



CB&I  
12005 Ford Road, Suite 600  
Dallas, Texas 75234  
Tel: 972.773.8400  
Fax: 972.773.8401  
www.CBI.com

July 25, 2014

Mr. Hunt Prompungtagorn  
Project Manager  
MSW Permits Section MC-124  
Waste Permits Division  
Texas Commission on Environmental Quality  
12100 Park 35 Circle  
Austin, Texas 78753

Re: Pescadito Environmental Resource Center - Webb County  
Municipal Solid Waste (MSW) Permit Application No. 2374  
Minor Amendment – Notice of Deficiency (NOD) Response  
Tracking Nos. 14669041(18207240); CN603835489/RN106119639

Dear Mr. Prompungtagorn;

CB&I Environmental and Infrastructure, Inc. (CB&I) is in receipt of your letter dated July 15, 2014 in which you have requested additional information regarding the minor amendment to the Pescadito Environmental Resource Center (MSW Application 2374). On behalf of Rancho Viejo Waste Management, LLC we are providing the following responses and attachments. Your specific comments are listed below followed by our response:

1) *As a result of the proposed permit area reduction, the proposed waste footprint area is basically divided in two separate areas, the North portion and the South portion, which are separated by buffer zones and the mineral classified land Survey 2366. Figure 5, Monitoring System and Cell Layout Plan, in Part II of the Application was revised accordingly. However, the required information in Figure 5, in accordance with Title 30 of the Texas Administrative Code (30 TAC) Section (§)330.61(d)(9)(E) related to the maximum waste elevations and final cover, is provided only for the North portion.*

*Please revise the Figure 5 to include the maximum waste elevations and final cover for the South portion.*

**RESPONSE:**

Part II, Figure 5 has been revised to include the maximum waste elevation and final cover elevation for the South portion of the proposed waste footprint. The attached revised Part II, Figure 5 should replace the version sent in June 2014.

2) *Section 1.6, Threatened and Endangered Species (T&ES), of Part II of the Application was revised to indicate that a subsequent T&ES studies performed by ACI Consulting are discussed in Section 4.0. However, we found these discussions in Section 14.0 of Part II of the minor amendment request and not in Section 4.0. Please revise accordingly. Furthermore, please also include the subsequent T&ES studies in Part II of the Application.*

**RESPONSE:**

The typographical error in Part II, Section 1.6 has been corrected to indicate that the discussion on Threatened and Endangered Species can be found in Section 14.0. Although it is our position that the letter from the USFWS is ample evidence of Compliance with the Endangered Species Act and inclusion of the Biological Assessment in Part II is unnecessary, the section has been further revised to indicate that a copy of the Biological Assessment can be found in Part II, Attachment A. Section 14.0 (Page 38) of Part II has also been updated to indicate that a copy of the Biological Assessment can be found in Part II, Attachment A. The attached Pages 8 and 38 of Part II should replace the version sent in June 2014. The attached Biological Assessment should be included at the end of Part II, Attachment A.

3) *Section 13, Floodplains and Wetlands Statement, of Part II of the Application was revised to indicate that ACI Consulting performed an extensive Jurisdictional Determination (JD) at the site and downstream of the site. The U.S. Army Corps of Engineers (USACE) approved the Jurisdictional Determination and the U.S. Environmental Protection Agency concurred that the site contains only "intra-state, isolated, non-navigable waters". The wetlands study in the Application, performed by TRC Environmental Corporation (2011), determined that there are wetlands within the proposed permit boundary and the TRC Environmental Corporation recommended the coordination with the USACE to determine if the USACE will exert jurisdiction over the identified wetlands. This extensive JD and the coordination with the USACE confirmed that the landfill project will not involve activities subject to the requirements of Section 404. In accordance with 30 TAC §330.61(m)(2), please include the extensive JD documents in Part II of the Application.*

**RESPONSE:**

Although it is our position that the Jurisdictional Determination from the Corps and USEPA stating that there are no jurisdictional wetlands on the facility, and therefore no permit is required, adequately complies with Part II [330.61(m)], however Section 13 of Part II has been revised to include a statement that the approved Jurisdictional Determination can be found in Part II, Attachment A. The attached Page 37 of Part II should replace the version sent in June 2014. Additionally, the attached Jurisdictional Determination should be included in Part II, Attachment A after the e-mail to Kevin Ramberg from Darvin Messer (USACE) and before the letter from the USFWS.

4) *Section 13, Floodplains and Wetlands Statement, of Part II of the*



*Application was also revised to indicate that the CLOMR application has been submitted to the FEMA for review and approval. Please address the following comments:*

- *Include a statement to verify that the submitted CLOMR application has the same design for the proposed landfill and related facilities as the design in the technically completed Application which includes a comprehensive storm water management system consisting of dikes, drainage channels, and detention ponds.*

**RESPONSE:**

The 2014 Minor Amendment to reduce the permit boundary area has no effect on the CLOMR application. The CLOMR, as submitted, is the same design for the currently proposed landfill and related facilities as the design in the previous Technically Complete application for Parts I and II. It should be noted that the “system of dikes, drainage channels and detention ponds” presented in the CLOMR is independent of the drainage system associated with the development of the landfill and related facilities that will be provided in Part III of the Application. Clarifying language for the drainage design(s) has been added to Section 13.0 (Page 36 of Part II). It should replace the version sent in June 2014.

- *Include a statement to verify that this design system will remove the area of the landfill and proposed buildings from the 100-year floodplain.*

**RESPONSE:**

Section 13.0 already provides the requested statement “Collectively, this system will remove the area of the landfill and proposed buildings from the 100-year floodplain. ... The CLOMR when issued will verify that the proposed site drainage plans will, in fact, remove areas of the site proposed for the landfill, processing and storage areas and related development from the 100-year floodplain.” However, clarifying language has been added to distinguish between the CLOMR drainage system and the separate landfill-related drainage system to be subsequently provided in Part III of the Application. The attached Page 36 of Part II has been revised accordingly. It should replace the version sent in June 2014.

