552269	3243288	10

Table B-1. Shovel Test Data, Including Terminal Depth and Recovery, continued....

Shovel Test	Terminal Depth (cmbs)	Recovery (1=yes; 0=no)	Survey Type	Soil Type (see Figure 2-10)	UTM Easting	UTM Northing	Survey Area (see Figure 6-1)
178	60	0	Shovel Testing	LvB	552065	3242696	10
179	60	0	Shovel Testing	HnC2	551245	3241984	7
180	60	1	Shovel Testing	HnB	551234	3242030	7
181	60	0	Shovel Testing	HnC2	551352	3242034	7
182	60	0	Shovel Testing	HnC2	551503	3242048	7
183	60	0	Shovel Testing	HnC2	551624	3242060	7
184	60	0	Shovel Testing	HnC2	551729	3242071	7
185	60	0	Shovel Testing	HnC2	551797	3242083	7
186	60	0	Shovel Testing	HoD3	553413	3240910	4
187	60	0	Shovel Testing	HoD3	553367	3240922	4
188	60	0	Shovel Testing	HtA	552745	3241099	4
189	60	0	Shovel Testing	HtA	552476	3241181	4
190	60	0	Intensive Recon	HtB	553519	3240867	4
191	60	0	Intensive Recon	HtB	553307	3240850	4
192	60	0	Shovel Testing	HtA	552897	3240816	4
193	60	0	Shovel Testing	HtA	552674	3240785	4
194	60	0	Shovel Testing	HsA	551801	3243445	10
195	60	0	Shovel Testing	HsA	551897	3243432	10
196	60	0	Shovel Testing	HsA	551910	3243317	10
197	60	0	Shovel Testing	HsA	551801	3243462	10
198	60	0	Shovel Testing	LvB	551915	3242908	10
199	60	0	Shovel Testing	LvB	551936	3242875	10
203	60	0	Intensive Recon	HtA	551649	3240612	3
204	60	0	Intensive Recon	HtA	551647	3240655	3
205	60	0	Intensive Recon	HtA	551625	3240700	3
206	60	0	Intensive Recon	HtA	551989	3239985	1
207	60	0	Intensive Recon	HtA	551946	3240004	1
208	60	0	Intensive Recon	HtA	551934	3240000	1
209	60	1	Intensive Recon	HtB	552312	3239562	1
210	60	0	Intensive Recon	HtB	552314	3239580	1
211	30	0	Intensive Recon	HtB	552301	3239582	1
214	60	0	Shovel Testing	HsB	551252	3242088	7
215	40	0	Shovel Testing	LvB	552765	3242293	9
216	60	0	Shovel Testing	LvB	552948	3242483	9
217	60	0	Shovel Testing	LvB	553019	3242067	9
218	60	0	Shovel Testing	LvB	552974	3242294	9
219	60	0	Shovel Testing	LvB	552728	3242528	9
220	60	0	Shovel Testing	HsA	552160	3243213	10
221	60	0	Shovel Testing	HsA	552059	3243327	10
222	60	0	Shovel Testing	HsA	552078	3243543	10
223	60	0	Shovel Testing	HsA	552052	3243464	10
224	60	0	Shovel Testing	HsA	552072	3243070	10

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Appendix C:
John Richard Yturri Interview, May 23, 2016

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On May 23, 2016, CAR Project Archaeologist Antonia Figueroa conducted an oral history interview with Mr. John Richard Yturri. As stated in the Oral History guidelines set by Texas Historical Commission (THC 2004), oral histories are based on eyewitness accounts and memories of events and experiences. This oral history interview focused on the history of land use in and around the Project Area and changes that have occurred in the community. The interview was framed around a set of questions developed by CAR staff archaeologist José Zapata. The responses provided by Mr. Yturri have been paraphrased for the reader. The interview took place on the Yturri property in southern Bexar County, Texas. The audio file, in a wave sound format, is stored at CAR. The interview was 10 minutes and 30 seconds in length. Clarification and additional information supplied by CAR research is presented in brackets and is italicized.

