130 ENVIRONMENTAL PARK

APPENDIX IIE
ENDANGERED OR THREATENED SPECIES DOCUMENTATION

HALFF

August 30, 2013
AVO 29520

Dr. Amy Turner
Texas Parks and Wildlife Department
Wildlife Division
4200 Smith School Road
Austin, TX 78744-3291

Re: Threatened and endangered species assessment for the proposed 130 Environmental Park in Caldwell County, Texas

Dear Dr. Turner:

130 Environmental Park, LLC intends to permit, register and operate a new municipal solid waste facility in northern Caldwell County, Texas. The 130 Environmental Park will include a Type I municipal solid waste landfill and a Type V municipal solid waste transfer station. The site entrance will be located about one-quarter mile north of the intersection of US Highway 183 (US 183) and Farm-to-Market Road 1185 (FM 1185), on the east side of SH 130. The proposed facility is intended to provide waste disposal for the City of Lockhart, Caldwell County, and the surrounding areas.

The USGS Quadrangle Map for "Lockhart North, Texas" shows multiple stream channel segments and on-channel ponds on the property. All are part of the Dry Creek tributary system which flows into Plum Creek approximately five miles south of the property; all are part of the larger San Marcos River tributary system. Site investigations showed that streams on the property are consistent with what is mapped on the USGS map; numerous smaller tributaries not shown on the USGS map were also identified.

Attached is the Texas Parks and Wildlife Department Wildlife Habitat Assessment Program Questionnaire for Threatened and Endangered Species, with a preliminary site assessment included.

If you have any questions or require any additional information, please do not hesitate to call at (214) 346-6367.

Sincerely,
HALFF ASSOCIATES, INC.

Russell Marusak
Environmental Scientist

C: Mr. Kenneth Welch, P.E. – Biggs and Mathews Environmental
Mr. Ernest Kaufmann – 130 Environmental Park, LLC

HALFF ASSOCIATES, INC.
1201 NORTH BOWSER ROAD
RICHARDSON, TX 75081-2275
TEL (214) 346-6200
FAX (214) 739-0095
WWW.HALFF.COM

HALFF

August 30, 2013
AVO 29520

Mr. Adam Zerrenner
U.S. Fish and Wildlife Service
10711 Burnet Road, Suite 200
Austin TX 78758

Re: Threatened and endangered species assessment for the proposed 130 Environmental Park in Caldwell County, Texas

Dear Mr. Zerrenner:

130 Environmental Park, LLC intends to permit, register and operate a new municipal solid waste facility in northern Caldwell County, Texas. The 130 Environmental Park will include a Type I municipal solid waste landfill and a Type V municipal solid waste transfer station. The site entrance will be located about one-quarter mile north of the intersection of US Highway 183 (US 183) and Farm-to-Market Road 1185 (FM 1185), on the east side of SH 130. The proposed facility is intended to provide waste disposal for the City of Lockhart, Caldwell County, and the surrounding areas.

The USGS Quadrangle Map for "Lockhart North, Texas" shows multiple stream channel segments and on-channel ponds on the property. All are part of the Dry Creek tributary system which flows into Plum Creek approximately five miles south of the property; all are part of the larger San Marcos River tributary system. Site investigations showed that streams on the property are consistent with what is mapped on the USGS map; numerous smaller tributaries not shown on the USGS map were also identified.

Attached is the Texas Parks and Wildlife Department (TPWD) Wildlife Habitat Assessment Program Questionnaire for Threatened and Endangered Species that was submitted to TPWD, with a preliminary site assessment included for listed species.

If you have any questions or require any additional information, please do not hesitate to call at (214) 346-6367.

Sincerely,
HALFF ASSOCIATES, INC.

Russell Marusak
Environmental Scientist

C: Mr. Kenneth Welch, P.E. – Biggs and Mathews Environmental
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WILDLIFE HABITAT ASSESSMENT PROGRAM
QUESTIONNAIRE FOR
THREATENED AND ENDANGERED SPECIES

AS ATTACHED TO LETTERS DATED AUGUST 30, 2013 TO:
TEXAS PARKS AND WILDLIFE DEPARTMENT
AND
U.S. FISH AND WILDLIFE SERVICE

TEXAS PARKS & WILDLIFE

WILDLIFE HABITAT ASSESSMENT PROGRAM
Review Requests

(Including Threatened and Endangered Species)

Name: Russell Marusak Date: August 30, 2013

Your Company: Halff Associates, Inc. Phone: 214.346.6367

Your Company Address: 1201 North Bowser Road Fax: 214.739.0095

City, State, Zip: Richardson, TX 75081 Email: rmarusak@halff.com

Project Title, Number and Site Location: 130 Environmental Park, Caldwell County, Texas County(ies): Caldwell

1) Scope of the Project:

(a) What regulations will this review help you to comply with? Or, if not regulatory, why is the review being requested? Who is the project sponsor?

130 Environmental Park (Project) will be permitted in accordance with 30 Texas Administrative Code (TAC) Chapter 330 Municipal Solid Waste Management Regulations. The Texas Commission on Environmental Quality (TCEQ) is the agency responsible for permitting and regulating municipal solid waste facilities.

The TCEQ requires an applicant to address protection of endangered and threatened species and document coordination with the applicable state and federal agencies regarding the Endangered Species Act in accordance with the following regulations:

- 30 TAC §330.61 (n)(1) and §330.551(a) The owner or operator shall consider the impact of a solid waste disposal facility upon endangered or threatened species. The facility and the operation of the facility shall not result in the destruction or adverse modification of the critical habitat of endangered or threatened species, or cause or contribute to the taking of any endangered or threatened species.
- 30 TAC §330.61(n)(2) For landfill applications, the owner or operator shall submit Endangered Species Act compliance demonstrations as required under state and federal laws and determine whether the facility is in the range of endangered or threatened species. If the facility is located in the range of endangered or threatened species, the owner or operator shall have a biological assessment prepared by a qualified biologist in accordance with standard procedures of the United States Fish and Wildlife Service and the Texas Parks and Wildlife Department to determine the effect of the facility on the endangered or threatened species. Where a previous biological assessment has been made for another project in the general vicinity, a copy of that assessment may be submitted for evaluation. The United States Fish and Wildlife Service and the Texas Parks and Wildlife Department shall be contacted for locations and specific data relating to endangered and threatened species in Texas.
- 30 TAC §330.157 A facility and the operation of the facility must not result in the destruction or adverse modification of the critical habitat of endangered or threatened species, or cause or contribute to the taking of any endangered or threatened species. Facilities must be operated in conformance with any endangered or threatened species protection plan required by the commission. The site operating plan should contain criteria for the protection of any identified endangered species.

(b) What and where is the project site? What activities will be conducted at the site? (Especially activity types, extent boundaries, length & width, waterways vegetation disturbance, and total acreage of site and acreage of the site that will be disturbed.)

130 Environmental Park, LLC intends to permit, register and operate a new municipal solid waste facility in northern Caldwell County east of State Highway 130 (SH130) (**Figure 1** and **Figure 2**). The site entrance will

be located about one-quarter mile north of the intersection of US Highway 183 (US 183) and Farm-to-Market Road 1185 (FM 1185), on the east side of SH 130.

130 Environmental Park, LLC will locate the proposed 130 Environmental Park, consisting of a permit boundary of approximately 519.746 (approximately 520) acres within a 1,229 acre tract of land. The 130 Environmental Park will include a Type I municipal solid waste landfill facility and a Type V municipal solid waste transfer station. Refer to **Drawing I** – General Site Plan (Biggs and Mathews, 2013) for the property boundary and permit boundary. The overall property consists of gently undulating grasslands with limited forest cover. The property generally slopes to the south. The major topographic feature of the property is the Soil Conservation Service Site 21 Reservoir on Dry Creek; Dry Creek traverses the property in a northeast to southwest direction (**Figure 3**), entering Plum Creek approximately five miles south of the property. Plum Creek flows in a southeast direction, entering the San Marcos River about 23 miles downstream from the property. The permit boundary is located in the northern portion of the property, northwest of Dry Creek. Portions of the permit boundary along Dry Creek and unnamed tributaries are located within the limits of the 100-year floodplain, however, the entirety of the landfill footprint, processing and/or storage units, and entrance facilities will be located outside of the 100-year floodplain.

The landfill facility will be accessed from northbound US 183 through an entrance road. A gatehouse and scales will be provided within the facility boundary. Additional facilities will include an office, maintenance area, citizen convenience center, reusable materials staging area, and truck wheel wash. The landfill footprint will cover approximately 212 acres and is intended to provide about 50 years of site life. The landfill and attendant facilities would be strategically located on the property to minimize the disturbance to upland woodlands, riparian corridors, creeks, and wetlands identified on the property.

(c) If this request is for a site investigation or risk assessment, why is the site being investigated? If applicable, what containment pathways are being evaluated?
Not applicable.

(d) Schedule of activities – Approximately when (which calendar month, how many years) will the project be active on the site?
A schedule for construction of the proposed facilities has yet to be determined.

2) Vegetation: Species, dominant plants, structure and composition, vegetation layers, height of layers, natural vegetation community types.

According to the Level Three Ecoregions of Texas, the site is located where the Texas Blackland Prairies transition to the East Central Texas Plains. The Texas Parks and Wildlife Department (TPWD) Texas Ecological Systems Classification identifies numerous vegetation types within the property boundary including: Blackland Prairie, Disturbance or Tame Grassland; Central Texas, Floodplain Deciduous Shrubland; Central Texas, Floodplain Hardwood Forest; Central Texas, Floodplain Herbaceous Vegetation; Central Texas, Riparian Deciduous Shrubland; Central Texas, Riparian Hardwood Forest; Native Invasive, Deciduous Woodland; Native Invasive, Mesquite Shrubland; Open Water; Post Oak Savanna, Post Oak Motte and Woodland; and Post Oak Savanna, Savanna Grassland (**Figure 4**). Site investigations confirmed that existing site conditions are generally consistent with the TPWD Ecological Classifications.

These different classifications can be grouped into four general classifications for purposes of describing dominant vegetation: post oak-cedar elm woodlands; mesquite thicket; grassland pasture; and pond/wetlands. Maintained utility rights-of-way and interior roads depict a transition between woodland and grassland types, with layer development dependent on the most recent maintenance cycle.

The woodland communities are dominated by post oak (*Quercus stellata*) and cedar elm (*Ulmus crassifolia*). exas persimmon (*Diospyros texana*) is common within this community type; agarita (*Mahonia trifoliolata*),

slimleaf panicgrass (*Dichanthelium linearifolium*), and prickly pear cactus species (*Opuntia* sp.) are also common in the understory. Prickly pear specimens can get quite large and occupy a large volume of the understory layer. Mesquite thickets are dominated almost exclusively by mesquite (*Prosopis glandulosa*) in the tree and shrub layer. Prickly pear and Texas wintergrass (*Nassella leucotricha*) are common understory species. The levee and emergency spillway of the large impoundment comprise the majority of the grassland communities; edge habitats associated with utility corridors and interior access roads may also be included in this type. Ponds are scattered across the property, with the largest centrally located near the southern property boundary. Wetland communities identified are mostly associated with the emergent fringes of these impoundments; smaller features associated with old meanders of Dry Creek, as well as upland terrace depressions were also identified.

3) **Other Natural Resources/Physical Features:**
(a) Soils, geology, watercourses, aquifers, flood zones, etc.

According to the Natural Resource Conservation Service Soil Data Mart, the following soils are mapped within the property boundary. A map (**Figure 5**) of the soils is attached.

Soil Id	Soil Series	Topography	Available Water Capacity	Drainage Class	Flooded	Ponded
BuB	Burleson Clay	1-3% slopes	Moderate	Moderately Well Drained	No	No
CfB	Crocket fine sandy loam	1-3% slopes	Moderate	Moderately Well Drained	No	No
CrC2	Crockett soils	2-5% slopes, eroded	Moderate	Moderately Well Drained	No	No
CrD3	Crockett soils	3-8% slopes, eroded	Moderate	Moderately Well Drained	No	No
DAM	Dams	---	---	---	---	---
FeE	Fett gravelly soils	1-12% slopes	Low	Somewhat Poorly Drained	No	No
HeC2	Heiden clay	3-5% slopes, eroded	Moderate	Well Drained	No	No
HmB	Heiden-Wilson complex	1-3% slopes	Moderate	Well Drained/ Moderately Well Drained	No	No
HoC2	Houston Black clay	3-5% slopes, eroded	Moderate	Moderately Well Drained	No	No
MaA	Mabank loam	0-1% slopes	Moderate	Moderately Well Drained	No	No
MaB	Mabank loam	1-3% slopes	Moderate	Moderately Well Drained	No	No
Ts	Tinn soils, frequently flooded	0-1 % slopes	High	Moderately Well Drained	Yes	No
W	Water	---	---	---	---	---
WgC	Wilson gravelly loam	1-5% slopes	Moderate	Moderately Well Drained	No	No

The majority of the study area is mapped as Fett gravelly soils and Wilson gravelly loam (soil map symbols FeE and WgC). The Tinn soil unit (map symbol Ts) is associated with the floodplains of the larger drainages across the property, and typically floods more than once a year. None of the listed soils are considered hydric soils according to the USDA Soil Data Mart. However, the database shows that Tinn Soils, frequently flooded unit and the Mabank loam 0-1% slopes unit contain unnamed minor components located in depressions that may meet hydric criteria, based on ponding and/or flooding.

Dry Creek is the primary drainage that with a network of smaller tributaries, traversing the eastern half of the property. Another substantial tributary of Dry Creek crosses the property in a north to south manner; this tributary and its network of smaller tributaries drain the western half of the property. Both of these tributaries are impounded by a substantial impoundment structure. USGS maps show a riser elevation of 500 feet above mean sea level (amsl) which maintains a pond size of approximately 27 acres. The emergency spillway elevation at 517 feet amsl suggests an impoundment area over 380 acres, an area which extends beyond the northeast property boundary. Two other headwater tributaries are located in the southwestern corner of the property. In addition to the array of tributaries on the property, several smaller man-made ponds are scattered about the property to provide water for livestock.

According to the Flood Insurance Rate Map (FIRM) published by the National Flood Insurance Program, Dry Creek is mapped with a wide floodplain across the length of the study area. The western tributary of Dry Creek has a narrower floodplain, while the remaining tributaries have an even narrower floodplain consistent with their stream courses observed on aerial photography. The overbank areas of Dry Creek and its tributaries are located within the 1% chance annual flood hazard zone with base elevations determined (Zone AE). The remainder of the study area is mapped as determined to be outside of the 0.2% annual chance flood. A map (**Figure 6**) showing the limits of the floodplain on recent aerial photography is attached.

(b) Habitat, animals, animal assemblages, other sensitive features, etc.

A site investigation was conducted in June and July 2013. Cattle are a minor presence on the property, consisting of a small herd that concentrates in the southern portion of the site. Interior access roads and utility corridors provide different edge habitats, and whitetail deer, turkey, and feral hogs were seen on several days at various times of the day during the site investigation. A number of stock ponds are scattered about the site, including one substantial impoundment feature on the southern portion of the site. Black-bellied whistling ducks were observed in late June at some of the smaller ponds. Different heron and egret species, as well as occasional roseate spoonbills, were observed daily at the larger impoundment.