- *In accordance with 30 TAC §330.61(m)(1), 30 TAC Chapter 301 - Subchapter C, and Texas Water Code §16.236, include a statement to verify that a copy of the CLOMR application is provided to the Webb County's Director of Planning for review and approval.*

**RESPONSE:**

There is existing language in Section 13.0 that accurately states: “The results of this engineering design along with an application for a Conditional Letter of Map Revision (CLOMR) have been (were) submitted to the Webb County Planning Department (WCPD) for review and were approved (see Attachment G).” The CLOMR has been approved by the WCPD and will remove the area of the proposed landfill and buildings from the 100-year floodplain. The

attached Page 36 of Part II has been revised for clarification. It should replace the version sent in June 2014.

### **END OF COMMENTS**

An original of the changes are included with this letter as Attachment A. A copy of the changes, in redline/strikeout format, is included in Attachment B for ease in reviewing the changes. An updated certification statement is included as Attachment C.

Two additional copies are included for your use, and a copy is being sent to the TCEQ Region office in Laredo and the Laredo Public Library.

We trust this information answers your concerns; however, should you need additional information, please let me know.

Sincerely,  
**CB&I Environmental and Infrastructure, Inc.**  
TBPE Firm F-5650



Michael W. Oden, P.E.  
Project Manager

#### Attachments

- A – Clean Copy of Changes
- B – Redline/Strikeout version of changes
- C – Applicant's Statement

CC: Mr. Carlos Y. Benavides III  
Mr. William W. Thompson  
Mr. Geoffrey S. Connor  
TCEQ Region 16 Office – Laredo  
Laredo Public Library

**Attachment A to July 25, 2014 Letter**  
**Revised and New Pages**



## PART II

### APPLICATION FOR PERMIT TYPE I MUNICIPAL SOLID WASTE FACILITY MSW PERMIT NO. 2374

### PESCADITO ENVIRONMENTAL RESOURCE CENTER

### SOLID WASTE MANAGEMENT AND DISPOSAL FACILITY RANCHO VIEJO WASTE MANAGEMENT, LLC LAREDO, WEBB COUNTY, TEXAS

Sections 1.1, 1.2, 2.1.4, 10.1—10.4, 11.1 –  
Signed by H.C. Clark, P.G., Ph.D. on Feb. 7,  
2012

Except for Sections 1.1, 1.2, 2.1.4,  
10.1—10.4 and 11.1 – remaining  
portions of Part II through February 17,  
2012 revisions were signed/sealed by  
James F. Neyens, P.E. on February 24,  
2012.

**Originally  
Prepared By:**

TRC Environmental Corporation  
TBPE Firm Registration No. 3775

March 28, 2011; Revised May 20, 2011; Revised September 14, 2011; Revised December 14, 2011; Revised February 17, 2012

**Revised on June 12, 2014 by:**



Shaw Environmental, Inc. (a CB&I company)  
TBPE Firm Registration No. F-5650  
and

H.C. Clark P.G., Ph.D. for Sections 1.2, 2.1.4 and 11.1

**Revised July 25, 2014 by:**

CB&I Environmental and Infrastructure, Inc.





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11.1 – Signed by H.C. Clark, P.G.,  
Ph.D. on Feb. 7, 2012

Except for Sections 1.1, 1.2, 2.1.4,  
10.1—10.4 and 11.1 – remaining  
portions of Part II through February  
17, 2012 revisions were signed/sealed  
by James F. Neyens, P.E. on  
February 24, 2012.

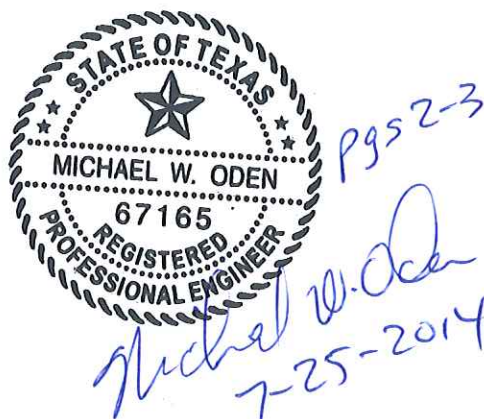
Revised June 12, 2014

H.C. Clark P.G., Ph.D. for Sections 1.2, 2.1.4 and 11.1

And

CB&I (Shaw Environmental, Inc.) for other revised pages

**Revised July 25, 2014** by CB&I Environmental and Infrastructure, Inc.  
TBPE Firm F-5650





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Attachment G	100-Year Floodplain Coordination
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Sections 1.1, 1.2, 2.1.4, 10.1—10.4,  
11.1 – Signed by H.C. Clark, P.G.,  
Ph.D. on Feb. 7, 2012

Except for Sections 1.1, 1.2, 2.1.4,  
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by James F. Neyens, P.E. on February  
24, 2012.

Revised June 12, 2014

H.C. Clark P.G., Ph.D. for Sections 1.2, 2.1.4 and 11.1

And

CB&I (Shaw Environmental, Inc.) for other revised pages

**Revised July 25, 2014** by CB&I Environmental and Infrastructure, Inc.  
TBPE Firm F-5650



*Michael W. Oden*  
7-25-2014



This floodplain is depicted in Figure 11, Part II. The FIRM can also be found in Attachment G of Part II. It is important to realize that the surface topography used to create the FIRM does not appear to include the existing dikes and surface impoundments at the site and in the watershed upslope from the site. TRC is engaged in engineering studies of the actual surface topography as it currently exists. TRC is also performing an engineering analysis of drainage at the site and all watersheds above and immediately below the site. TRC will design a series of drainage channels and detention structures that will result in the removal of the proposed landfill area from the 100-year floodplain. Furthermore, a Conditional Letter of Map Revision (CLOMR), has been submitted to FEMA requesting correction of the existing FIRM to take into account the related drainage and floodplain improvements. We expect this action will result in documentation that construction of the proposed watershed improvements at and adjacent to the site will remove the landfill from the 100-year floodplain.