State your name, age, and place of birth:

My name is John Richard Yturri. I was born June 22, 1931. I was born here on our farm and ranch [*current property, located south of the REDUS Project Area*].

Your home address and how long you have lived at this address?

The address at that time, if my memory serves me, was Route 240. Over the years, it has changed. I believe it was Route 7, Box 240, when I was born, and we had had several changes. It was Route 31, Box 181. The current address is 2151 Goeth Road.

Where and when did you go to school?

I went to the first year at Buena Vista School. It was kindergarten to high school, but it no longer exists. It was wrecked about 50 years ago. I only attended my first year at Buena Vista. Then I went to James Buckler Bonham Elementary that is on South St. Mary's Street, and then I went to Thomas Nelson Paige, located in Highlands. I then went to San Antonio Community College on Alamo Street. We called it the old German English School.

Who were your neighbors?

When I was growing up, our neighbors to the south was the Gaease ranch. As years went by, they passed away. The ranch became the property of other people. Originally, the land belonged to my mother's grandmother's sister. The ranch directly to the south of us was one of the sisters that married a Truehart. Farther down, it was Crawfords, and to the north, it was Dewitt.

My grandmother was a de la Garza [*Elena de la Garza, 1841-1925*] and she was the daughter of Jose Antonio de la Garza [*1776-1851*]. She inherited the land in 1854 on the death of her father.

Did your family have any connection to the Missions?

Yes, at the nearest Mission, San Francisco de la Espada, we had a lot that we inherited through ours grandmother. In 1993, we gave the land to the Archdiocese of San Antonio when the area around it became a Federal Park.

Do you know who can be buried at the local Mission Espada Cemetery?

I would imagine that anyone who was Catholic and who bought a plot could be buried there. I think that is the way it usually worked [*Mr. Yturri and Ms. Figueroa subsequently visited the small cemetery, though no details are available from the visit*].

We are exploring the connection via an acequia or the Espada ditch to the Medina River? Do you know of any evidence that the acequia or ditch ran all the way to the Medina River?

I don't believe so. As far as I know, the only ditch that ran across our place, probably built sometime after the civil war, was what we called the Truehart ditch. It was dug by James Truehart, who was an engineer and was also one of the first postmasters of San Antonio. He built that ditch to water the pecan orchard that was planted near the San Antonio River. He also built a dam right near the bridge on the Blue Road and the San Antonio River.

What can you tell us about major flooding or wildfires in the area?

The biggest flooding that we all refer to was in 1921. It covered the whole area. In the downtown area, the water got up to the second floor of Gunter Hotel. In our area, there was a dam across the Medina River and the water burst the dam. This was the first major flooding I was aware of. In early 1940, we had another big flood, the first during my lifetime, and we have had about three or four since then. As the city grows, more and more water is drained into the San Antonio River, and it gets to our area in hurry, and it is very destructive as it flows down the river eroding the riverbanks.

Can you describe the type of land use? Was it for livestock mostly?

Originally, I imagine it was mainly livestock, and then in the early 1900s, they started clearing the land and planting. And, then, in my lifetime, my father [*Edward H. Yturri, 1878-1958*] started a dairy farm in 1930. He planted different crops, including grasses and corn that he ground into silage. That was his main crop, which was used as feed for dairy cattle. His dairy operation milked about 120 cows twice a day, starting early in morning and then later in evening. He gave my brother Robert [*Robert Yturri. 1929-2009*] and I the ranch in 1949. At that time, we mainly started more farming. We started out with wheat, flax, corn, and milo maize. The property is presently leased out, and that farmer is growing milo maize.

Any idea as to who else might be available to talk about the history of the area?

The farmers that are close by, I really don't know them. They have changed over the years, and the original farmers have all passed away. My father was born in 1878, and all of his family is all gone. They passed away, and any cousins that we have are scattered all over the United States.