4) **Existing Site Development: Extent of pavement, gravel, shell, or other cover; buildings, landscaped, xeriscaped, drainage system, etc.**

With the exception of ranch access roads, the site is vegetated and utilized as pasture. In many instances, less traveled access roads were fully vegetated. The only other buildings included occasional barn or corral structures used for the cattle operation.

5) **Historic Use/Function of Site: Pasture, forest, urban, row crops, rangeland, wetland, etc. If the request is for a risk assessment, when was, or for how long, has the site been active, inactive? Are cultural resources present on the site or will the project cross or impact state or federal lands, local parklands?**

The property has been historically used as pasture and ranchland dating back at least to the late 1930s. No waste disposal activities have occurred on the site and no permitting or construction permit approvals have been received or applied for.

TEXAS PARKS & WILDLIFE

WILDLIFE HABITAT ASSESSMENT PROGRAM
Review Requests (Continued)

(Including Threatened and Endangered Species)

6) **Has a threatened and endangered species survey or assessment, wetland delineation, or other biological assessment already been performed? (In general, TPWD recommends an on-site habitat assessment be performed.)** ☒**Yes** ☐**No**

(a) **If yes, provide surveyor name, qualifications, methods or protocols acreages surveyed, level of effort, weather conditions, time of day, and dates the survey was performed.**

Prior to conducting the field investigation, the most current species lists from the U.S. Fish and Wildlife Service (USFWS) and TPWD were obtained. Also, a waters of the United States and wetland delineation was conducted over several days in June and July 2013 to delineate the present-day extent of waters of the United States (including Section 404 jurisdictional wetlands) and non-jurisdictional wetlands, on the property. Site conditions were clear, dry, and temperate. To intersect potential wetland areas, transects were established perpendicular to the hydrological gradients of the Dry Creek tributary system, which represents the major drainage in the property. Transects were generally aligned from west to east, with north to south transects included for secondary tributaries. Multiple wetland data points were recorded, documenting vegetation, hydrology, and soil characteristics along each transect. The collection of wetland data points was consistent with the USACE guidelines for wetland delineations per the "1987 Corps of Engineers Wetlands Delineation Manual," in addition to the "Final Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Great Plains Region", and also allowed for the identification of non-jurisdictional wetlands. Although the site inspection was specific to procedures for wetland delineations, these procedures allowed for a thorough reconnaissance of the property, allowing observations for consecutive days over several weeks. The collection and classification of vegetation and hydraulic conditions on the site allowed for an assessment of federal- and state-listed threatened and endangered species and their habitat, as well as potential for occurrence on the property. Results of this preliminary assessment are attached as an internal memorandum to the landfill engineer.

The majority of the site investigation was conducted by Mr. Danny Griffith, Mr. Brandyn Littleton, Mr. Josh Troegle, and Mr. Brian Boe of Halff Associates, Inc. (Halff). Mr. Russell Marusak provided planning and coordination oversight of the investigation team, and conducted field reviews during the delineation process. Together, the investigation team has extensive experience all over the state in conducting wetland delineations and general habitat assessments. As the team leader, Mr. Marusak is an Environmental Scientist and an ISA Certified Arborist who has extensive experience in endangered species coordination, primarily associated with Department of the Army Section 404 permits. Mr. Marusak has coordinated with Mr. Omar Bocanegra, a Staff Biologist with the USFWS Branch Office in Arlington, Texas on numerous endangered species issues in the Dallas-Fort Worth area, most notably those involving the interior least tern. He has also worked with Ms. Edith Erfling in the Houston Clear Lake Office on matters involving the bald eagle.

(b) **If yes, please provide results and copy of survey/assessment report.**

Please see attached report summarizing the results of a listed species review and assessment of existing site conditions.

7) **Could current on-site or adjacent habitat support rare species?** ☒**Yes** ☐**No**
Specifically, explain why or why not.

In the vicinity of the site, State-listed rare species, or species of concern include the Arctic peregrine falcon, Henslow's sparrow, mountain plover, western burrowing owl, cave myotis bat, plains spotted skunk, Guadalupe bass, Guadalupe darter, squawfoot (a mollusk), spot-tailed earless lizard, and three plant species. It should be noted that none of these species was observed during the site investigation. The current habitat could support the spotted plains skunk and spot-tailed earless lizard given the general habitat requirements for these species. Given the association with post oak communities and the proximity of the site to Carizo Sand outcrops to the east, there is limited potential for the green beebalm and sandhill woolywhite to occur on site. The listed bird species generally required more open grassland habitats than what is currently found on

the site, and it is unlikely they would occur on the property. They aquatic species have flowing stream requirements which are not found on the property.

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8) **Provide a description of potential negative direct and indirect impacts from proposed project activities or former and current site activities, such as types or habitat and acreage to be degraded or lost, temporarily and permanently. Also, describe cumulative effects that could be anticipated from the project on the natural environment.**

The landfill and transfer station would be located on the northern portion of the property, with the landfill to be centrally located between the two large tributary systems that cross the property. This location will minimize the disturbance to riparian corridors, creeks, and wetlands identified on the property. Furthermore, the landfill will be located in vegetation types identified as "native invasive" communities by a TPWD classification system, thereby minimizing impacts to post oak woodland communities along the western portion of the property, and the floodplain communities on the eastern portion of the property.

Impacts to post oak woodland communities would occur with the placement of an interior access road and attendant facilities; the alignment will focus on the minimization of impacts to multiple ephemeral streams that will be crossed by the road. Drainage design and controls for the access road and facilities will prevent a significant alteration of natural drainage patterns.

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9) **Provide a description of planned beneficial mitigation and enhancement or restoration efforts. Be sure to note the avoidance, minimization, and compensatory mitigation measures planned to address the threat of negative impacts (e.g. which erosion control measures will be used, what will site restoration activities encompass, etc.).**

Because the landfill and transfer station facilities will not be located in wetlands areas subject to mitigation requirements under Section 404 of the Clean Water Act, the project has limited potential to impact waters of the United States as regulated under Section 404 of the Clean Water Act (including wetlands). If access road stream crossings require Section 404 permitting, consistent with goals of the Section 404 program, mitigation will first focus on avoiding and minimizing impacts to aquatic resources to the extent practicable. Final design will focus on avoiding and minimizing impacts to streams and other potential waters of the United States on the site. If compensatory mitigation is required, mitigation could focus on the preservation of undisturbed habitats or creation of additional areas on other portions of the property. Over the life of the project, general landscaping maintenance requirements would be implemented for overall aesthetics and to ensure soil and grade stabilization. A Species Protection Plan, describing measures that will be taken to avoid, minimize, and mitigate potential impacts to listed species, is attached to the Threatened and Endangered Species Review for the project.

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10) **Include copies of coordination with other agencies relevant to impacts or enhancements of natural resources for the project & contact name.**

A Texas Natural Diversity Database (TXNDD) search conducted in July 2013 identified several plant and animal species which have historically occurred in adjacent USGS quadrangles to that which includes the study area. The TXNDD was searched for Element Occurrence Records (EORs) to determine if any reported sightings of species have occurred within the study area. No EORs were recorded for the USGS quadrangle which contains the study area.

---

11) **Clearly delineate exact location of site and its boundaries using an applicable USGS quad (most preferable) as the base layer or best map available. The topographic map citation should include the USGS quad name. The map must contain identifiable features and scale that allows us to find your**

site and accurately pinpoint your site boundaries. When using internet maps, provide both a location map (zoomed out for highway reference) and a layout map (zoomed in for site features, boundaries, and neighboring street reference).
See attached maps.

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12) Originals or color-copy photographs of site and surrounding area with captions or narratives.
Representative photos of different vegetation communities identified and classified during the wetland delineation study have been provided. Additional photographs may be made available upon request.

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13) Aerial photographs with pertinent features labeled. Aerials should show the year photograph was taken.
See attached imagery (**Figures 7, 8,** and **9**).

TEXAS PARKS & WILDLIFE

WILDLIFE HABITAT ASSESSMENT PROGRAM
Review Requests (Continued)

(Including Threatened and Endangered Species)

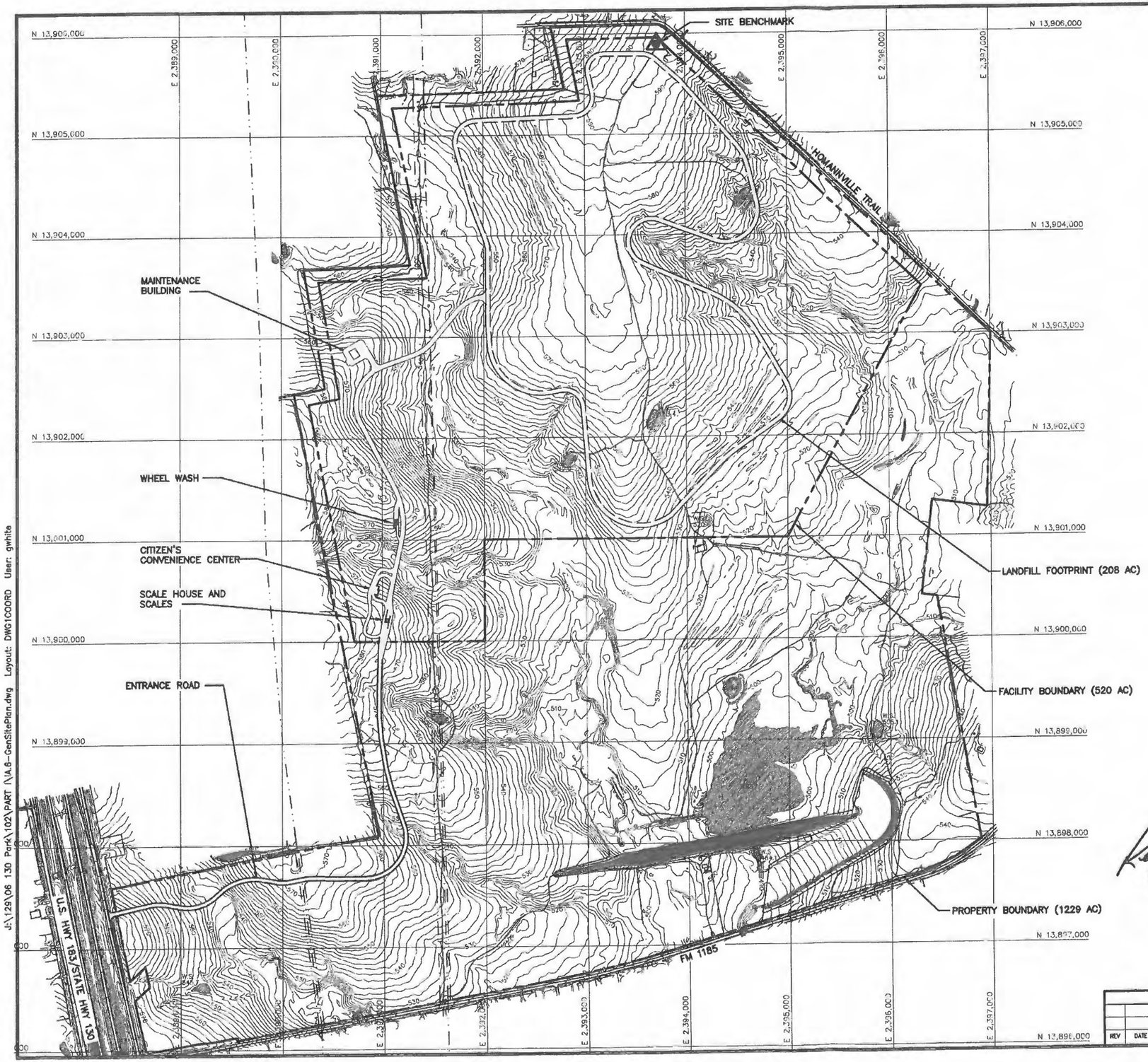
Send completed form to:

Texas Parks and Wildlife Department
Wildlife Division
Wildlife Habitat Assessment Program
4200 Smith School Road
Austin, Texas 78744-3291
(512) 389-4571 (Phone) (512) 389-4599 (Fax)

Texas Parks and Wildlife Department maintains the information collected through this form. With few exceptions, you are entitled to be informed about the information we collect. Under Section 552.021 and 552.023 of the Texas Government Code, you are also entitled to receive and review the information. Under Section 559.004, you are also entitled to have this information corrected.

Drawing I – General Site Plan

(Biggs and Mathews, 2013)



LEGEND

- PROPERTY BOUNDARY
- FACILITY BOUNDARY
- LANDFILL FOOTPRINT
- SITE BENCHMARK
- 510 EXISTING CONTOUR
- N 6753000 STATE PLANE GRID
- EASEMENT LOCATION

NOTES:

1. CONTOURS AND ELEVATIONS PROVIDED BY DALLAS AERIAL SERVICE FROM AERIAL PHOTOGRAPHY FLOWN MAY 13, 2013. HORIZONTAL DATUM IS TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE (NAD 83). ELEVATIONS ARE RELATIVE TO NAVD88 – GEOID 12A.
2. REFER TO PART I, APPENDIX 1C FOR FACILITY BOUNDARY LEGAL DESCRIPTION.
3. THERE ARE NO WASTE DISPOSAL ACTIVITIES WITHIN THE FACILITY BOUNDARY THAT ARE NOT INCLUDED IN THIS PERMIT APPLICATION.
4. THERE ARE NO INTAKE/DISCHARGE STRUCTURES LOCATED WITHIN OR ASSOCIATED WITH THE FACILITY.
5. PERMANENT BENCHMARK INFORMATION:
   COORDINATES (NAD 83): N 13905896.44
   E 2393722.33
   LATITUDE: N 28°58'43.75"
   LONGITUDE: W 97°39'24.76"
   ELEVATION: 592.37 FT-MSL

STATE OF TEXAS
KENNETH J. WELCH
60773
REGISTERED
PROFESSIONAL ENGINEER
8/27/13

ISSUED FOR COORDINATION

REVISIONS						
REV	DATE	DESCRIPTION	DSN BY	DES BY	CHK BY	APP BY

GENERAL SITE PLAN

130 ENVIRONMENTAL PARK, LLC
130 ENVIRONMENTAL PARK
TYPE I PERMIT APPLICATION

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
MANSFIELD • WICHITA FALLS
817-563-1144

TBPE FIRM NO. F-256 | TBPG FIRM NO. 50222

DSN. KJW	DATE : 8/13	DRAWING 1
DWN. GLW	SCALE : GRAPHIC	
CHK. KJW	DWG : IA.6-GenSitePlan.dwg	

J:\129\06 130 Park\102\PART I\A.6-GenSitePlan.dwg Layout: DWG1COORD User: gwhite

Threatened and Endangered Species Review

(Halff, 2013)

THREATENED AND ENDANGERED SPECIES REVIEW

For:
130 Environmental Park

Prepared by:

HALFF ASSOCIATES, INC.