## **1.6 Threatened and Endangered Species**

TRC has performed an initial assessment of threatened and endangered (T&E) species at the site, and subsequently conducted a more detailed biological evaluation. These studies will assure compliance with federal and state requirements for the protection of T&E species and their habitats. These studies have been submitted to the Texas Parks and Wildlife Department (TPWD) and the U.S. Fish and Wildlife Survey (USFWS), as discussed in Section 14.0. Subsequent to these studies, aci Consulting performed a Biological Assessment and received notice from the U.S. Fish and Wildlife Service that the proposed project had complied with section 7(a)(2) of the Endangered Species Act, and concurred that the project would have no effect on four of the species identified (ocelot, interior least tern, ashy dogweed and Johnston's frankenia) and would not adversely affect the jaguarundi due to its closest observation being 44 miles to the north and the proposed conservation measures that will benefit the species should they be in the vicinity of the project site. See Part II, Attachment A for a copy of the Biological Assessment and correspondence from the USFWS.

## **1.7 Land Use**

Land use at and within one mile of the facility is exclusively devoted to cattle ranching and oil and gas exploration and production. This same land use extends generally for many miles in every direction. The only exceptions are an area of residential land use about four miles to the northwest and two transportation corridors. The residential land use is in the community of Ranchitos Las Lomas, which is located along Highway 59 and had a population of 334 in the 2000 census. The transportation corridors include U.S. Highway 59, which passes through Ranchitos Las Lomas four miles to the northwest, and the Kansas City Southern Railroad about two miles to the south of the facility, which will provide rail service to the site.

## **1.8 Oil and Gas Production**

While some oil but mostly gas production has been prevalent in the area, very little has actually occurred on the proposed site of the facility. Several wells were attempted on or adjacent to the site, but have been sealed and abandoned. The width of the landfill was selected to allow possible future development of gas reserves beneath the landfill by using directional drilling methods. Existing practices employed by energy companies in



### **13.0 FLOODPLAINS AND WETLANDS STATEMENT [330.61 (m)]**

Portions of the proposed facility are currently located within the 100-year floodplain, as indicated on the replication of the most current available floodplain map, or Flood Insurance Rate Map (FIRM), presented in Figure 11. An independent comprehensive storm water management system of dikes, drainage channels and detention ponds has been designed to remove areas of the site proposed for the landfill, processing and storage areas and related development from the 100-year floodplain. TRC performed all the necessary hydrological and hydraulic engineering analysis and design to accomplish this. The results of this engineering design along with an application for a Conditional Letter of Map Revision (CLOMR) were submitted to the Webb County Planning Department (WCPD) for review and were approved (see Attachment G). WCPD is the local agency responsible for floodplain management. With concurrence from WCPD, the CLOMR application has been submitted to the Federal Emergency Management Agency (FEMA) for review and approval. The CLOMR when issued will verify that the proposed CLOMR system drainage plans will, in fact, remove areas of the site proposed for the landfill, processing and storage areas and related development from the 100-year floodplain. The design of the proposed landfill and related appurtenances to be provided in Part III of the Application will include a separate, comprehensive storm water management system of dikes, drainage channels and detention ponds.

Any reduction of the permit boundary area will have no effect on the CLOMR application. The CLOMR, as submitted to FEMA, has not changed from that approved by the WCPD and will effectively remove the area of the proposed landfill and buildings from the 100-year floodplain.

Construction of the landfill will impact a named reservoir, Burrito Tank, and possibly several smaller stock tanks. All affected reservoirs are owned by the applicant or by its parent, Rancho Viejo Cattle Company, Ltd. In order to approximate effects of the tanks, storage and discharge relationships were developed and utilized for simulation of the pre-project conditions in the CLOMR analysis. Therefore, all existing features were included in the pre-project conditions analysis. It should be noted that, after reviewing the delineation of the FEMA floodplain with respect to the tanks, the tanks will likely not have any significant attenuation effect on the peak discharge. The 100-year flood is so broad in the vicinity of the tanks it appears there is sufficient area to carry the flows which will bypass the tanks' zones of impact.

The proposed landfill is located in an ideal location considering soil, groundwater, land use, and oil and gas activities (past, present, and future). No other location is equally plausible. It is difficult to find an area of appropriate size in Eastern Webb County that does not have floodplain issues due to the prevailing flat topography and rapid runoff soil





conditions. Applicant endeavored to find an upland location that was reasonably close to the headwater conditions to minimize any impacts to floodplains and/or wetlands.

aci Consulting performed an extensive Jurisdictional Determination at the site and downstream of the site. The U.S. Army Corps of Engineers approved the Jurisdictional Determination and the U.S. Environmental Protection Agency concurred that the site contains only “intra-state, isolated, non-navigable waters” under 33 CFR 328.3 (a)(3). Correspondence was subsequently received from the U.S. Army Corps of Engineers stating that this project will not involve activities subject to the requirements of Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act of 1899 and that no permit was necessary to comply with Section 404 or Section 10 as there are no Waters of the United States at the site. See Part II, Attachment A for a copy of the approved Jurisdictional Determination and correspondence from the U.S. Army Corps of Engineers and U.S. Environmental Protection Agency.



#### **14.0 ENDANGERED OR THREATENED SPECIES [330.61 (n)]**

A site reconnaissance and evaluation was performed by TRC in 2009 to assess the potential for the facility to harbor endangered and threatened species, or to provide critical habitat for such species. This evaluation included obtaining current lists of both federal- and state-listed species for Webb County and identifying the habitat and range or occurrence characteristics of all such listed species.

Based on the results of their evaluation, TRC concluded that the site of the proposed facility may contain habitat or range conditions that may result in the occurrence of endangered or threatened species. By comparing the characteristics of the site to surrounding areas, it was clear that habitat and environmental conditions of the site are not significantly different from conditions for many miles surrounding the site. No unique or critical habitat conditions were observed. A biological evaluation was completed and provided to TPWD and USFWS. TPWD has responded and a copy of its response letter is contained in Attachment A.

Subsequent to TRC's studies, aci Consulting performed an extensive Biological Assessment and received notice from the U.S. Fish and Wildlife Service that the proposed project had complied with section 7(a)(2) of the Endangered Species Act, and concurred that the project would have no effect on four of the species identified (ocelot, interior least tern, ashy dogweed and Johnston's frankenia) and would not adversely affect the jaguarundi due to its closest observation being 44 miles to the north and the proposed conservation measures that will benefit the species should they be in the vicinity of the project site. See Part II, Attachment A for a copy of the Biological Assessment and correspondence from the USFWS.