[*The following information comes primarily from Ancestry.com birth records (2017) and their Find A Grave index (2017), with searches conducted on John Richard Yturri, James Trueheart, José Antonio de la Garza, and Elena de la Garza. Additional information was gathered from Oronzco (2017). Mr. Yturri's mother was Enedina Holland (1898-1973). His father was Edward H. Yturri (1878-1958). His grandfather was Manuel Yturri (1838-1913). His grandmother was Elena de la Garza (1841-1925). His great grandfather was José Antonio de la Garza (1776-1851). James Trueheart (1815-1882) was married to Petra Margarita de la Garza, daughter of José Antonio de la Garza and Maria Josefa Menchaca (1808-1874).*]

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Appendix D:
San Antonio River Trip, August 2016

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In August of 2016, CAR Archaeologists Antonia Figueroa and Leonard Kemp accompanied Mr. Yturri on a boat trip along a section of the San Antonio River, from below Mission Espada to the REDUS property line. The goal of the roughly 4.0-km trip was to document buried features and conditions associated with the REDUS property (see also Fredrick et al. 2018). This appendix provides documentation of that trip by presenting 14 photographs from the excursion. Photos are organized from north to south, with selected shots referenced to Figure D-1.

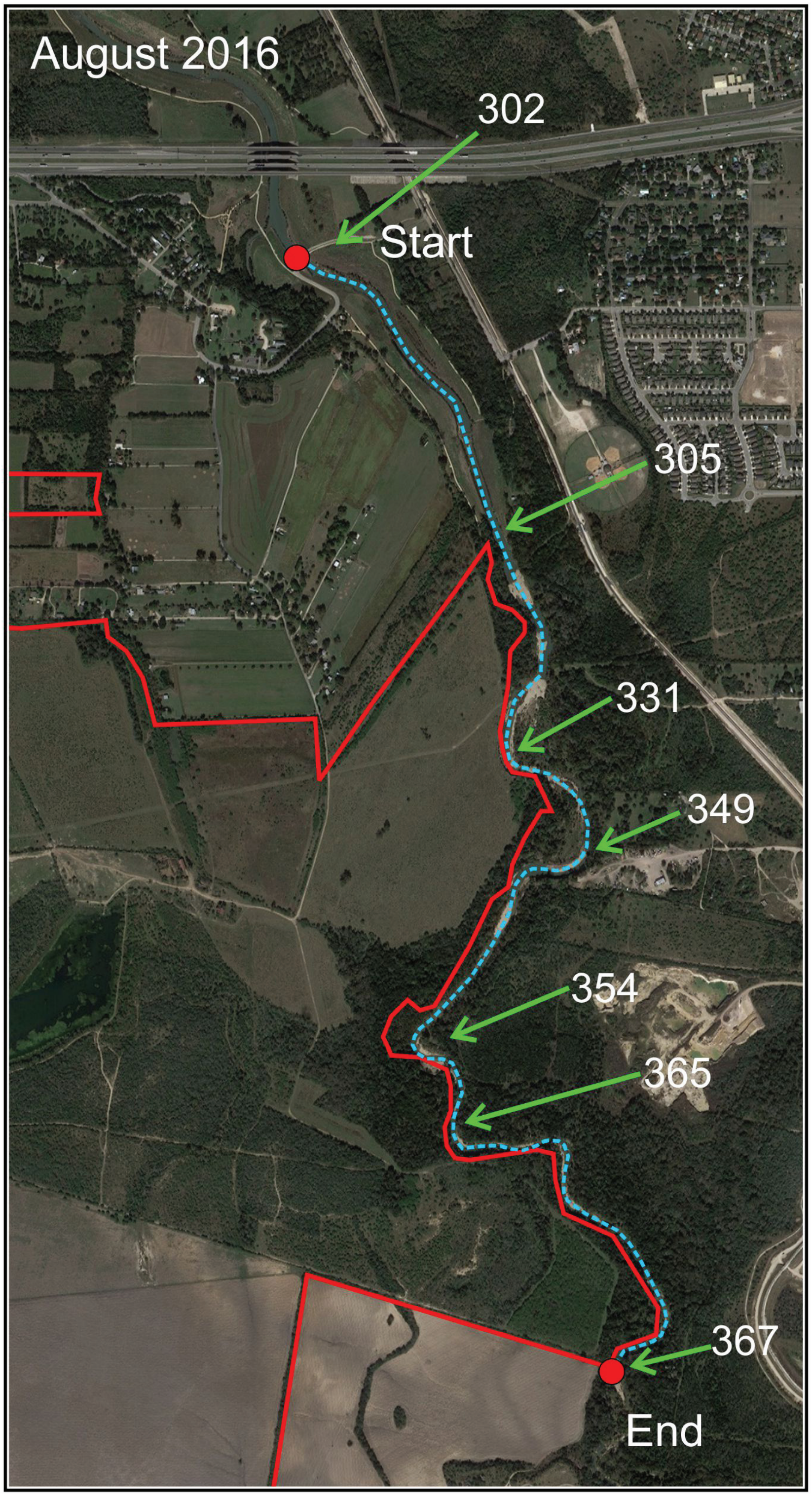

Figure D-1. Index of selected photographs from along the San Antonio River provided for orientation and reference.

Figure D-2. Shot 302. Start of trip (see Figure D-1).

Figure D-3. Shot 305. In channelized section.

Figure D-4. Shot 311. Below channelized section. Note multiple deposition zones.