1201 NORTH BOWSER ROAD
RICHARDSON, TX 75081

TEL (214) 346-6200
FAX (214) 739-0095

WWW.HALFF.COM

AVO 29520

August 2013

TABLE OF CONTENTS

TABLES

APPENDICES

1.0 PURPOSE

Halff Associates (Halff) has been retained to provide to 130 Environmental Park, LLC a threatened and endangered species assessment for the proposed 130 Environmental Park in Caldwell County, Texas. The study area consists of approximately 1,229 acres and is located on the east side of State Highway (SH) 130/US 183 north of the City of Lockhart, Texas, extending from the intersection of US 183 and FM 1185 east to Homannville Trail. **Figure 1** shows the general project location with respect to larger metropolitan areas. **Figure 2** shows the location within Caldwell County and in relation to the City of Lockhart.

130 Environmental Park, LLC intends to permit and operate a new municipal solid waste facility in northern Caldwell County. The 130 Environmental Park will include a Type I municipal solid waste landfill facility and a Type V municipal solid waste transfer station. The purpose of this assessment is to evaluate and document the potential effects on federally- and state-listed species as a result of the proposed project, in support of Texas Commission on Environmental Quality (TCEQ) applications for the proposed project, pursuant to TCEQ rules at 30 TAC 330.61 (n)(1) and (2), 330.157, and 330.551.

2.0 THREATENED AND ENDANGERED SPECIES REGULATION

2.1 Endangered Species Act

The U.S. Fish and Wildlife Service (USFWS) has authority under the Endangered Species Act (ESA) to list and monitor the status of species whose populations are considered imperiled. The federal process identifies potential candidates based upon the species' biological vulnerability. The vulnerability decision is based upon many factors affecting the species within its range and is linked to the best scientific data available to the USFWS at the time. Species listed as threatened or endangered by the USFWS are provided full protection under the ESA including a prohibition of indirect take such as destruction of known critical habitat (i.e., areas formally designated by USFWS in the Federal Register). Candidate species are those the USFWS has enough information to warrant proposing them for listing but is precluded from doing so by higher listing priorities. Candidate species are not specifically protected by the ESA, and are not included in this biological evaluation, unless listed as a state protected species.

Biological assessments include one of three recommended determinations of effect on federally-listed endangered, and threatened species and their habitat: "no effect," "may affect, not likely to adversely affect," or "may affect, likely to adversely affect." These three possible determinations, in accordance with guidance offered by the USFWS for the purpose of Biological Assessments and Evaluations, are described below.

1. No effect – A "no effect" determination means that there are absolutely no effects from the proposed action, positive or negative, to listed species. A "no effect" determination does not include effects that are insignificant (small in size), discountable (extremely unlikely to occur), or beneficial.

2. May affect, not likely to adversely affect – A "may affect, not likely to adversely affect" determination may be reached for a proposed action where all effects are beneficial, insignificant, or discountable. Beneficial effects have contemporaneous positive effects without any adverse effects to the species or habitat. Insignificant effects relate to the size of the effects and should not reach the scale where take occurs. Discountable effects are those that are extremely unlikely to occur.

3. May affect, likely to adversely affect – A "may affect, likely to adversely affect" determination means that all adverse effects cannot be avoided. A combination of beneficial and adverse effects is still "likely to adversely affect" even if the net effect is neutral or positive.

2.2 Texas Parks and Wildlife Code

Texas endangered species legislation in 1973 and subsequent amendments have established a state regulatory program for the management and protection of endangered species (i.e., species in danger of extinction) and threatened species (i.e., likely to become endangered within the foreseeable future). Chapters 67 and 68 of the Texas Parks and Wildlife Code authorize the Texas Parks and Wildlife Department (TPWD) to formulate lists of threatened and endangered fish and wildlife species and to regulate the taking or possession of the species. Under this statutory authority, the TPWD regulates the taking, possession, transport, export, processing, selling or offering for sale, or shipping of threatened or endangered species of fish and wildlife.

3.0 METHODS

For this biological assessment, the study area was determined by identifying the maximum area in which the proposed project may result in direct and indirect impacts in and around the project area. Both construction and operation phases of the project were considered. The study area was determined to extend to the limits of the property as shown on 2013 aerial photography (**Appendix A, Figure 3**). Although property boundaries are arbitrary to natural processes, the 1229-acre property boundary is considered to encompass more than any potential effects boundary (i.e. over-inclusive).

This assessment includes a review of current species lists from TPWD and USFWS for Caldwell County, Texas, and a search request from the Texas Natural Diversity Database (TXNDD). The TXNDD is a record of occurrences (sorted per USGS quadrangle) for rare plant and animal resources that is based upon the best available information to TPWD. The TXNDD data is to support determinations of potential species occurrence for the study area, and provide specific information where available. An absence in the TXNDD data is not equated to absence of a species in the study area. Halff personnel spent hundreds of man-hours investigating the study area in June and July 2013. This investigation included a pedestrian survey of the proposed project area and a windshield survey of publicly accessible areas in the vicinity of the project area.

Based on information gathered from the literature review and field reconnaissance, this assessment will first identify potential for occurrence within the study area for each species. For species that may occur within the study area, the conclusion of this assessment will include one of three recommended determinations of effect on federally-listed endangered or threatened species and their habitat: "no effect," "may affect, but not likely to adversely affect," or "may affect, likely to adversely affect." Because state-listed species are regulated in a different manner, the presence of potential habitat and potential impacts to state-listed species are addressed as to whether the project would result in the take of a state-listed species.

4.0 LISTED THREATENED AND ENDANGERED SPECIES

Table 1 lists species that are considered endangered or threatened by the USFWS and/or TPWD and whose geographic range may include any portion of Caldwell County. The estimate of the potential for a species to occur within the study area is based on analysis of habitat observed during field visits to the study area, the known habitat preferences for each species, and other factors as noted. There is no USFWS-designated critical habitat within the study area for any of the federally-protected species in **Table 1**. A discussion of each species' habitat, potential for occurrence within the study area and, for species that may occur within the study area, a determination of effect from the proposed project follows **Table 1**.

A TXNDD search conducted in July 2013 identified several species which have historically occurred in adjacent USGS quadrangles to that which includes the study area. The TXNDD was searched for Element Occurrence Records (EORs) to determine if any reported sightings of species have occurred within the study area. No EORs were recorded for the USGS quadrangle which contains the study area.

Table 1 - Endangered, Threatened, or Rare Wildlife Potentially in the Study Area

Common Name	Scientific Name	Listing Status[1]		Potential to Occur within Study Area?
		Federal	State	
BIRDS				
American peregrine falcon	*Falco peregrinus anatum*	DL	T	unlikely
Bald eagle	*Haliaeetus leucocephalus*	DM	T	unlikely
Whooping crane	*Grus americana*	E	E	unlikely
Wood stork	*Mycteria americana*		T	possible[2]
FISHES				
Blue sucker	*Cycleptus elongatus*		T	none
MAMMALS				
Red wolf	*Canis rufus*	E	E	very unlikely
MOLLUSKS				
False spike mussel	*Quadrula mitchelli*		T	unlikely
Golden orb	*Quadrula aurea*	C	T	possible
Texas fatmucket	*Lampsilis bracteata*	C	T	none
Texas pimpleback	*Quadrula petrina*	C	T	possible
REPTILES				
Cagle's map turtle	*Graptemys caglei*		T	none
Texas horned lizard	*Phrynosoma cornutum*		T	possible
Timber/canebrake rattlesnake	*Crotalus horridus*		T	possible

Sources: USFWS, 2013 and TPWD, 2012.

Notes:

1. **USFWS listing codes:** C = Candidate; DL = Delisted; DM = Delisted species that has recovered and is being monitored during the first five years of delisted status; E = Endangered (i.e., in danger of extinction); T = Threatened (i.e., severely depleted population that may become endangered); blank = no federal status. **TPWD listing codes**: E = Endangered; T = Threatened
2. Assumed to be a transient species, potentially migrating through the study area and using suitable habitat for stopovers.

4.1 Federal Listings

4.1.1 Peregrine Falcon

4.1.1.1 Habitat Description

The peregrine falcon (*Falco peregrinus*) nests on cliffs and in cliff-like areas near wetlands and water bodies. The American subspecies (*Falco peregrinus anatum*) breeds throughout the western United States, Canada, and Mexico, and in the Trans-Pecos region of Texas. This subspecies is not easily distinguished at a distance from the Arctic subspecies (*Falco peregrinus tundrius*), which breeds within the tundra regions of Alaska, Canada, and Greenland. Both subspecies migrate through Texas, and can be found seasonally along the Texas Gulf Coast. Species decline has been attributed to human disturbance, habitat loss, illegal shooting/collecting, and, most notably, past use of the pesticide dichloro-diphenyl-trichloroethane (DDT). The Arctic subspecies is no longer listed in Texas; however, because the subspecies are difficult to distinguish from one another, references are generally made at the species level.

4.1.1.2 Potential for Occurrence

Preferred habitat for these subspecies is absent within the study area, and there exists no potential for the area to be used for stopover during migration. It is unlikely that the peregrine falcon, including both subspecies, would occur on the site.

4.1.2 Bald Eagle

4.1.2.1 Habitat Description

In Texas, preferred bald eagle winter nesting habitat is along river systems or within 1-2 miles of large bodies of water. In Texas, bald eagle nesting typically occurs from October to July. Past threats to the species included reproductive failure due to pesticides, unrestricted taking by humans, and loss of habitat. Habitat loss continues to be a current threat to populations.

4.1.2.2 Potential for Occurrence

Bald eagles sightings are occurring more frequently, and may include a variety of aquatic habitats. Halff has observed nest sites and individuals near major reservoirs as well as nest

sites near a major stream in the absence of large open water body (i.e. lake or pond). It is reasonable to conclude that a bald eagle could use the large impoundment in the southern portion of the study area. However, the bald eagle is a commonly known species, and any presence in the area would be notable from frequently used interior access roads. No known sightings of the bald eagle have been reported on the site. Although the large pond may provide suitable habitat, it is unlikely that the bald eagle would occur in the study area.

4.1.3 Whooping Crane

4.1.3.1 Habitat Description

Preferred whooping crane habitat includes freshwater marshes, tidal flats, barrier islands, and wet prairies. Historically, the whooping crane occurred throughout most of North America. It was almost extirpated during the twentieth century due to habitat destruction and human disturbances. Whooping crane populations increased from a low of 18 in 1938-1939 to approximately 300 in 1990. Whooping cranes breed in the wetlands of Wood Buffalo National Park, Northwest Territory, Canada, and winter in the coastal wetlands of the Aransas National Wildlife Refuge in Aransas, Calhoun, and Refugio Counties, Texas,. Consistent with a USFWS publication addressing whooping cranes and transmission lines, the migration route may be described as a generally straight corridor extending north to south from West Central Canada to the Texas Gulf Coast. This north to south corridor is approximately 220 miles wide west to east, and the study area lies on the eastern edge of migration corridor. The main flight corridor, within which 85 percent of migrating whooping crane sightings has been made throughout its length from Canada to the Texas Gulf Coast includes the study area.

4.1.3.2 Potential for Occurrence

Whooping crane stopover sites have been known to include the shallow upstream flats of major reservoirs in the central Texas portion of their migration route. These types of habitats generally provide broad open inundated flats that provide suitable foraging opportunities. The large impoundment in the southern portion of the study area may contain some shallow aquatic habitats on the upstream end where Dry Creek, the primary drainage, enters the pond. However, these areas are relatively small and densely vegetated with emergent and floating aquatic species. The density of sightings in Texas is more diffuse compared to the central United States, with only a few sightings in the central Texas region. Sighting reports are much more common near the coast where the birds have reached the terminus of their migration.

Preferred habitat for this species is absent within the study area, and there exists no potential for the area to be used for stopover during migration. There are no records of observations of whooping cranes within the study area, and it is unlikely the whooping crane would use the impoundment of Dry Creek as a stopover site.

4.1.4 Red Wolf

4.1.4.1 Habitat Description

The red wolf was historically found throughout much of the eastern half of Texas. Typical habitat included woodlands and grasslands where suitable cover and den sites could be found.

4.1.4.2 Potential for Occurrence

Although suitable habitat may exist based on the description, it is thought to be extirpated throughout its range and it is very unlikely that the red wolf would occur in the study area.

4.1.5 Golden Orb

4.1.5.1 Habitat Description

Golden orb is known to occur in the San Antonio, Guadalupe, Colorado, Brazos, Nueces, and Frio River systems. Habitat includes sand and gravel in riverine settings; specimens have also been collected in mud at the bases of inundated trees on impoundments of larger stream systems.

4.1.5.2 Potential for Occurrence

It is reasonable to conclude that the Golden orb could be found in the large impoundment in the southern portion of the study area.

4.1.6 Texas Fatmucket

4.1.6.1 Habitat Description

Texas fatmucket is known to occur in the San Antonio, Guadalupe, and Colorado River systems, with habitat limited to streams and rivers of sand, mud, and gravel substrates. This species is considered intolerant of impoundment.

4.1.6.2 Potential for Occurrence

Given the reported intolerance to impoundment, it is unlikely that the large impoundment in the southern portion of the study area could be classified as suitable habitat. In the absence of perennial flowing streams, it is reasonable to conclude that the Texas fatmucket does not occur in the study area.

4.1.7 Texas Pimpleback

4.1.7.1 Habitat Description

Texas pimpleback is known to occur in the Guadalupe and Colorado River systems, including reports from the Llano, San Saba, and Pedernales Rivers. Habitat includes mud and gravel at slow flow rates, and may also extend to impoundments of larger streams.

4.1.7.2 Potential for Occurrence

It is reasonable to conclude that the Texas pimpleback could be found in the large impoundment in the southern portion of the study area.

4.2 State Listings

4.2.1 Wood stork

4.2.1.1 Habitat Description

The preferred habitat of the wood stork consists of low-lying wetland areas that may be seasonably flooded and/or drying. This stork forages in swamps, prairie ponds, wet meadows, flooded pastures or fields, ditches, and other shallow standing water, including coastal areas. This stork usually roosts communally in tall snags, sometimes in association with other wading birds (such as herons). Only seasonally drying wetlands (mostly in drying ponds) concentrate enough fish to provide the food that a pair of these big birds requires during the breeding season. The wood stork is not a federally-listed endangered species in Texas, but is listed by the USFWS in Alabama, Georgia, Florida, and South Carolina. The wood stork is a state-listed threatened species by TPWD.

4.2.1.2 Potential for Occurrence

Preferred habitat for this species would be limited to the larger impoundment found on the property. In addition to providing foraging habitat, the east side of the pond contains several

large snags that would be suitable for roosting or perching. No wood storks were observed during the field investigations; however, numerous other heron and egret species were observed perching in the snags, and wading in the shoreline wetland fringe. It is reasonable to conclude that the wood stork could use the large impoundment as a stopover site. The bird's potential use of the study area for migratory stopovers should be considered incidental relative to the large area regarded as their migration corridor and the common frequency of stock ponds within this migration corridor.

4.2.2 Blue Sucker

4.2.2.1 Habitat Description

The blue sucker is a large river fish that needs fast-moving water to survive. River substrates generally consist of exposed bedrock, in combination with hard clay, sand, and gravel. Adults winter in deep pools and move upstream to spawn on riffles. Impoundments to major streams are considered the biggest threat to the species.