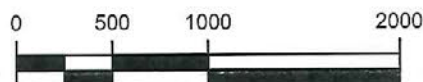
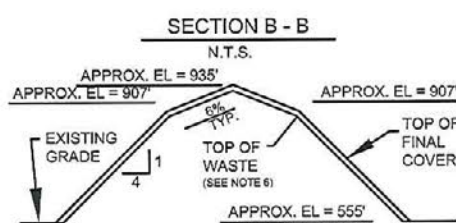
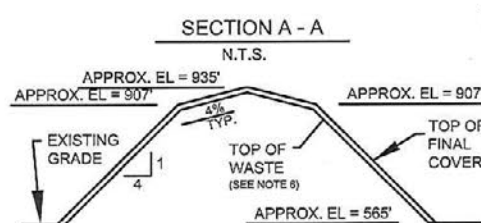


## FIGURES





LOCATE DRAINAGE DITCHES,  
DETENTION PONDS AND  
PERIMETER MAINTENANCE ROAD  
IN LANDFILL BUFFER ZONE



SCALE IN FEET  
1" = 1000'

### NOTES

1. FACILITY PERMIT AREA APPROXIMATELY 953 ACRES.
2. SOURCE: BOUNDARY AND IMPROVEMENT SURVEY, MEJIA ENGINEERING COMPANY (4/9/10 & 5/9/14).
3. CONSTRUCT SECURITY FENCE AND GATES ALONG FACILITY PERMIT BOUNDARY.
4. TRC ENVIRONMENTAL CORP. TBPE FIRM F-3775.
5. FACILITY PERMIT BOUNDARY REVISED BY CB&I (SHAW ENVIRONMENTAL, INC.) TBPE FIRM F-5650
6. LANDFILL ELEVATIONS ARE PRELIMINARY FOR TOP OF FINAL COVER. SUBTRACT 2.5' FOR TOP OF WASTE ELEVATION.

### LEGEND

- (A-1) LANDFILL CELL DESIGNATION  
--- GROUNDWATER MONITORING ZONE LOCATION  
--- LANDFILL GAS MONITORING ZONE LOCATION  
--- TYP. LANDFILL CELL BOUNDARY  
--- FACILITY PERMIT BOUNDARY LINE  
--- APPROXIMATE LANDFILL LIMIT  
--- FENCE  
--- PROPERTY LINE AND FENCE  
--- 8' HOG FENCE

THIS DRAWING HAS BEEN ADAPTED FROM "GENERAL LOCATION MAP" DEVELOPED BY TRC FOR THE PART 1 APPLICATION FOR PERMIT, TYPE 1 MUNICIPAL SOLID WASTE FACILITY, MSW PERMIT NO. 2374, PISCADITO ENVIRONMENTAL RESOURCE CENTER. THIS PERMIT APPLICATION WAS DEVELOPED ON BEHALF OF RANCHO VIEJO WASTE MANAGEMENT, LLC AND WAS SUBMITTED TO THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY AND DECLARED TECHNICALLY COMPLETE ON JULY 2, 2012. THE ORIGINAL DRAWING FILE IS DATED 2/14/2011 AND WAS STAMPED BY LICENSED PROFESSIONAL ENGINEER JAMES F. NEYENS, LICENSE NO. 52766 ON 9/14/2011. REVISIONS TO THE ORIGINAL DRAWINGS ARE SUMMARIZED IN THE REVISION NOTES.

## PISCADITO ENVIRONMENTAL RESOURCE CENTER WEBB COUNTY, TEXAS

### FIGURE 5 - PART 2 MONITORING SYSTEM AND CELL LAYOUT PLAN

DRAWN BY: MTE APPROVED BY: MWO PROJ. NO.: 148866 DATE: MAY 2014



CB&I Environmental  
& Infrastructure, Inc.

12005 FORD RD. SUITE 600  
DALLAS, TEXAS 75234  
(972) 773-0400

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**Attachment A**

**T&E Species and Wetlands Assessment**



**Pescadito Environmental Resource Center**  
**Biological Assessment**



January 9, 2014

***VIA GROUND DELIVERY***

Mr. Ernesto Reyes  
U.S. Fish and Wildlife Service  
Ecological Services Alamo Field Office  
Santa Ana Refuge  
3325 Green Jay  
Alamo, Texas 78516

**Re: Revised Biological Assessment: An Endangered Species Review for the  
FEMA Action Area of the Pescadito Environmental Resource Center, Webb  
County, Texas**

Dear Mr. Reyes,

Enclosed please find documentation and analysis regarding the federal endangered species related to the Federal Emergency Management Agency (FEMA) issuance of a Conditional Letter of Map Revision (CLOMR) for the Pescadito Environmental Resource Center (PERC) in Webb County, Texas. This biological assessment has been updated from our October 21, 2013 submittal to your office based on discussions with USFWS and incorporation of conservation measures onsite.

The proposed PERC site includes 1,110 acres in rural Webb County, south of U.S. Highway 59 approximately 20 miles east of Laredo, Texas (Attachment A, Figure 1). Rancho Viejo Waste Management, LLC proposes to construct and operate a municipal solid waste landfill onsite. As part of the PERC project, Rancho Viejo Waste Management proposes modifications to the 100-year floodplain. These proposed floodplain modifications require documentation and authorization from FEMA under the CLOMR process. In 2010, FEMA issued guidance for Endangered Species Act (ESA) compliance from the FEMA CLOMR process.

As stated in the FEMA guidance for ESA compliance (see Attachment B), documentation of compliance can be either an Incidental Take Permit, Incidental Take Statement, “not likely to adversely affect” determination from the National Marine Fisheries Service or the U.S. Fish and Wildlife Service (collectively known as “the Services”), or an official letter from the Services concurring that the project has “No Effect” on listed species or critical habitat. Rancho Viejo Waste Management and aci consulting courteously request U.S. Fish and Wildlife Service (USFWS) to review the proposed project, related

endangered species investigations, and effects determination described in this letter. For each species, site specific assessments were conducted.