Figure D-5. Shot 317. Looking upriver, showing large gravel bar (see Figure D-1).

Figure D-6. Shot 322. Large gravel bar below channelized section.

Figure D-7. Shot 326. Gravel bar below channelized section.

Figure D-8. Shot 331. River bank. Area of 41BX2200 (see Figure D-1).

Figure D-9. Shot 333. Feature exposed below buried soil.

Figure D-10. Shot 335. Riverbank with multiple deposition zones and modern soil.

Figure D-11. Shot 337. Gravel bar.

Figure D-12. Shot 349. Riverbank with multiple depositional zones (see Figure D-1).

Figure D-13. Shot 354. Gravel bar (see Figure D-1).

Figure D-14. Shot 365. Riverbank with several depositional zones (see Figure D-1).

Figure D-15. Shot 367. Gravel bar near end point of trip (see Figure D-1).

Appendix E:
Radiocarbon Results

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This appendix presents additional information on the two radiocarbon samples acquired and analyzed on the project. Both samples were processed at the Paleo Research Laboratory at the CAR at UTSA. The samples were subsequently dated by DIRECT-AMS radiocarbon dating service in Bothell, Washington. Both samples were AMS dates. The first sample, CAR 594 (D-AMS 024195), was on a small section of a burned twig taken roughly 55-60 cm from below the surface in an exposed drainage cut (see Figure 2-13). The sample returned a modern date, with the percent modern carbon reading of 116.8% and an error of +/- 0.33. As this item is likely short-lived, the sample was calibrated in OxCAL Version 4.3.2 (Bronk Ramsey 2009). Figure E-1 shows the resulting calibration using the post-bomb atmospheric Northern Hemisphere curve (Hua et al. 2013). The calibration produced two age ranges, with the most likely range (89.4% probability) being between the years of 1988 and 1990.