4.2.2.2 Potential for Occurrence

In the absence of any perennial flowing streams on the property, it can be concluded that the blue sucker would not occur in the study area.

4.2.3 False Spike Mussel

4.2.3.1 Habitat Description

The false spike mussel inhabits substrates of cobble and mud, with water lilies present. This species is known to inhabit the Rio Grande, Brazos, Colorado, and Guadalupe (historic) river basins. The false spike mussel is possibly extirpated in Texas.

4.2.3.2 Potential for Occurrence

Although potential habitat may exist in the pond substrates, the species is potentially extirpated in Texas, and it is unlikely the species would occur in the study area.

4.2.4 Cagle's Map Turtle

4.2.4.1 Habitat Description

Known to some as the "green" map turtle to differentiate it from the similar Texas map turtle, Cagle's map turtle is endemic to the Guadalupe River—but can also be found in associated creeks and tributaries. Habitats are characterized with swift to moderate flow with gravel or cobble bottom, connected by deeper pools with a slower rate and silt or mud bottom. Riffle sequences are important prey habitats. TXNDD records indicate that the turtles were observed in the San Marcos River, a perennial flowing stream, approximately 15 miles southwest of the study area.

4.2.4.2 Potential for Occurrence

In the absence of any perennial flowing streams, it can be concluded that the Cagle's map turtle would not occur in the study area.

4.2.5 Texas Horned Lizard

4.2.5.1 Habitat Description

The historical range of the Texas horned lizard included the entire state in areas of flat, open terrain with scattered vegetation and sandy or loamy soils. Over the last several decades, declines have been linked to loss of habitat, over-collection by the pet trade, and the accidental introduction of the imported fire ant. Despite low numbers in east and central Texas, the Texas horned lizard is still locally common in portions of the Rio Grande Plains of south Texas, the Rolling and High Plains of northwest Texas and the Trans Pecos of far west Texas. According to TPWD habitat requirements, the Texas horned lizard can be found "in arid and semiarid habitats in open areas with sparse plant cover." Other habitat descriptions are similar and described as arid and semiarid open country with sparse plant growth, bunch grass, cactus, juniper, acacia, and mesquite. The ground may be of sand, loam, hardpan, or rock. TPWD Staff Herpetologists have suggested that dense herbaceous vegetation may be suitable habitat provided that there is no canopy (i.e. bunch grasses). As one moves further west in the state, Texas horned lizards may be more common as habitats change to Ashe juniper/mesquite cover types. These cover types are usually on rockier soils which are conducive to sparse plant growth in the herbaceous layer.

4.2.5.2 Potential for Occurrence

Almost all of the study area is heavily vegetated with either oak/elm woodlands, mesquite woodlands, or grassland/pasture land. Grassland areas are dominated by dense cover species such as Texas wintergrass and threeawn which would provide significant ground cover compared to clump species. However, forested areas had rockier soils with less cover in the herbaceous layer. Red ants, a food source for the Texas horned lizard, were observed along interior access roads and other locations in the study area. Generally easy to identify where present, no individuals Texas horned lizards were identified during the site investigation. However, the study area is certainly within the historical range of the Texas horned lizard, and it is reasonable to conclude the Texas horned lizard could occur in the study area.

4.2.6 Timber Rattlesnake

4.2.6.1 Habitat Description

The timber/canebrake rattlesnake is a shy animal that prefers to live in areas with ample cover and available refuge. Preferred habitat is forested areas with dense ground cover. The distribution of the timber/canebrake rattlesnake stretches from the East Coast westward into Texas, and as far north as New England. In the southern portions of its range, this species prefers to make its den in moist lowland forests, or hilly woodlands near rivers, streams, and lakes.

4.2.6.2 Potential for Occurrence

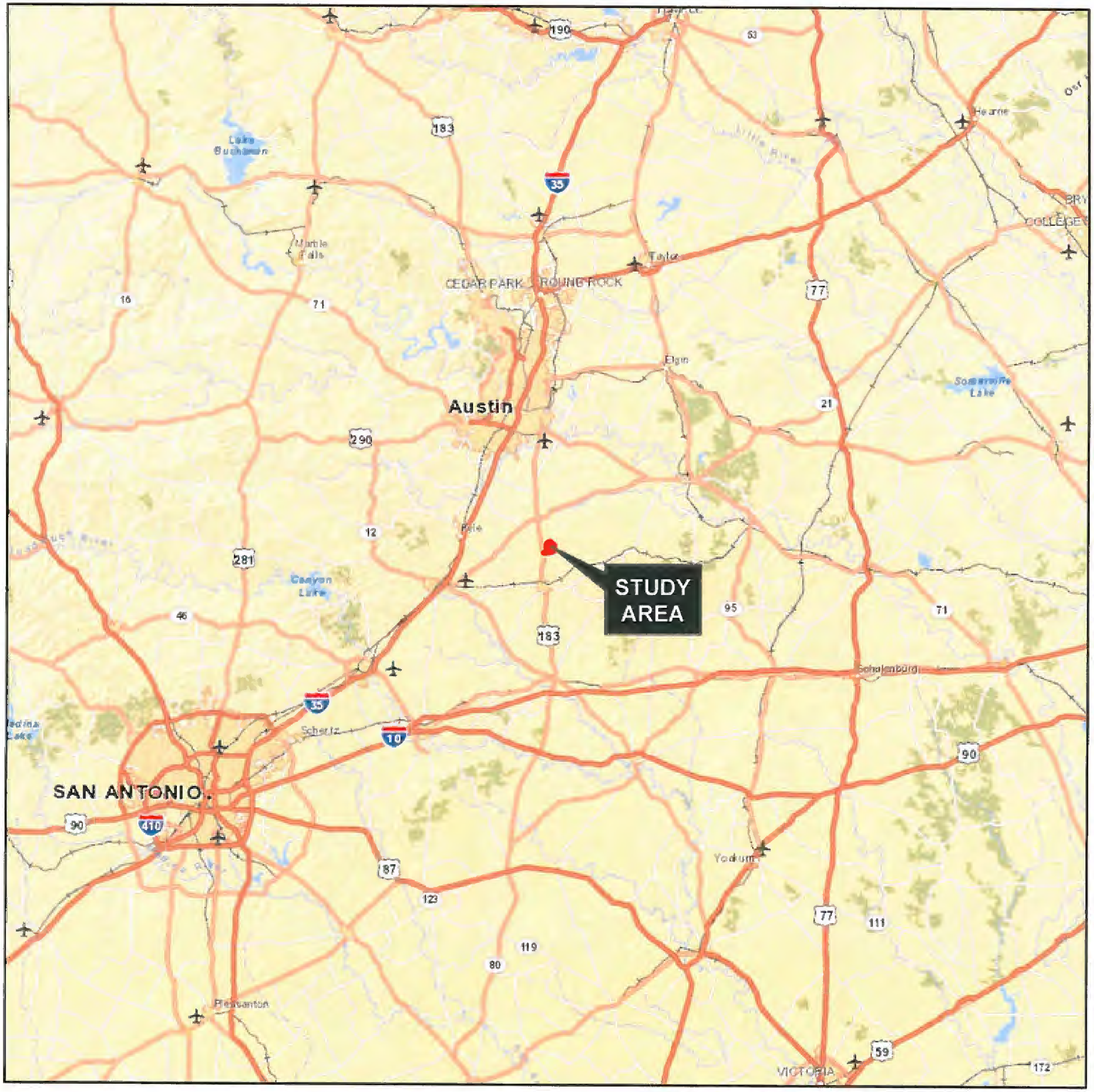
The study area represents the western edge of its range, and includes area that may be considered suitable habitat. Populations tend to be higher in eastern Texas where greater concentrations of wetlands and humid forests are found. Given the somewhat general habitat requirements for the timber rattlesnake, it is reasonable to conclude that the species may occur in the study area. The oak/elm forests in the study area occur in both upland and riparian habitats which meet some habitat descriptions. Given the shallow soils and presence of large cobble in several of the streams, rock outcropping and rock fissures necessary for dens could also be present.

5.0 CONCLUSIONS

As shown on in **Table 1** of this memorandum, Halff has identified five threatened or endangered species that have the potential to occur within the study area: the wood stork, the golden orb, the Texas pimpleback, the Texas horned lizard, and the timber rattlesnake. Because none of these is a federal-listed threatened or endangered species, no critical habitat has been designated for any of them. There will be "no effect" to any federally-listed threatened or endangered species. Those portions of the study area that may provide suitable habitat for the state-listed wood stork, golden orb, and Texas pimpleback are limited to aquatic habitats associated with the large impoundment in the southern portion of the study area, away from areas that will be impacted by the proposed facility. Construction and operation of the project will not result in destruction or adverse modification of habitat (including critical habitat) for these species, and will not cause or contribute to the taking of these species.

A small area of oak/elm woods that may provide suitable habitat for the timber rattlesnake will be cleared during construction of the access road and attendant facilities; an additional larger area within some portion of the landfill footprint will also be cleared. Similarly, this habitat type may also provide habitat for the Texas horned lizard. Clearing will be done in accordance with the attached species protection plan for both species to be included in Appendix IVC to the Site Operating Plans for the landfill and transfer station. As a result, Halff has concluded that 130 Environmental Park and its operation will not result in the destruction or adverse modification of these species' habitat, or cause or contribute to the taking of these species.

APPENDIX A
FIGURES



0 10 20 40
Miles

Legend

Study Area

Notes:
1. Source/Year of Base Map: ESRI, World Street Map/2013
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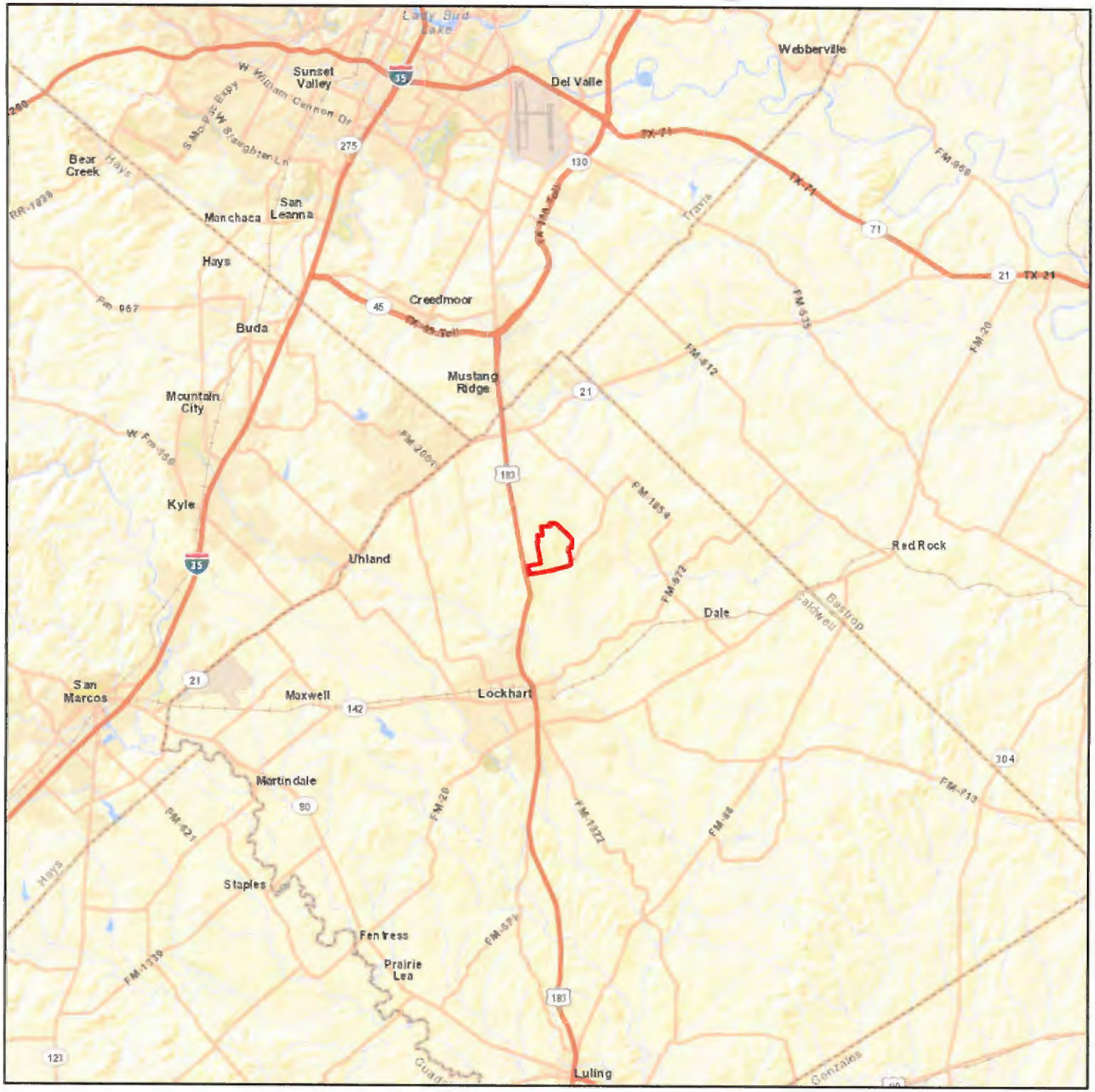
Project Title: 130 ENVIRONMENTAL PARK	
Project Number:	
Date: 08/2013	AVO: 29520
Sheet Title: PROJECT LOCATION MAP	
Sheet Number: FIGURE A-1	

HALFF



Notes:
1. Source/Year of Base Map: ESRI, World Street Map Service/2013
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Project Title: 130 ENVIRONMENTAL PARK
Project Number:
Date: 08/2013 AVO: 29520
Sheet Title: PROJECT VICINITY MAP
Sheet Number: FIGURE A-2
HALFF

0 750 1,500 3,000

Feet

Legend

Study Area

Notes:
1. Aerial photo from Dallas Aerial Service flown May 13, 2013
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Project Title: 130 ENVIRONMENTAL PARK
Project Number:
Date: 08/2013 AVO: 29520
Sheet Title: STUDY AREA MAP
Sheet Number: FIGURE A-3
HALFF

APPENDIX B
SPECIES PROTECTION PLAN

SPECIES PROTECTION PLAN

For:
130 Environmental Park

Prepared by:

HALFF ASSOCIATES, INC.

1201 NORTH BOWSER ROAD
RICHARDSON, TX 75081

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AVO 29520

August 2013

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Figures

1.0 INTRODUCTION

130 Environmental Park, LLC plans to develop a new municipal solid waste facility, including a Type I municipal solid waste landfill and a Type V municipal solid waste transfer station, within a facility boundary area of 520 acres located on a tract of land totaling approximately 1,229 acres in Caldwell County (the study area). The location of the study area is on the east side of State Highway (SH) 130/US 183 north of the City of Lockhart, Texas, extending from the intersection of US 183 and FM 1185 east to Homannville Trail. **Figure 1** shows the general project location with respect to larger metropolitan areas. **Figure 2** shows the location within Caldwell County and in relation to the City of Lockhart. The facility will be accessed from northbound US 183 through an entrance road. A gatehouse and scales will be provided within the facility boundary. The landfill footprint will cover approximately 208 acres located within the facility boundary area.