This report presents a summary of the project, the associated FEMA action, the environmental setting, and an assessment of the action's potential to affect species protected under the federal ESA.

## **FEMA REGULATORY NEXUS**

Rancho Viejo Waste Management, LLC proposes to construct and maintain various infrastructure flood control features north and west of the PERC site. The FEMA action area includes approximately 225 acres; 141 acres are located outside of the proposed PERC site (Attachment A, Figure 1).

The proposed flood control structures include:

- three floodwater detention basins north and west of the PERC site,
- one diversion channel connecting the north and northwest detention basins to the west detention basin, and
- one channel connecting the west detention basin to areas south and downstream of the PERC site.

The project engineering consultant, CB&I, is preparing and processing the FEMA CLOMR request through FEMA.

## **PROJECT LOCATION**

Currently the site is entirely within the 12,000-acre Yugo Ranch owned by Rancho Viejo Cattle Company, Ltd. The ranch has been utilized as a cattle operation with scattered oil and gas production. The PERC site is favorable for development for several reasons: ideal soil and geological conditions, isolation from usable groundwater, the secluded location (and lack of potential land use conflicts), and transportation access.

## **EXISTING ENVIRONMENT**

### ***Physiography***

The subject area encompasses approximately 1,110 acres and is located roughly 20 miles east of Laredo (Webb County) within the Texas-Tamaulipan Thornscrub ecoregion of the Southern Texas Plains. This ecoregion is distinguishable by its lightly rolling plains, low-growing thorn shrubland, and noticeable cuts throughout the landscape created by arroyos and streams. Although the subject area is within the Texas-Tamaulipan Thornscrub ecoregion, it is bound to the west by the Rio Grande Floodplain and Terraces ecoregion, which is unmistakably characterized by its dramatic change in elevation. The

subject area lies at the upper headwaters of the Rio Grande Basin, approximately 20 miles north of the Rio Grande, and is bordered to the immediate northeast by the Nueces River Basin (Griffith et al. 2007). The elevation ranges from 530 feet to 570 feet above mean sea level according to the *Burrito Tank* USGS 7.5 minute topographic quadrangle (Attachment A, Figure 2).

### ***Climate***

Webb County's climate is subtropical, with hot, dry summers and relatively mild winters (Griffith et al. 2007). The summer temperatures average about 85°F and have a maximum daily average of 97°F. The winter temperatures average 58°F and have a minimum daily average of 46°F (USDA 1985). Precipitation throughout this county and ecoregion is the heaviest in the late spring and the early fall; however, transpiration and evaporation greatly exceed rainfall input (Griffith et al. 2007; USDA 1985). The total yearly precipitation is typically suitable for range vegetation, but often not for crops such as cotton, small grains, and sorghum because of the high evaporation rates. Thunderstorms occur on about 40 days each year, mostly in the summer time (USDA 1985).

### ***Flora and Fauna***

The subject area is within the Texas-Tamaulipan Thornscrub ecosystem is occupied primarily by “drought-tolerant, mostly small-leaved, and often thorn-laden small trees and shrubs, especially legumes” (Griffith et al. 2007). The most significant woody species is the honey mesquite (*Prosopis glandulosa*). Other suitable vegetation for this ecoregion includes: brasil (*Condalia hookeri*), lime pricklyash (*Zanthoxylum fagara*), Texas persimmon (*Diospyros texana*), lotebush (*Ziziphus obtusifolia*), granjeno (*Celtis pallida*), kidneywood (*Eysenhardtia texana*), coyotillo (*Karwinskia humboldtiana*), Texas paloverde (*Parkinsonia texana*), anacahuita (*Cordia boissieri*), and various species of cacti (*Opuntia* spp.). Typically xerophytic brush dominates the rocky ridges and uplands and can include species such as blackbrush (*Acacia rigidula*), guajillo (*Acacia berlandieri*), and ceniza (*Leucophyllum frutescens*). The most notable grasses are cane bluestem (*Bothriochloa barbinodis*), silver bluestem (*Bothriochloa laguroides*), multiflowered false rhodesgrass (*Trichloris pluriflora*), sideoats grama (*Bouteloua curtipendula*), pink pappusgrass (*Pappophorum bicolor*), bristlegrasses (*Setaria* spp.), lovegrasses (*Eragrostis* spp.), and tobosa (*Hilaria mutica*). However, red grama (*Bouteloua trifida*), Texas grama (*Bouteloua rigidiseta*), buffalograss (*Buchloe dactyloides*), and curleymesquite (*Hilaria belangeri*) can be found on overgrazed or drier sites in the west portion of this ecoregion (Griffith et al. 2007).

Faunal species in the Tamaulipan region at one time included numerous species despite the arid climate. Blair (1950) notes that over 60 species of mammals, 36 species of snakes, 19 lizards, two land turtles, three salamander species, and 19 amphibians are known from this ecoregion.

### ***Geology and Soils***

The subject area overlies rock of the Eocene Jackson group. This rock formation consists primarily of fine to coarse grained sandstone with some clay inclusions (USGS 2009).

Eight soil units occur within the subject area:

- *Aguilares sandy clay loam, 0 to 3 percent slopes (AgB),*
- *Brundage fine sandy loam, occasionally flooded (Bd),*
- *Catarina clay, 0 to 2 percent slopes (CaB),*
- *Catarina clay, occasionally flooded (CfA),*
- *Copita fine sandy loam, 0 to 3 percent slopes (CpB),*
- *Hebbronville loamy fine sand, 0 to 2 percent slopes (HeB),*
- *Moglia clay loam, 1 to 5 percent slopes (MgC), and*
- *Montell clay, saline, 0 to 2 percent slopes (MnB).*

These soils are classified within the Aguilares, Brundage, Catarina, Copita, Hebbronville, Moglia, and Montell soil series. These soils range from deep, well drained clayey or loamy soils to deep, moderately well drained saline, clayey soils (USDA 1985). Within the ecoregion, the soil series extends even further to include the Zapata series, a shallow, well drained, loamy soil on uplands (Griffith et al. 2007; USDA 1985).