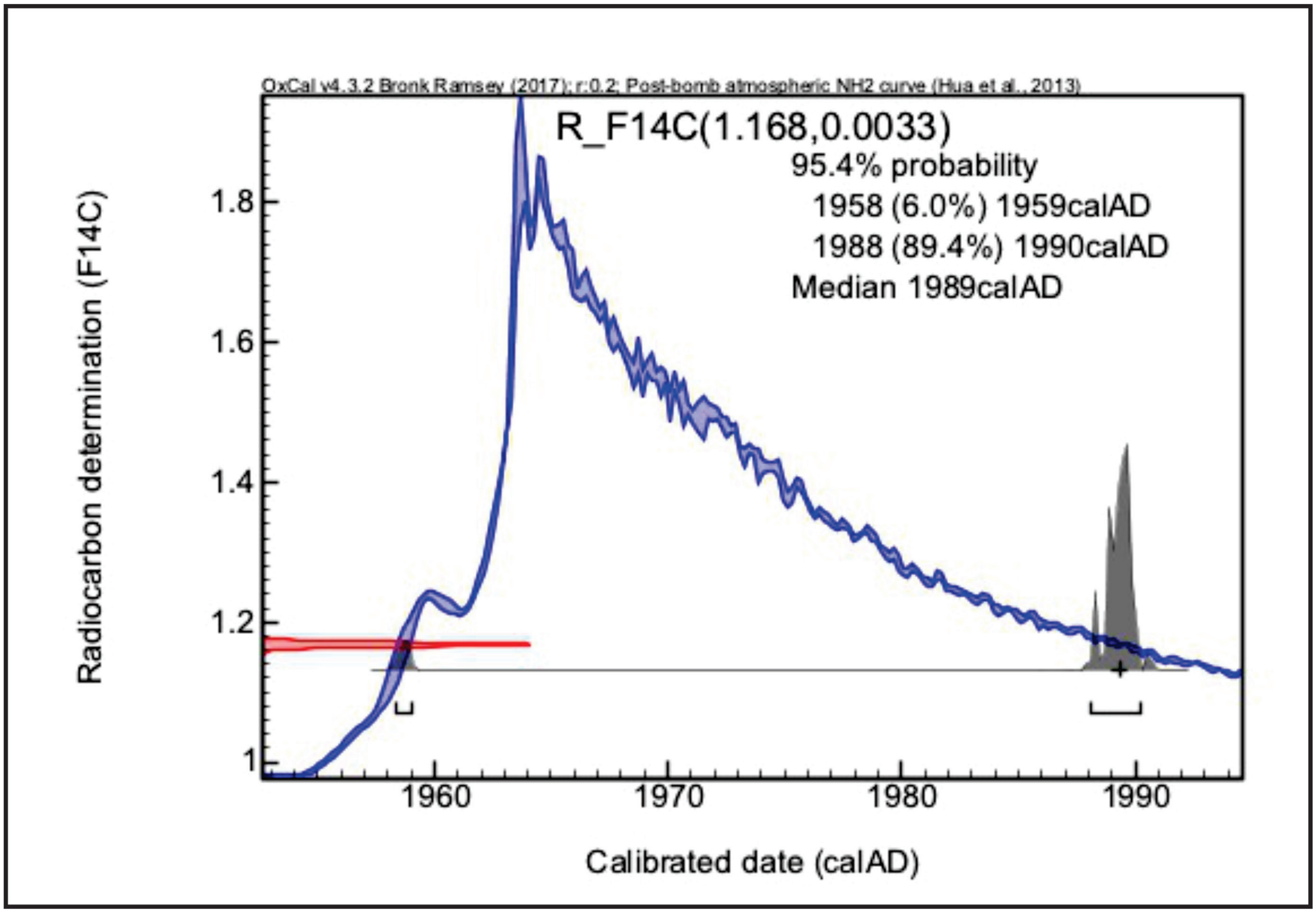

Figure E-1. Calibrated age range for CAR 594 (D-AMS 024195).

A second radiocarbon sample, CAR 593 (D-AMS 024194), was acquired from a single piece of charcoal extracted from a feature exposed roughly 90-100 cm below the surface of what is designated as 41BX2200. The feature was exposed in the west bank of the San Antonio River (see Figure D-9). The sample returned a date of 3516 +/- 34 RCYBP. Figure E-2 shows the calibration results using version 4.3.2 of OxCal (Bronk Ramsey 2009). The sample age, at a 95.4% probability range, is between 1935 and 1747 cal BC (3884 to 3696 cal BP). This places the sample at the beginning of the Late Archaic.