The facility will be permitted/registered in accordance with 30 TAC Chapter 330 Municipal Solid Waste Management Regulations. The Texas Commission on Environmental Quality (TCEQ) is the agency responsible for permitting and regulating municipal solid waste facilities. The TCEQ requires an applicant to address endangered and threatened species. Halff Associates, Inc. (Halff) has identified five threatened or endangered species that have the potential to occur within the study area: the wood stork, the golden orb mussel, the Texas pimpleback mussel, the Texas horned lizard, and the timber rattlesnake. All are state-listed threatened species; no critical habitat has been designated for any of these species. Those portions of the study area that may provide suitable habitat for the wood stork, golden orb, and Texas pimpleback are located away from areas that will be impacted by construction and operation of the facility. Within the study area, the forested areas near permanent water sources may provide suitable habitat for the Texas horned lizard and timber rattlesnake.

2.0 PRESENCE OF POTENTIALLY SUITABLE HABITAT

2.1 Wood Stork

The potential for occurrence of the wood stork within the study area is conditional on the basis that this species migrates and its migratory range may happen to overlap water features in the study area (the south central pond/wetland complex shown on **Figure 3**) that may be suitable as a temporary stopover site. Because no critical habitat has been designated for this species,

because of the incidental chance for occurrence, and because the suitable habitat occurs in an area that will not be impacted by the proposed facility, the project will not result in the destruction or adverse modification of critical habitat of or cause or contribute to takings of this species.

2.2 Golden Orb and Texas Pimpleback

The golden orb and Texas pimpleback are mussel species whose range includes the Guadalupe River tributary system. Recorded observations are known to include impoundments of larger stream systems, and it is reasonable to conclude that these species could be found in the south central pond. Because no critical habitat has been designated for these species, and because the suitable habitat occurs in areas that will not be impacted by the proposed facilities, the project will not result in the destruction or adverse modification of critical habitat of, or cause or contribute to takings of, these mussels.

2.3 Timber Rattlesnake

The study area represents the western edge of the timber rattlesnake's range, and includes conditions that may be suitable for this snake. Timber rattlesnakes are found in upland woods, rocky ridges, and moist lowland forests or thickets near permanent water sources such as rivers, lakes, ponds, streams and swamps where tree stumps, logs and branches provide refuge. Within the study area, the areas that may provide suitable habitat for the timber rattlesnake are the forested areas in close proximity to stream corridors. A conservative (overly-inclusive) depiction of these areas is shown on **Figure 3.**

2.4 Texas Horned Lizard

The historical range of the Texas horned lizard included the entire state in areas of flat, open terrain with scattered vegetation and sandy or loamy soils. Grassland areas in the study area are dominated by dense cover species such as Texas wintergrass and threeawn which would provide significant ground cover compared to clump species. However, forested areas along the western portion of the study area have rockier soils with less cover in the herbaceous layer and would be considered the more suitable habitat for this species within the study area. A conservative (overly-inclusive) depiction of these areas is shown on **Figure 3.**

3.0 AVOIDANCE, MINIMIZATION, AND MITIGATION

No wood stork, Texas horned lizard, or timber rattlesnake was observed by Halff personnel during the hundreds of man-hours spent investigating the study area in June and July 2013; because the potentially suitable habitat for the mussel species within the study area (the large impoundment in the southern portion) is away from area that would be impacted by the project, surveys to determine the presence of the mussel species were not conducted. Suitable habitat within the study area for these species is depicted on **Figure 3**. Facility construction and operation activities will occur away from areas that include potentially suitable habitat for the wood stork and the two mussel species. A linear forested area (less than 14.8 acres) along the western edge of the study area will be cleared during construction of the entrance road; this area includes habitat that is potentially suitable for both the Texas horned lizard and timber rattlesnake. Additional forested areas (totaling 118.0 acres) will be cleared as part of the landfill development; this area has limited potential to include the timber rattlesnake. Each of these areas depicted in **Figure 3**; not depicted on the figure is perimeter fencing which will be placed along the edge of the facility boundary.

The avoidance, minimization, and mitigation measures to be implemented pursuant to this species protection plan include:

1. Clearing of the forested areas shown on **Figure 3**, and the clearing for the perimeter fencing, will not occur between September and May to avoid the hibernation periods for the Texas horned lizard and timber rattlesnake.

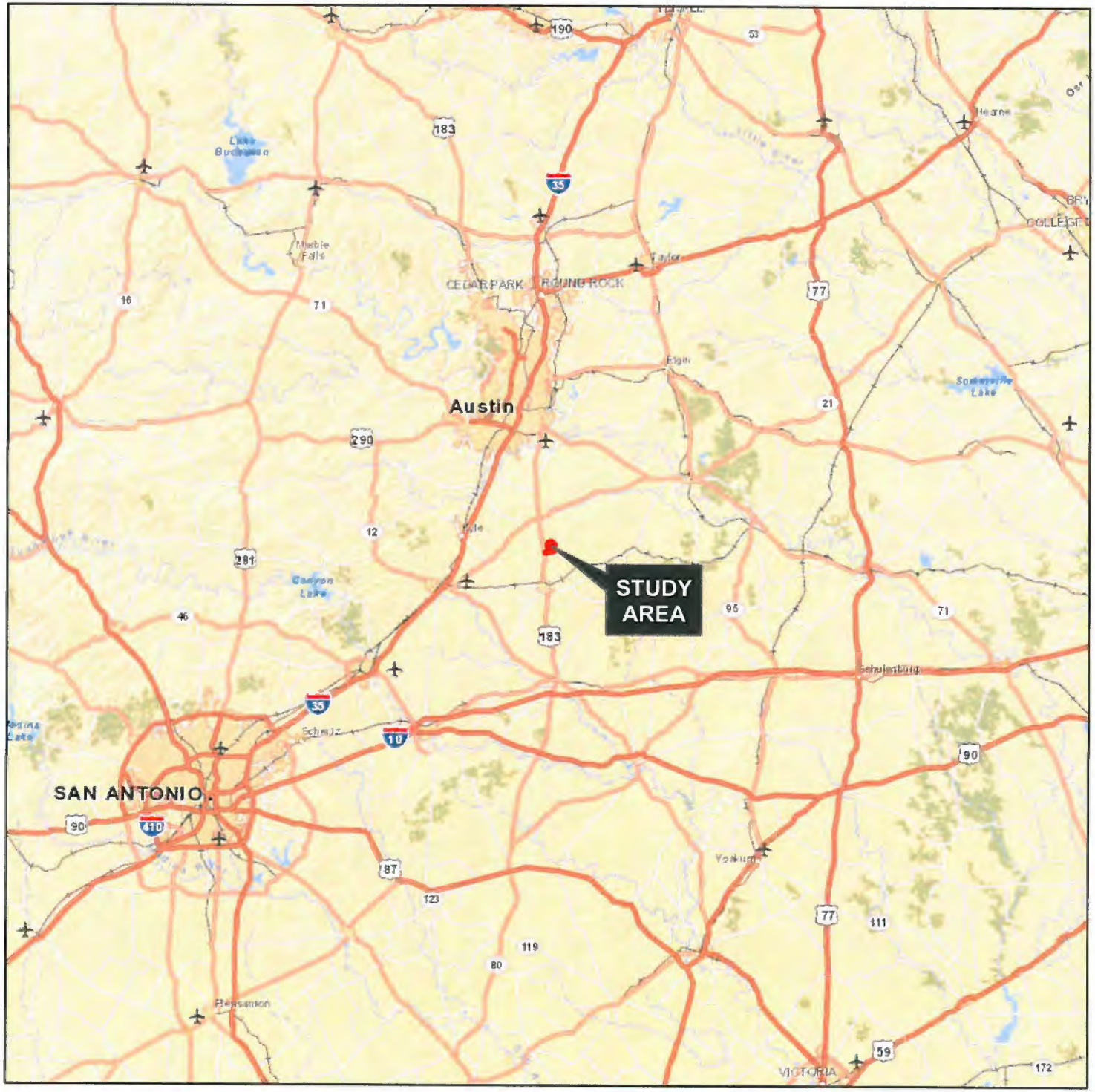
2. Immediately prior to clearing to facilitate construction of the access road, landfill area, transfer station, and perimeter fencing, a survey of the area will be conducted by a biologist with a Texas Parks & Wildlife Department (TPWD) scientific collection permit. If a Texas horned lizard or timber rattlesnake is observed during this survey, the specimen(s) will be relocated by the biologist to suitable habitat in the forested riparian corridor area in the western part of the study area.

3. During the clearing operations, a biologist with a TPWD scientific collection permit will conduct surveys around construction equipment prior to start-up of the equipment and in the area where clearing or fencing will occur in advance of operations. If a Texas

horned lizard or timber rattlesnake is observed during these surveys, work will be stopped and the specimen(s) will be relocated by the biologist to suitable habitat in the forested riparian corridor area in the western part of the study area.

4. Although unexpected, a limited potential exists that the Texas horned lizard or timber rattlesnake may be encountered in marginal habitat in other parts of the site. If specimens are observed during construction in any such area, work will be stopped and a biologist with a TPWD scientific collection permit will be contacted to determine and implement any appropriate actions, including pre-construction surveys and/or the possible relocation (by a biologist with a TPWD scientific collection permit) of specimens to suitable habitat in the forested riparian corridor area in the western part of the study area.

5. Employees and construction crews working on the site will receive pocket identification cards with color photographs and species information for the wood stork, Texas horned lizard, and timber rattlesnake. These will allow for identification of the species and provide instructions on how to respond to a sighting: avoid disturbance of the animal and notify the facility general manager of the sighting location and species. Signage will also be posted at the Gate House with similar information. Following a reported sighting of any of these species, the facility general manager will contact a biologist with a TPWD scientific collection permit to determine and implement any appropriate action, including the possible relocation (by a biologist with a TPWD scientific collection permit) of a Texas horned lizard or timber rattlesnake to suitable habitat in the forested riparian corridor area in the western part of the study area.



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0 10 20 40

Miles

Legend

Study Area

Notes:
1. Source/Year of Base Map: ESRI, World Street Map/2013
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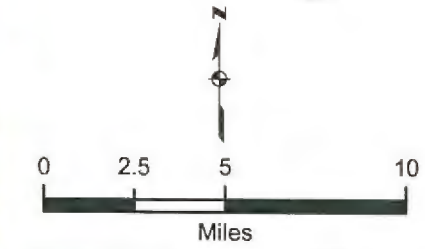
Project Title: 130 ENVIRONMENTAL PARK
Project Number
Date: 06/2013 AVO: 29520
Sheet Title: PROJECT LOCATION MAP
Sheet Number: FIGURE 1
HALFF



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Study Area

Notes:
1. Source/Year of Base Map: ESRI, World Street Map Service/2013
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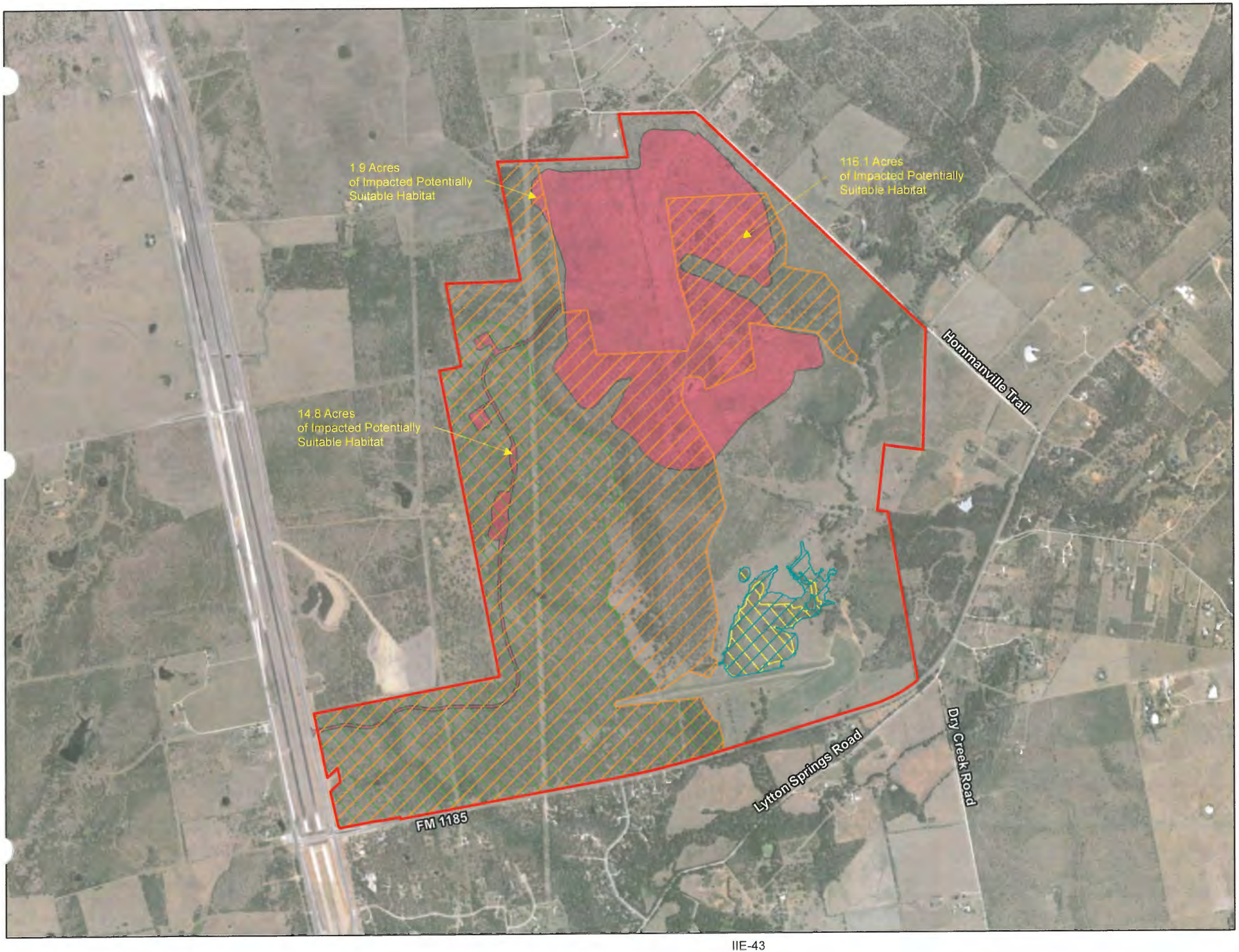
Project Title: 130 ENVIRONMENTAL PARK
Project Number
Date: 06/2013 AVO: 29520
Sheet Title: PROJECT VICINITY MAP
Sheet Number: FIGURE 2
HALFF



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SCALE IN FEET

Legend

- Study Area
- Wood Stork
- Golden Orb & Texas Pimpleback
- Timber/ Canebrake Rattlesnake
- Texas Horned Lizard
- Project Impact Area

Species	Potentially Suitable Habitat Acreage
Wood Stork	30.9
Texas Pimpleback	20.9
Golden Orb	20.9
Timber/ Canebrake Rattlesnake	705.9
Texas Horned Lizard	388.8

Notes:
1. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Project Title: 130 ENVIRONMENTAL PARK
Project Number:
Date: 08/2013 AVO: 29520
Sheet Title: POTENTIALLY SUITABLE HABITAT MAP
Sheet Number: FIGURE 3
HALFF

Texas Natural Diversity Database (TXNDD) Search

(Halff, 2013)

Element Occurrence Record

Scientific Name: Argythamnia aphoroides **Occurrence #:** 14 **Eo Id:** 1107

Common Name: Hill Country wild-mercury **Track Status:** Track all extant and selected historical EOs

TX Protection Status:

Global Rank: G2 **State Rank:** S2 **Federal Status:**

Location Information:

Directions:

SAN MARCOS AND VICINITY

Survey Information:

First Observation: **Survey Date:** **Last Observation:** 1898-SUMM

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data:

Reference:

Citation:

RARE PLANT STUDY CENTER, UNIVERSITY OF TEXAS AT AUSTIN. 1978. REPORT ON ARGYTHAMNIA APHOROIDES.