### **ENDANGERED SPECIES BACKGROUND**

According to USFWS (2013), five species are federally listed as threatened or endangered in Webb County, Texas. Provided below is information on the biology and habitat of the federally-listed endangered species in Webb County: 1) jaguarundi (*Herpailurus yagouaruondi*), 2) ocelot (*Leopardus pardalis*), 3) least tern (*Sterna antillarum athalassos*), 4) ashy dogweed (*Thymophylla tephroleuca*), and 5) Johnston's frankenia (*Frankenia johnstonii*).

### ***Jaguarundi and Ocelot***

The jaguarundi (*Herpailurus yagouaruondi*) was federally listed as endangered on June 14, 1976 (41 FR 24062-24067). The jaguarundi is a small, slender-bodied cat with a small, flattened head and long tail. According to Texas Parks and Wildlife Department, large patches (100 acres) of canopy cover and dense shrubs, or smaller patches connected by dense vegetation corridors, are vital to jaguarundi habitat (Campbell 2003). Jaguarundi are considered very rare in Texas, and the probability of encountering a jaguarundi is highly unlikely. Review of the Texas Natural Diversity Database (TNDD) managed by TPWD showed no known occurrences in Webb County (TPWD 2013) (Attachment A, Figure 3). TNDD data also indicated that the closest known occurrence of the jaguarundi was observed in 1988 and is approximately 44 miles north of the subject area in La Salle County, Texas (EO# 8138) (Attachment A, Figure 3). Review of



the element occurrence information provided by TPWD, noted the sighting was generally described as crossing FM 625 (or FM 624) 20 miles east of Cotulla and continued southeast. The radius of this polygon is 8000 meters. It is interpreted through the TPWD TNDD “Shapefile Data Interpretation and Use” document that an element polygon with a radius of 8000m was a general location which had the least precision and was used when the location description was vague (TPWD 2013c). The closest known occurrence of the jaguarundi observed to the south of the subject area was in 1992 and is approximately 69 miles away in Starr County, Texas (EO# 2074) (Attachment A, Figure 3). Based on review of the element occurrence information, this element occurrence was cited from 1987 to 1993 by various TPWD performance reports. The sighting was very generally described as being along El Negro Ranch Road. The radius of this polygon is also 8000 meters; therefore, it is also believed to be less precise element polygon with a vague location description (TPWD 2013c).

The last Class A documented jaguarundi report in the United States occurred in 1986 east of Brownsville, Texas (Tewes 2012).

The ocelot (*Leopardus pardalis*) was federally listed as endangered on June 21, 1982 (47 FR 31670-31672). The ocelot is a medium-sized gray or buff spotted cat with variable dark spots, rings, blotches, and bars. Ocelots occur in the dense thorny shrub lands of the Lower Rio Grande Valley and Rio Grande Plains in areas of deep, fertile clay or loamy soils (Campbell 2003). Large patches (100 acres) of canopy cover and dense shrubs, or smaller patches connected by dense vegetation corridors, are vital to ocelot habitat (Campbell 2003). This species is predominately active at night, and spends days hiding in thick brush (Campbell 2003). As this species is predominately active at night, the probability of encountering an ocelot is highly unlikely.

Review of the TNDD data (TPWD 2013c) indicates the closest occurrence of the ocelot was observed in 1991, approximately 67 miles northwest of the subject area in Dimmit County, Texas (EO# 4510) (Attachment A, Figure 3).

### ***Least Tern***

The least tern (*Sterna antillarum athalassos*) was federally listed as endangered on May 28, 1985 [50 FR 21784-21792]. The least tern is a migrant species whose breeding range in Texas includes three reservoirs along the Rio Grande River, on the Canadian River in the northern Panhandle, on the Prairie Dog Town Fork of the Red River in the eastern Panhandle, and along the Red River (Texas/Oklahoma boundary) into Arkansas. The species winters along the Central American coast and the northern coast of South America from Venezuela to northeastern Brazil. USFWS has listed the least tern as a possible migrant through most of Texas. From late April to August, the tern uses barren to sparsely vegetated sand, shell, and gravel beaches; sandbars; islands; and salt flats associated with rivers and reservoirs. The terns prefer open habitat and avoid thick

vegetation and narrow beaches. As natural nesting sites have become scarce, the terns have used sand and gravel pits, ash disposal areas of power plants, reservoir shorelines, and other manmade sites. The terns nest in a shallow hole scraped in an open sandy area, gravelly patch, or exposed flat (Campbell 2003).

Review of the TNDD data indicates that the closest known occurrence of the interior least tern is 16 miles west of the subject area (Attachment A, Figure 4). The occurrence site was documented in 1994 at Casa Blanca Lake.

### ***Ashy Dogweed***

Ashy dogweed (*Thymophylla tephroleuca*) was federally-listed as endangered on July 19, 1984 [49 FR 29232-29234]. This plant forms dense, circular clumps in open areas on sandy pockets in the Maverick-Catarina, Copita-Zapata, and Nueces-Comita soils of southern Webb and northern Zapata Counties, Texas (TPWD 2007) in level areas or in gentle, rolling topography (USFWS 2012). Ashy dogweed has been observed in areas of ground disturbance, but it is unknown if the plant prefers disturbed areas or would also flourish in undisturbed areas (TPWD 2007). Ashy dogweed grows among shrubs including mesquite, calderona (*Krameria ramosissima*), Texas lantana, goatbush (*Castela erecta*), anacahuita, and cenizo (*Leucophyllum frutescens*). At least six populations have been identified in southern Webb County and northern Zapata County (TPWD 2013).

TNDD data indicated the closest known occurrence of ashy dogweed was observed in the 1980's, approximately 18 miles south of the subject area in Webb and Zapata Counties, Texas (EO# 1456) (Attachment A, Figure 5). Ashy dogweed was identified at the head of the Dos Arroyos drainage during the 1980's, then again around Mangana-Hein Road and Dolores Creek in 1994, 1999, and 2000. A review of USWFS species occurrence (2013b) found that the closest observation for ashy dogweed is approximately 16 miles southwest of the subject area (Attachment A, Figure 5).