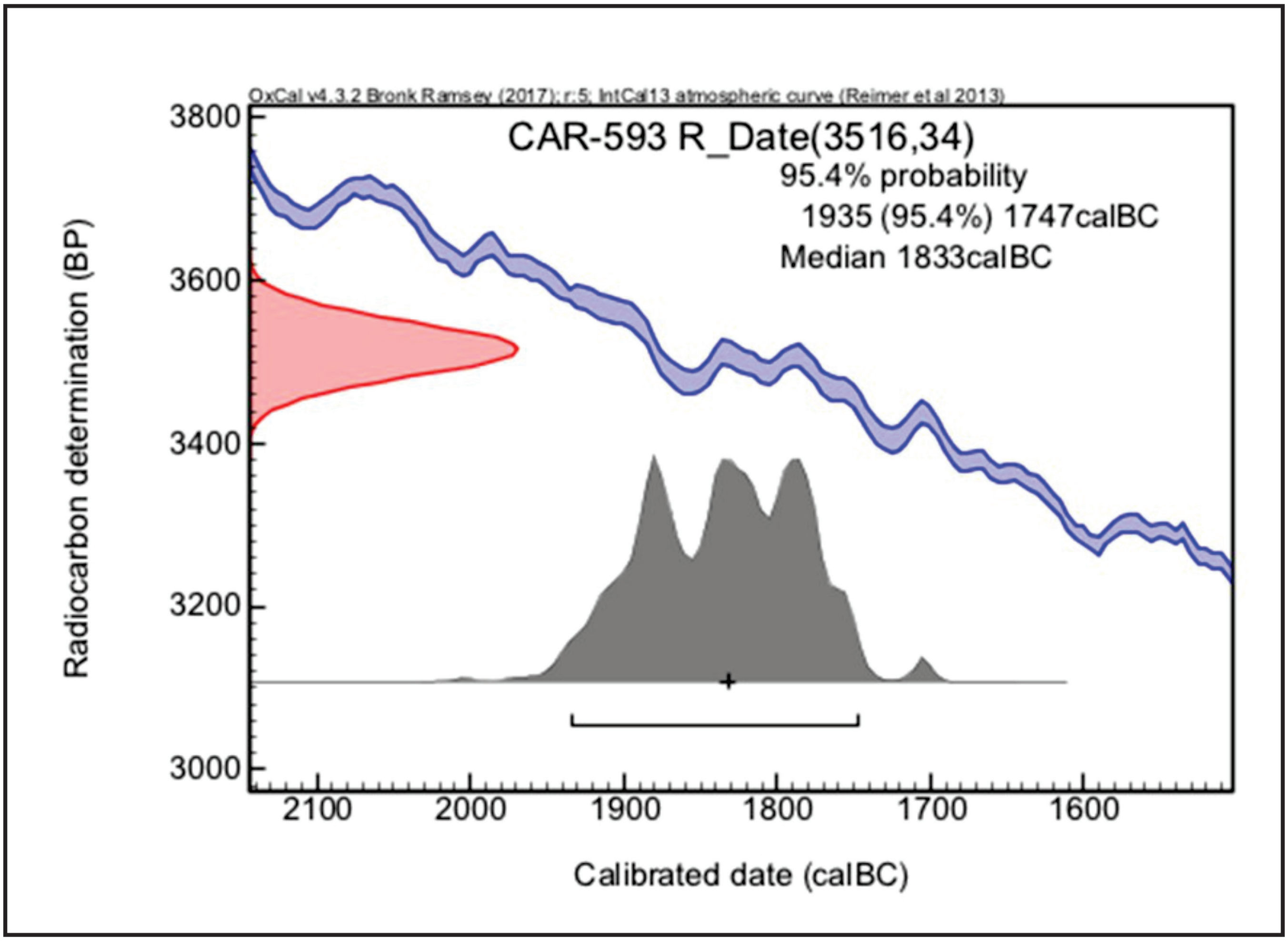

Figure E-2. Calibration age range for CAR 593 (D-AMS 024194).

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