Specimen:

New York Botanical Garden, Bronx. 1898. S.W. Stanfield (s.n.), Specimen # ? NY. Summer 1898.

Element Occurrence Record

Scientific Name: Graptemys caglei **Occurrence #:** 10 **Eo Id:** 8881

Common Name: Cagle's Map Turtle **Track Status:** Track all extant and selected historical EOs

TX Protection Status: T

Global Rank: G3 **State Rank:** S1 **Federal Status:**

Location Information:

Directions:

Turtles were observed in the San Marcos River at the FM 20 crossing.

Survey Information:

First Observation: 2006 **Survey Date:** 2006 **Last Observation:** 2006

Eo Type: **Eo Rank:** E **Eo Rank Date:** 2006

Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: 2005-2006: Four individuals were identified visually with spotting scopes.

Reference:

Citation:

Simpson, Thomas R. and F. L. Rose. 2007. Distribution of Cagle's map turtle (Graptemys caglei) in the Blanco and San Marcos rivers. The Texas Journal of Science. 59(3): 201-208

Specimen:

Element Occurrence Record

Scientific Name: Holbrookia lacerata

Occurrence #: 129 **Eo Id:** 9733

Common Name: Spot-tailed Earless Lizard

Track Status: Track all extant and selected historical EOs

TX Protection Status:

Global Rank: G3G4 **State Rank:** S2

Federal Status:

Location Information:

Directions:

Bastrop, 16 miles W on Moore Brothers Ranch.

Survey Information:

First Observation: 1970-11-15 **Survey Date:** 1970-11-15 **Last Observation:** 1970-11-15

Eo Type: **Eo Rank:** H **Eo Rank Date:** 1970-11-15

Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: 15 Nov 1970: A specimen was collected.

Reference:

Citation:

Duran, Mike and R. W. Axtell. 2010. A rangewide inventory and habitat model for the spot-tailed earless lizard (Holbrookia lacerata). Horned Lizard License Plate Fund Contract # 199464. Submitted to Texas Parks and Wildlife Dept. 30 November 2010. 35 pp with additional files.

Ralph Axtell. 1998. Holbrookia lacerata Cope. Interpretive Atlas of Texas Lizards, No. 20. Self published. 12 pp.

Specimen:

Texas Cooperative Wildlife Collection, Texas A&M University, College Station, TX; Wallace, Catalog # 36582, 15 Nov 1970, TCWC.

Element Occurrence Record

Scientific Name: Micropterus treculi **Occurrence #:** 24 **Eo Id:** 3822

Common Name: Guadalupe Bass **Track Status:** Track all extant and selected historical EOs

TX Protection Status:

Global Rank: G3 **State Rank:** S3 **Federal Status:**

Location Information:

Directions:

SAN MARCOS RIVER FROM SAN MARCOS TO LULING, LOCATED ESPECIALLY AT 1.6 KILOMETERS EAST OF STAPLES

Survey Information:

First Observation: **Survey Date:** **Last Observation:** 1978-03

Eo Type: **Eo Rank:** D **Eo Rank Date:**

Observed Area:

Comments:

General Description: CLEAR, MEDIUM STREAM, LIMESTONE AND SILT SUBSTRATE, RIFFLES AND POOLS

Comments: ENDEMIC TO SEVERAL RIVERS OF EASTERN EDWARDS PLATEAU, COMMON IN PREFERRED HABITAT

Protection Comments: HYBRIDIZES WITH MICROPTERUS PUNCTULATUS

Management Comments:

Data:

EO Data: SPECIMENS COLLECTED AT THIS LOCALITY, SEE SUMMARY IN EDWARDS, 1980, Ph.D. DISSERTATION, ZOOLOGY DEPARTMENT, UT-AUSTIN

Reference:

Citation:

EDWARDS, ROBERT J. 1980. THE ECOLOGY AND GEOGRAPHIC VARIATION OF THE GUADALUPE BASS (MICROPTERUS TRECULI). PhD. DISSERTATION, ZOOLOGY DEPARTMENT, UT-AUSTIN.

LEE, DAVID S. ET AL. 1980. ATLAS OF NORTH AMERICAN FRESHWATER FISHES. N.C. STATE MUSEUM OF NAT. HIST., GREENSBORO, NC.

Specimen:

Element Occurrence Record

Scientific Name: Quercus buckleyi series **Occurrence #:** 23 **Eo Id:** 2908

Common Name: Texas Oak Series **Track Status:** Track all extant and selected historical EOs

TX Protection Status:

Global Rank: G3 **State Rank:** S3 **Federal Status:**

Location Information:

Directions:

CALCAREOUS SANDSTONE SLOPES OF VARIOUS ASPECT NORTH, SOUTH, AND WEST OF RECREATION HALL, LOCKHART SRA

Survey Information:

First Observation: **Survey Date:** 1990-06-12 **Last Observation:** 1990

Eo Type: **Eo Rank:** CD **Eo Rank Date:** 1990-06-12

Observed Area:

Comments:

General Description: YOUNG GROWTH FOREST, MOSTLY CEDAR ELM WITH SCATTERED STANDS OF TEXAS OAK

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: DESCRIPTION AND PLANT LIST IN DLI REPORT, SITE 1

Reference:

Citation:

TEXAS PARKS & WILDLIFE DEPARTMENT. 1990. LOCKHART STATE RECREATION AREA. SUMMARY OF REPRESENTATIVE PLANT COMMUNITIES.

Specimen:

Element Occurrence Record

Scientific Name: Quercus fusiformis/schizachyrium scoparium series

Common Name: Plateau Live Oak/little Bluestem Series

Occurrence #: 7 **Eo Id:** 3659

Track Status: Track all extant and selected historical EOs

TX Protection Status:

Global Rank: G2G4 **State Rank:** S3

Federal Status:

Location Information:

Directions:

LEVEL UPLAND ON LEONA FORMATION TERRACE GRAVELS SOUTH OF ROAD TO RECREATION HALL, SOUTHWEST CORNER OF LOCKHART SRA

Survey Information:

First Observation:

Survey Date: 1990-06-13

Last Observation: 1990

Eo Type:

Eo Rank: C

Eo Rank Date: 1990-06-13

Observed Area:

Comments:

General Description: OLD PASTURE WITH SCATTERED POST OAK, LIVE OAK MOTTES; LITTLE BLUESTEM ON DEEPER SOILS, WEEDY FORBS ON SHALLOWER SOILS

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: DESCRIPTION AND PLANT LIST IN DLI REPORT, SITE 2

Reference:

Citation:

TEXAS PARKS & WILDLIFE DEPARTMENT. 1990. LOCKHART STATE RECREATION AREA. SUMMARY OF REPRESENTATIVE PLANT COMMUNITIES.

Specimen:

Element Occurrence Record

Scientific Name: Rookery **Occurrence #:** 539 **Eo Id:** 6195

Common Name: **Track Status:** Track all extant and selected historical EOs

TX Protection Status:

Global Rank: GNR **State Rank:** SNR **Federal Status:**

Location Information:

Directions:

AT AQUADUCT RESERVOIRS SOUTHEAST OF LOCKHART

Survey Information:

First Observation: 1988 **Survey Date:** **Last Observation:** 1989

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description:

Comments: COLONY NUMBER 599-001

Protection Comments:

Management Comments:

Data:

EO Data: NESTING COLONY OF THE LITTLE BLUE HERON AND CATTLE EGRET

Reference:

Citation:

TEXAS COLONIAL WATERBIRD SOCIETY AND TEXAS PARKS & WILDLIFE DEPARTMENT. 1986-1989. TEXAS COLONIAL WATERBIRD CENSUS SUMMARY. SPECIAL ADMINISTRATIVE REPORTS.

Specimen:

Element Occurrence Record

Scientific Name: Rookery **Occurrence #:** 592 **Eo Id:** 8928

Common Name: **Track Status:** Track all extant and selected historical EOs

TX Protection Status:

Global Rank: GNR **State Rank:** SNR **Federal Status:**

Location Information:

Directions:

Along the main road in Dale, TX. Approx. 11 air kilometers NE of Lockhart.

Survey Information:

First Observation: 2008 **Survey Date:** 2009-06-01 **Last Observation:** 2009-06-01

Eo Type: **Eo Rank:** A **Eo Rank Date:** 2009-06-01

Observed Area:

Comments:

General Description: The rookery is approx. 5,500 sq. meters and in a woodlot that appeared to be 100 percent hackberry. It looked like a second growth woodlot; the trees were not mature. They appeared to be around the same age. The volume of birds had a severe impact on the trees and the forest floor. The woodlot is bound by a highway on one side and driveways on two more sides.

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: 2008: Landowner first noticed birds using the rookery. 1 June 2009: Based on the size of the area, and the density of nests, there were 6,000-10,000 Cattle Egret nests and approx. 500 Little Blue Heron nests. In addition, a few pairs of Great Egrets and a single White Ibis were observed coming into the rookery, but nesting was not confirmed for these species.

Reference:

Citation:

Hanks, Cullen. 2009. Field survey to a rookery in Dale, Texas, of 1 June 2009.

Specimen:

Element Occurrence Record

Scientific Name: Schizachyrium scoparium-sorghastrum nutans series
Occurrence #: 75 **Eo Id:** 5073
Common Name: Little Bluestem-indiangrass Series
Track Status: Track all extant and selected historical EOs
TX Protection Status:
Global Rank: G2 **State Rank:** S2
Federal Status:

Location Information:

Directions:

EAST SIDE OF CLEAR FORK PLUM CREEK, SOUTH SIDE OF RODEO GROUNDS, HIDDEN SOUTHEAST CORNER OF LOCKHART SRA

Survey Information:

First Observation: **Survey Date:** 1990-06-13 **Last Observation:** 1990
Eo Type: **Eo Rank:** C **Eo Rank Date:** 1990-06-13
Observed Area:

Comments:

General Description: SELDOM MOWN OLD PASTURE WITH DENSE COVER OF LITTLE BLUESTEM AND SEVERAL "PRAIRIE" FORBS

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: DESCRIPTION AND PLANT LIST IN DLI REPORT, SITE 3

Reference:

Citation:

TEXAS PARKS & WILDLIFE DEPARTMENT. 1990. LOCKHART STATE RECREATION AREA. SUMMARY OF REPRESENTATIVE PLANT COMMUNITIES.

Specimen:

Element Occurrence Record

Scientific Name: Thamnophis sirtalis annectens **Occurrence #:** 24 **Eo Id:** 4519

Common Name: Texas Garter Snake **Track Status:** Track all extant and selected historical EOs

TX Protection Status:

Global Rank: G5T4 **State Rank:** S2 **Federal Status:**

Location Information:

Directions:

7 MILES NORTH-NORTHEAST OF KYLE

Survey Information:

First Observation: **Survey Date:** **Last Observation:** 1950-07-09

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data:

Reference:

Citation:

Specimen:

Baylor University, Bryce C. Brown Collection. 1950. Unknown Collector, Catalog # 5957 BCB. 9 July 1950.

Element Occurrence Record

Scientific Name: Ulmus crassifolia-celtis laevigata series **Occurrence #:** 31 **Eo Id:** 3352

Common Name: Cedar Elm-sugarberry Series **Track Status:** Track all extant and selected historical EOs

TX Protection Status:

Global Rank: G2G3 **State Rank:** S4 **Federal Status:**

Location Information:

Directions:

TERRACES ALONG CLEAR FORK OF PLUM CREEK, FROM LOW WATER CROSSING DOWNSTREAM TO PARK BOUNDARY, LOCKHART SRA

Survey Information:

First Observation: **Survey Date:** 1990-06-13 **Last Observation:** 1990

Eo Type: **Eo Rank:** CD **Eo Rank Date:** 1990-06-13

Observed Area:

Comments:

General Description: DECIDUOUS BOTTOMLAND HARDWOOD FOREST ON CREEK TERRACE; HEAVILY DISTURBED

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: DESCRIPTION AND PLANT LIST IN DLI REPORT, SITE 4

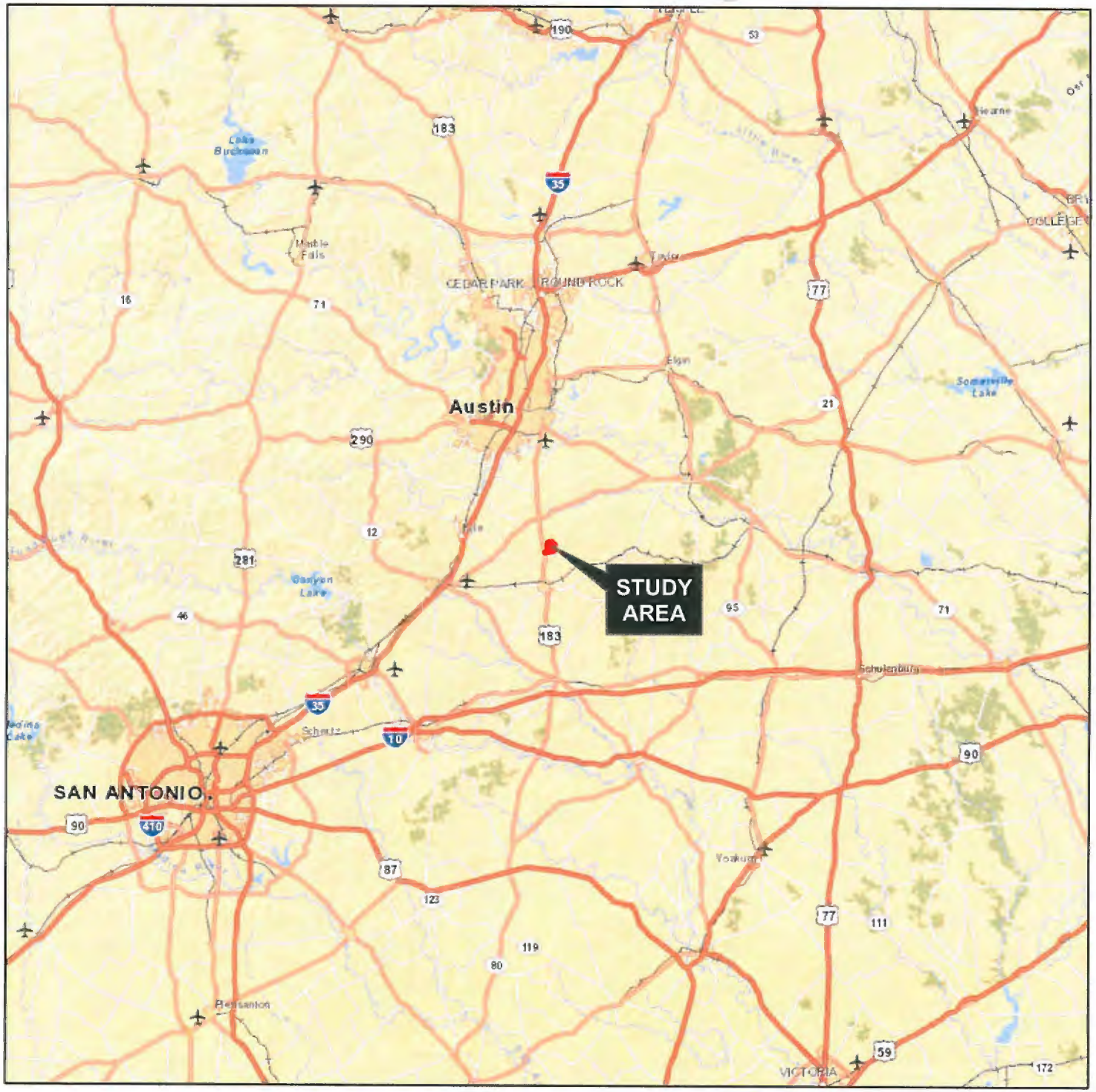
Reference:

Citation:

TEXAS PARKS & WILDLIFE DEPARTMENT. 1990. LOCKHART STATE RECREATION AREA. SUMMARY OF REPRESENTATIVE PLANT COMMUNITIES.