### ***Johnston's Frankenia***

Johnston's frankenia (*Frankenia johnstonii*) was federally-listed as endangered on August 7, 1984 (49 FR 31418-31421). On May 22, 2003, the species was proposed for delisting (68 FR 27961). This low, sprawling shrub generally grows on open or sparsely vegetated rocky hillsides or saline flats in saline sandy or clayey soils with high gypsum content (USFWS 1988). Johnston's frankenia is historically known from Nuevo Leon, Mexico and Starr and Zapata Counties in south Texas (USFWS 1988), but large populations were identified in western Webb County in 1999 (USFWS 2013b).

Review of the TNDD data (2013c) indicates that the closest known occurrence of Johnston's frankenia was observed in 1999, approximately 23 miles south of the subject area in Zapata County, Texas (EO# 4180). In addition to TNDD, USFWS provided aci consulting with endangered plant site occurrence data at an August, 2013 project meeting. A review of USWFS species occurrence (2013b) found that the closest

observation for Johnston's frankenia is approximately 11 miles west of the subject area (Attachment A, Figure 5).

#### **SITE-SPECIFIC ENDANGERED SPECIES INVESTIGATIONS**

Numerous site specific endangered species investigations have been completed onsite since 2011. The findings and conclusions of the various studies are summarized below and the most pertinent site specific investigations are included as attachments to this document.

##### ***Jaguarundi and Ocelot***

In 2011, TRC Environmental conducted site investigations on the 1,110-acre PERC site for federally threatened and endangered species (TRC 2011a). These investigations included habitat assessments for jaguarundi and ocelot. TRC's findings determined the density and canopy cover of vegetation within the PERC site were not sufficient to be considered preferred habitat for jaguarundi or ocelot (TRC 2011a).

Following TRC's assessment of the site, Dr. Michael Tewes conducted a site assessment of the PERC site in 2012. Tewes concluded that the potential for occurrence of resident jaguarundi on the PERC site was extremely unlikely (Tewes 2012). Attachment C contains the entirety of Tewes' investigations for reference.

Upon the determination of the FEMA action area extending outside of the 1,110-acre PERC site, aci consulting conducted additional endangered species site investigations in the 141-acre portion of the FEMA action area outside of the 1,110-acre PERC site. These investigations were completed in 2013 and included habitat evaluation for jaguarundi and ocelot. aci consulting concluded the 141-acre area north and west of the PERC site did not contain the structural and compositional elements of jaguarundi and ocelot habitat, and therefore the regular utilization of the area by the two species is very low (aci consulting 2013). Attachment D contains the entirety of the aci consulting FEMA action area endangered species assessment for reference.

##### ***Least Tern***

In 2011, TRC Environmental conducted site investigations on the 1,110-acre PERC site for federally threatened and endangered species (TRC 2011a). These investigations included habitat assessments for least tern. TRC's findings determined the PERC site lacked preferred riverine habitat for least tern (TRC 2011a).

Field investigations of the 141-acre FEMA action area by aci consulting found no potential shoreline or sandbar habitat conducive for least tern habitation. The FEMA action area did not contain the structural or compositional elements to be regularly utilized by least tern (aci consulting 2013, and Attachment D).

### ***Ashy Dogweed and Johnston's Frankenia***

Previous investigations on the 1,110-acre PERC site included a presence/absence survey for ashy dogweed and Johnston's frankenia (TRC 2011b, and Attachment E). This survey was conducted within specific soil series with the potential to contain the two species. The results of the survey found no ashy dogweed or Johnston's frankenia within the subject area. As shown in Attachment A, Figure 6, two soil series exist on the PERC site with some potential for the endangered plant occurrence. These soil series extend offsite into the 141-acre FEMA action area as well. Accordingly, in 2013, aci consulting conducted a presence/absence survey for ashy dogweed and Johnston's frankenia within the 141-acre FEMA action area. The results of the survey found no ashy dogweed or Johnston's frankenia (aci consulting 2013, and Attachment D).

### **EFFECTS DETERMINATION AND CONCLUSION**

Rancho Viejo Ventures is evaluating a 1,110 acre site in Webb County, Texas for the development of a municipal solid waste/industrial landfill. This Biological Assessment evaluated the potential for federally listed threatened and endangered species to be affected by the proposed action. This assessment builds upon the previous studies conducted on the subject.

Five species are listed as federally threatened or endangered in Webb County, Texas. Summaries for the findings of each species are included below:

### ***Jaguarundi and Ocelot***

- In 2011, TRC Environmental determined the PERC site lacked preferred habitat for jaguarundi or ocelot (TRC 2011a).
- In 2012, Michael Tewes determined that the occurrence of a resident jaguarundi on the 1,110-acre PERC site was extremely unlikely (Tewes 2012, and Attachment C). Tewes' conclusion was based on the absence of record of cats in the area and the lack of extensive thornscrub.
- In 2013, aci consulting concluded the 141-acre FEMA action area north and west of the PERC site lacked the structural and compositional elements of habitat for jaguarundi or ocelot (aci consulting 2013, and Attachment D).
- Based on the field efforts above, no effect to ocelot area anticipated for the FEMA action proposed.
- On October 21, 2013, aci consulting submitted a Biological Evaluation to USFWS documenting a no effect determination on the Jaguarundi and Ocelot. Following the submittal USFWS and aci consulting developed numerous conservation measures for the benefit of the species (Attachment E).
- Based on the field efforts, discussions with USFWS, and commitment to numerous conservations measures (See Attachment E), a "may affect, not likely to adversely affect" determination has been made for the jaguarundi.

***Least Tern***

- In 2011, TRC Environmental determined the PERC site lacked preferred riverine habitat for least tern (TRC 2011a).
- In 2013, aci consulting concluded the 141-acre FEMA action area north and west of the PERC site also lacked the structural and compositional elements of habitat for least tern (aci consulting 2013, and Attachment D).
- Therefore, no effect to least tern is anticipated for the FEMA action proposed.