Specimen:

Location Maps, Vegetation Maps, Soils Map, and Aerial Photography



N

0 10 20 40

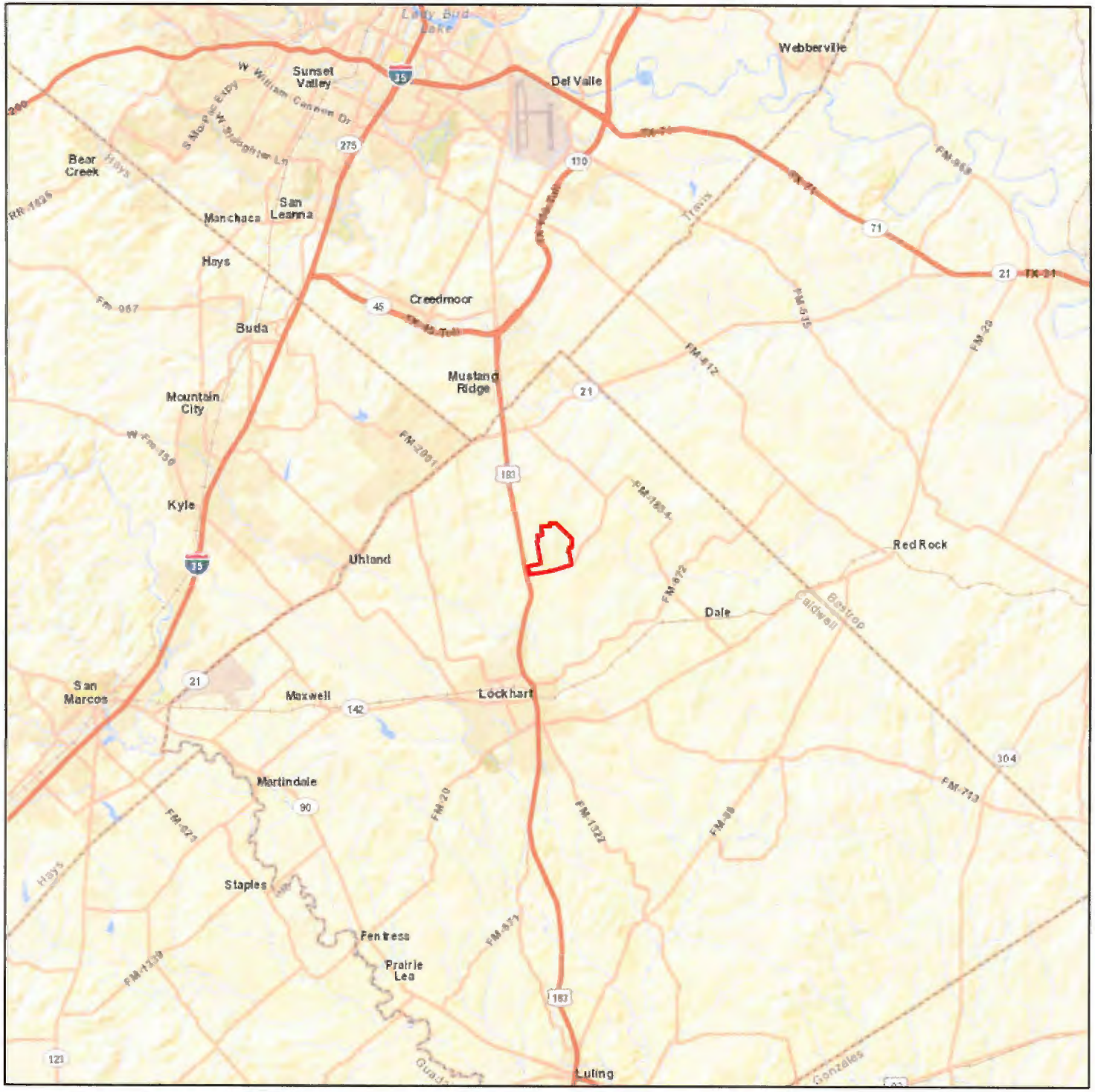
Miles

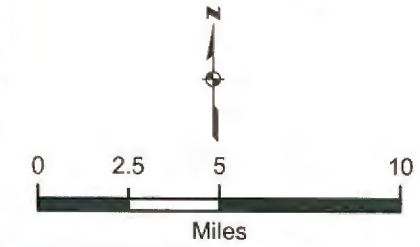
Legend

Study Area

Notes:
1. Source/Year of Base Map: ESRI, World Street Map/2013
2.
3.
4.
5.

Project Title: 130 ENVIRONMENTAL PARK
Project Number
Date: 06/2013 AVO: 29520
Sheet Title: PROJECT LOCATION MAP
Sheet Number: FIGURE 1
HALFF





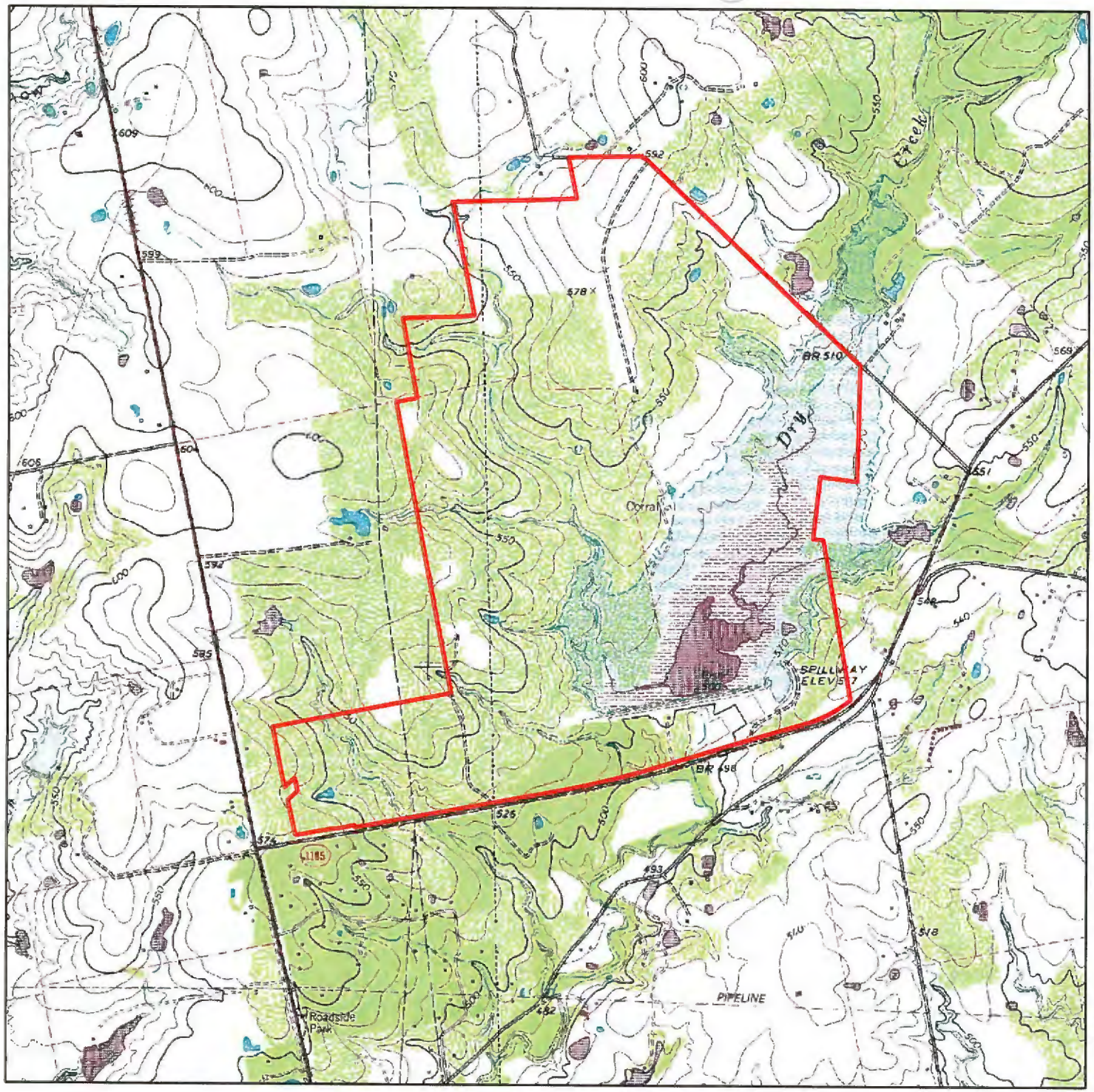
Legend

Study Area

Notes:
1. Source/Year of Base Map: ESRI, World Street Map Service/2013
2.
3.
4.
5.

Project Title: 130 ENVIRONMENTAL PARK
Project Number
Date: 06/2013 AVO: 29520
Sheet Title: PROJECT VICINITY MAP
Sheet Number: FIGURE 2

HALFF



N

0 1,000 2,000 4,000

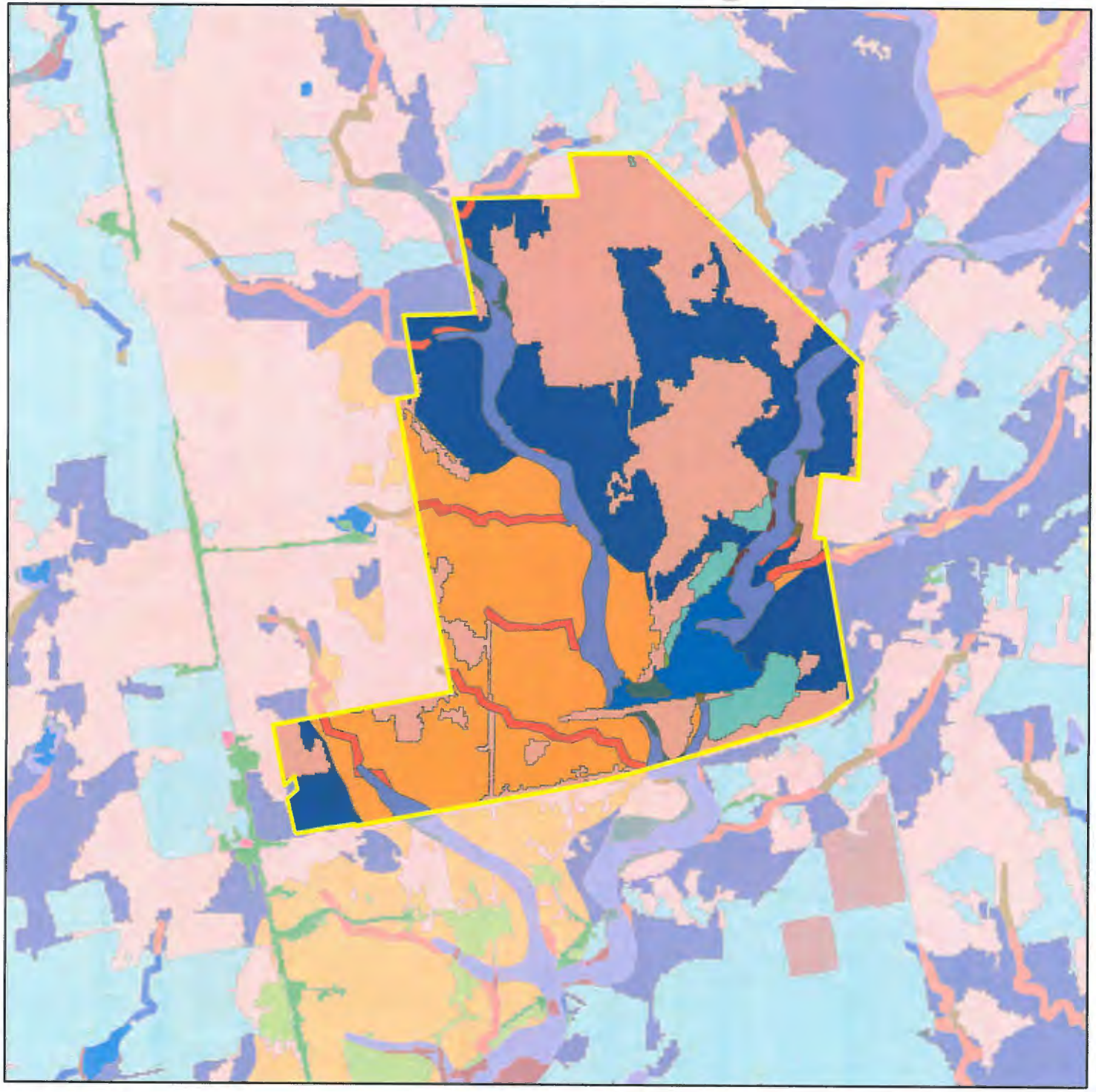
Feet

Legend

Study Area

Notes:
1. Source/Year of Base Map: Copyright:© 2013 National Geographic Society, i-cubed Map Service
2. USGS Quarter Quadrangle: Lockhart North
3.

Project Title: 130 ENVIRONMENTAL PARK
Project Number:
Date: 06/2013 AVO: 29520
Sheet Title:USGS TOPOGRAPHICAL MAP
Sheet Number: FIGURE 3
HALFF



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Feet

Legend

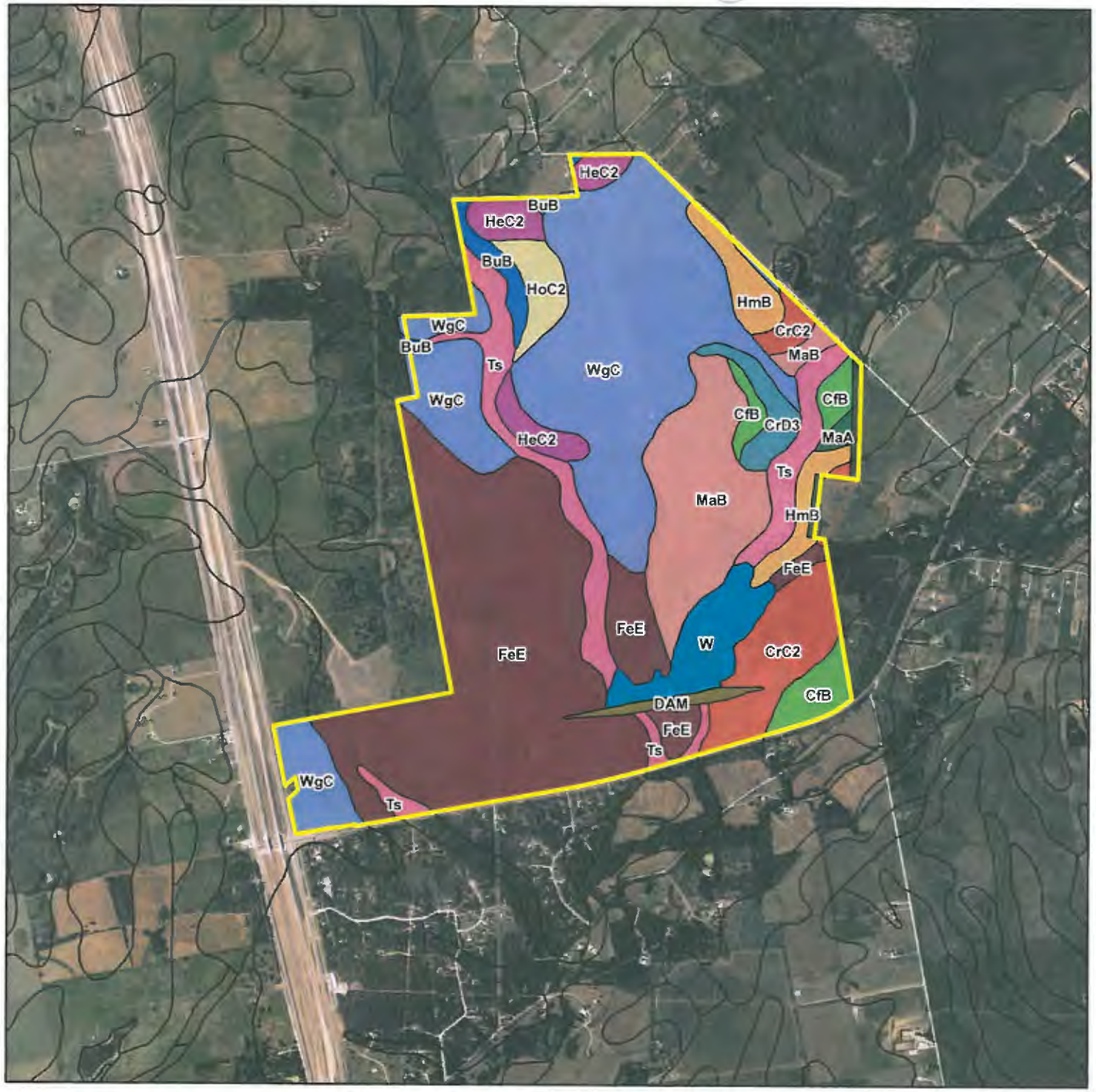
- Study Area

Vegetation Common Name

- Blackland Prairie: Disturbance or Tame Grassland
- Central Texas: Floodplain Deciduous Shrubland
- Central Texas: Floodplain Hardwood Forest
- Central Texas: Floodplain Herbaceous Vegetation
- Central Texas: Riparian Deciduous Shrubland
- Central Texas: Riparian Hardwood Forest
- Native Invasive: Deciduous Woodland
- Native Invasive: Mesquite Shrubland
- Open Water
- Post Oak Savanna: Post Oak Motte and Woodland
- Post Oak Savanna: Savanna Grassland

Notes:
1. Source/Year of vegetation data: Texas Parks and Wildlife Department/2012
2.
3.
4.

Project Title: 130 ENVIRONMENTAL PARK
Project Number:
Date: 06/2013 AVO: 29520
Sheet Title: TPWD ECOLOGICAL SYSTEMS CLASSIFICATION TYPES
Sheet Number: FIGURE 4
HALFF



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0 1,000 2,000 4,000

Feet

Legend

Study Area

BuB - Burleson clay, 1 to 3 percent slopes

CfB - Crockett fine sandy loam, 1 to 3 percent slopes

CrC2 - Crockett soils, 2 to 5 percent slopes, eroded

CrD3 - Crockett soils, 3 to 8 percent slopes, severely eroded

DAM - Dams

FeE - Fett gravelly soils, 1 to 12 percent slopes

HeC2 - Heiden clay, 3 to 5 percent slopes, eroded

HmB - Heiden-Wilson complex, 1 to 3 percent slopes

HoC2 - Houston Black clay, 3 to 5 percent slopes, eroded

MaA - Mabank loam, 0 to 1 percent slopes

MaB - Mabank loam, 1 to 3 percent slopes

Ts - Tinn soils, frequently flooded

W - Water

WgC - Wilson gravelly loam, 1 to 5 percent slopes

Notes:

1. Source/Year of Soil Survey: NRCS/USDA Web Soil Survey downloader for Caldwell County/2012
2.

Project Title: 130 ENVIRONMENTAL PARK
Project Number:
Date: 06/2013 AVO: 29520
Sheet Title: SOIL SURVEY MAP
Sheet Number: FIGURE 5
HALFF

N

0 1,000 2,000 4,000

Feet

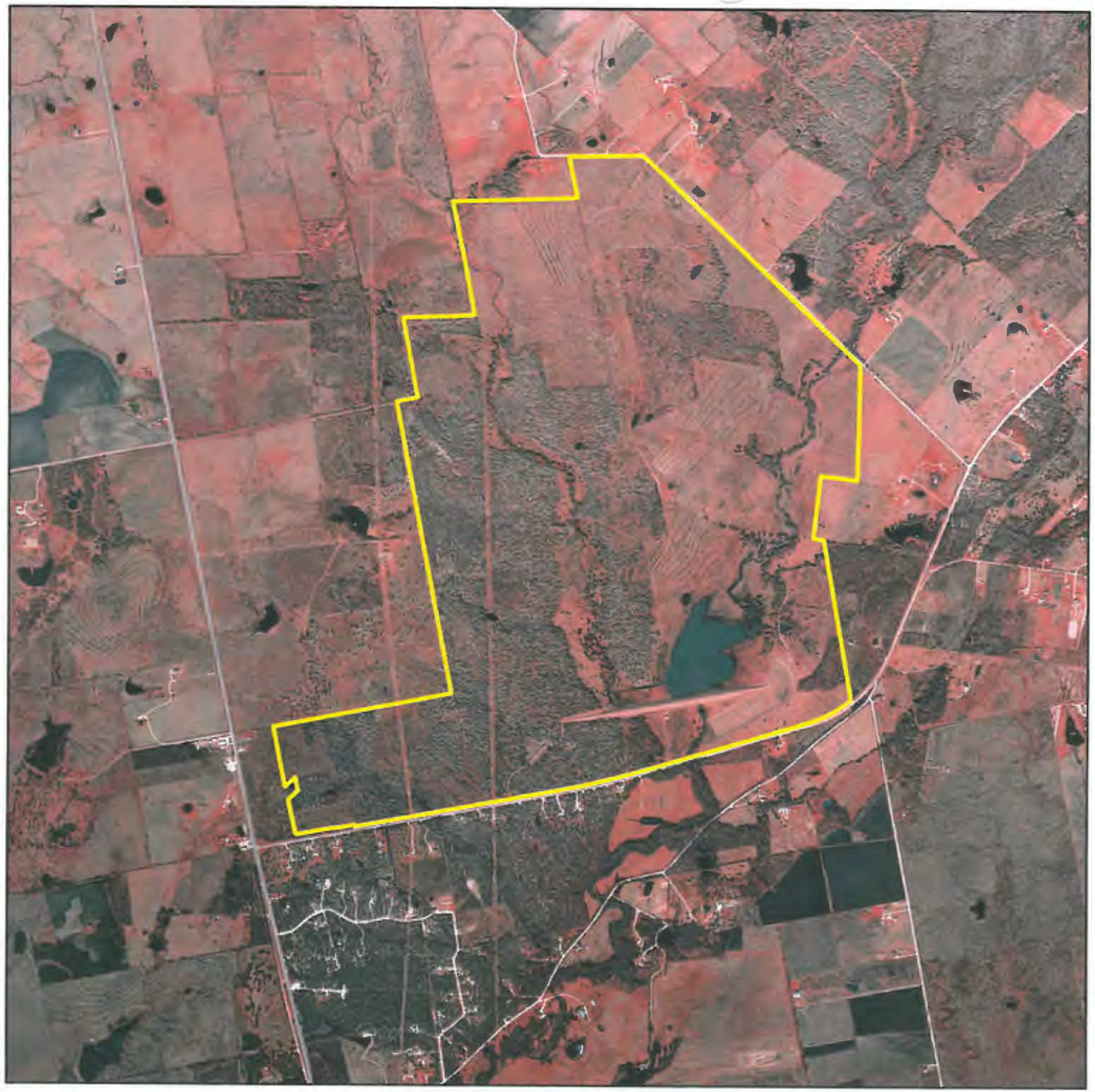
Legend

- Study Area
- 1-Percent Annual Flood Risk Zone
- River or Stream

Notes:
1. Source/Year of Effective Floodplain Data: FEMA/2012
3. Source/Year of Streams: National Hydrography Dataset/2011
4.
5.

Project Title: 130 ENVIRONMENTAL PARK
Project Number:
Date: 06/2013 AVO: 29520
Sheet Title: FLOODPLAIN MAP
Sheet Number: FIGURE 6

HALFF



N

0 1,000 2,000 4,000

Feet

Legend

Study Area

Notes:
1. Source/Year of Orthophoto: TNRIS, Lockhart North NE DOQQ Raster Dataset/1996
2.
3.
4.

Project Title: 130 ENVIRONMENTAL PARK
Project Number:
Date: 06/2013 AVO: 29520
Sheet Title: 1996 ORTHOPHOTO MAP
Sheet Number: FIGURE 7
HALFF

N

0 1,000 2,000 4,000

Feet

Legend

Study Area

Notes:
1. Source/Year of Orthophoto: TNRIS, Lockhart North NE DOQQ Raster Dataset/2010
2.
3.
4.

Project Title: 130 ENVIRONMENTAL PARK
Project Number:
Date: 06/2013 AVO: 29520
Sheet Title: 2010 NAIP ORTHOPHOTO
Sheet Number: FIGURE 8
HALFF

N

0 1,000 2,000 4,000

Feet

Legend

Study Area

Notes:
1. Source/Year of Orthophoto: APFO-USDA NAIP Imagery web service/2012
2.
3.
4.
5.

Project Title: 130 ENVIRONMENTAL PARK
Project Number:
Date: 06/2013 AVO: 29520
Sheet Title: 2012 NAIP ORTHOPHOTO
Sheet Number: FIGURE 9
HALFF

Site Photographs

VEGETATION COMMUNITY PHOTOGRAPHS

Mesquite Grassland Mosaic
This was one of the most frequently encountered vegetation communities within the study area. Dominant vegetation included mesquite scrub, prickly pear, pencil cactus, Texas persimmon, agarita, Texas wintergrass, lemon bee balm, and plains coreopsis.

Mesquite Woods
This community was similar to the mesquite grassland mosaic, and occurred at the transition to more wooded areas. Dominant vegetation in this community included large mesquite trees, cedar elm, post oak, hackberry, agarita, Texas persimmon, prickly pear, pencil cactus, and Texas wintergrass.

Sumpweed Depression Wetlands
Dominant vegetation in this community included sumpweed and common spikerush. These depressions were emergent wetlands occurring in terraced areas of the surrounding uplands and typically occurred within the mesquite grassland mosaic.

VEGETATION COMMUNITY PHOTOGRAPHS

Post Oak/ Cedar Elm Woods
Dominant vegetation in this community included post oak, cedar elm, yaupon holly, agarita, deciduous holly, Texas persimmon, mesquite, prickly pear, pencil cactus, pink thoroughwort, Virginia wild rye, slimleaf panicgrass, and wild oat.

Riparian Woods (Cedar Elm/ Oak) – This community occurred along riparian corridors at higher elevations and in the upper reaches of ephemeral streams. Dominant vegetation included cedar elm, live oak, post oak, hackberry, giant ragweed, Virginia wild rye, Texas wintergrass, pink thoroughwort, itchgrass, and lean flatsedge.

Riparian Woods (Green Ash/ Pecan/ Hackberry)
This community occurred at lower elevations along the larger tributaries within the study area. Dominant vegetation included hackberry, green ash, pecan, Virginia wild rye, giant ragweed, and common greenbriar.

VEGETATION COMMUNITY PHOTOGRAPHS

Floodplain Meadows
This vegetation complex occurred within the floodplain of Dry Creek, and appeared to be regularly mowed. Woody vegetation was sparse and limited to scattered cedar elm and bois d'arc. Dominant herbaceous vegetation included common ragweed, giant ragweed, ironweed, shortbeak sedge, rough cocklebur, annual canarygrass, bermudagrass, buffalograss, Virginia wild rye, and Carolina canarygrass.

Forested Wetlands – This community was observed at lower elevations within the study area. Herbaceous vegetation was more-or-less absent from this community and dominant woody species included green ash and cedar elm.

Emergent Wetlands (Pond Fringe) - This community occurred along the fringe of stock ponds and was typically surrounded by upland vegetation. Woody vegetation was more-or-less absent from this community with the exception of sesbania and the occasional mesquite or cedar elm at the wetland/ upland transition. Dominant herbaceous vegetation included common spikerush, flatstemmed spikerush, sumpweed, water-pepper, and manyspike flatsedge.

VEGETATION COMMUNITY PHOTOGRAPHS

Emergent Wetlands (Lacustrine Fringe) – These wetlands occurred along the shoreline and floodplain area of the large lake in the southern portion of the study area. Typical dominant vegetation included several species of spikerush, Pennsylvania smartweed, rough cocklebur, broadleaf arrowhead, and upright burhead.

Scrub/Shrub Wetlands –These wetlands occurred at higher elevations along the shoreline of the large lake in the southern portion of the study area. Typical dominant vegetation included sesbania, cedar elm, green ash, common spikerush, and sumpweed.