***Ashy Dogweed and Johnston's Frankenia***

- In 2011, TRC Environmental completed a presence/absence survey for ashy dogweed and Johnston's frankenia within the PERC site. No ashy dogweed or Johnston's frankenia were observed. (TRC 2011b, and Attachment F).
- In 2013, aci consulting conducted a similar presence/absence survey for ashy dogweed and Johnston's frankenia within the 141-acre FEMA action area north and west of the PERC site. The survey also found no ashy dogweed or Johnston's frankenia (aci consulting 2013, and Attachment D)
- Therefore, no effect to ashy dogweed or Johnston's frankenia is anticipated for the FEMA action proposed.

Rancho Viejo Waste Management and aci consulting appreciate the ongoing USFWS assistance with the project. This biological assessment serves as transmittal of Rancho Viejo Waste Management's "no effect" determination under Section 7 of the Act for the following species: ocelot, least tern, ashy dogweed and Johnston's frankenia. This biological assessment also serves as Rancho Viejo Waste Management's "may affect, not likely to adversely affect" determination for jaguarundi. Rancho Viejo Waste Management's courteously requests USFWS concurrence with these determinations. This documentation is necessary to satisfy FEMA's request for confirmation in the form of an official letter from USFWS concurring that the project has "no effect" and to various on listed species or critical habitat and that the project is "not likely to adversely affect" jaguarundi.

If you have any questions or comments, please contact me via phone at (512) 852-3888 or via email at [kramberg@aci-group.net](mailto:kramberg@aci-group.net).

Sincerely,

Kevin Ramberg  
Natural Resource Division

Cc: Dawn Whitehead (with Attachments)  
USFWS, Corpus Christi Ecological Services Field Office  
6300 Ocean Drive, Unit 5837  
Corpus Christi, TX 78412-5837

Carlos Benavides (with Attachments)  
Rancho Viejo Waste Management, LLC  
1116 Calle del Norte  
Laredo, TX 78041

Michael Oden (with Attachments)  
CB&I  
12005 Ford Road, Suite 600  
Dallas, Texas 75234

## REFERENCES

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- TRC. 2011a. Biological Evaluation for Pescadito Environmental Resource Center, Webb County, Texas. Prepared for: Rancho Viejo Waste Management, LLC. August 2011.
- TRC. 2011b. Presence/Absence Survey for Johnston's Frankenia and Ashy Dogweed on Pescadito Environmental Resource Center in Webb County, Texas. August 2011.
- (USDA) U.S. Department of Agriculture. 1985. Soil Survey of Webb County, Texas. USDA Soil Conservation Service. Lincoln, NE.
- (USFWS) U.S. Fish and Wildlife Service. 1988. Johnston's Frankenia (*Frankenia johnstonii*). Recovery Plan. U.S. Fish and Wildlife Service. Albuquerque, New Mexico. 49 pp.



- (USFWS) U.S. Fish and Wildlife Service. 2012. Species Profile for Ashy Dogweed (*Thymophylla tephroleuca*). Available at: <http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q1SH>. Accessed 10 September 2012.
- (USFWS) U.S. Fish and Wildlife Service. 2013a. Annotated List of Species in Texas By County: Webb County. [http://www.fws.gov/southwest/es/ES\\_ListSpecies.cfm](http://www.fws.gov/southwest/es/ES_ListSpecies.cfm). Accessed August 21, 2013.
- (USFWS) U.S. Fish and Wildlife Service. 2013b. Rare, Threatened, and Endangered Plant species and geologic formations in the vicinity. Map provided to aci consulting at project meeting on August 31, 2013 at USFWS Alamo Field Office. 1 pg.
- (USGS) U.S. Geological Survey. 2009. Geology 24k from the Geologic Database of Texas. Texas Water Development Board and U.S. Geological Survey. Austin, Texas.



## List of Attachments

### **Attachment A:** Site Figures

- Figure 1: Proposed Project Area
- Figure 2: USGS 7.5 Minute Topographic Quadrangle: *Burrito Tank*
- Figure 3: Historical Occurrences of Jaguarundi and Ocelot
- Figure 4: Historical Occurrences of the Interior Least Tern
- Figure 5: Historical Occurrences of Ashy Dogweed and Johnston's Frankenia
- Figure 6: Endangered Plant Soil Series
- Figure 7: Riparian Conservation Corridor

### **Attachment B:** FEMA ESA Guidance

**Attachment C:** Potential Presence of Jaguarundi and Their Habitat on the Proposed Site of the Pescadito Environmental Resource Center in Webb County, Texas (Tewes, 2012)

**Attachment D:** Endangered Species Habitat Evaluation and Presence/Absence Survey for the Pescadito Environmental Resource Center FEMA Action Areas, Webb County, Texas (aci consulting 2013)

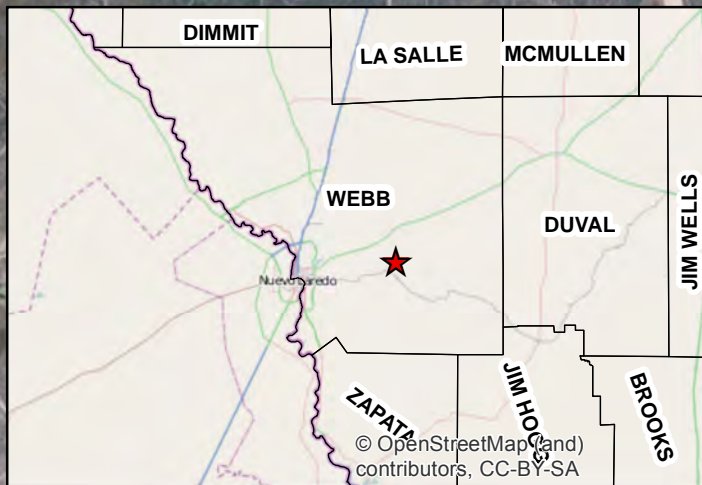
**Attachment E:** Proposed Conservation Measures for the Benefit of the Jaguarundi

**Attachment F:** Presence/Absence Survey for Johnston's Frankenia and Ashy Dogweed, Pescadito Environmental Resource Center, Webb County, Texas (TRC, 2011b)

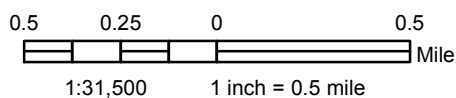
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## **Attachment A: Site Figures**

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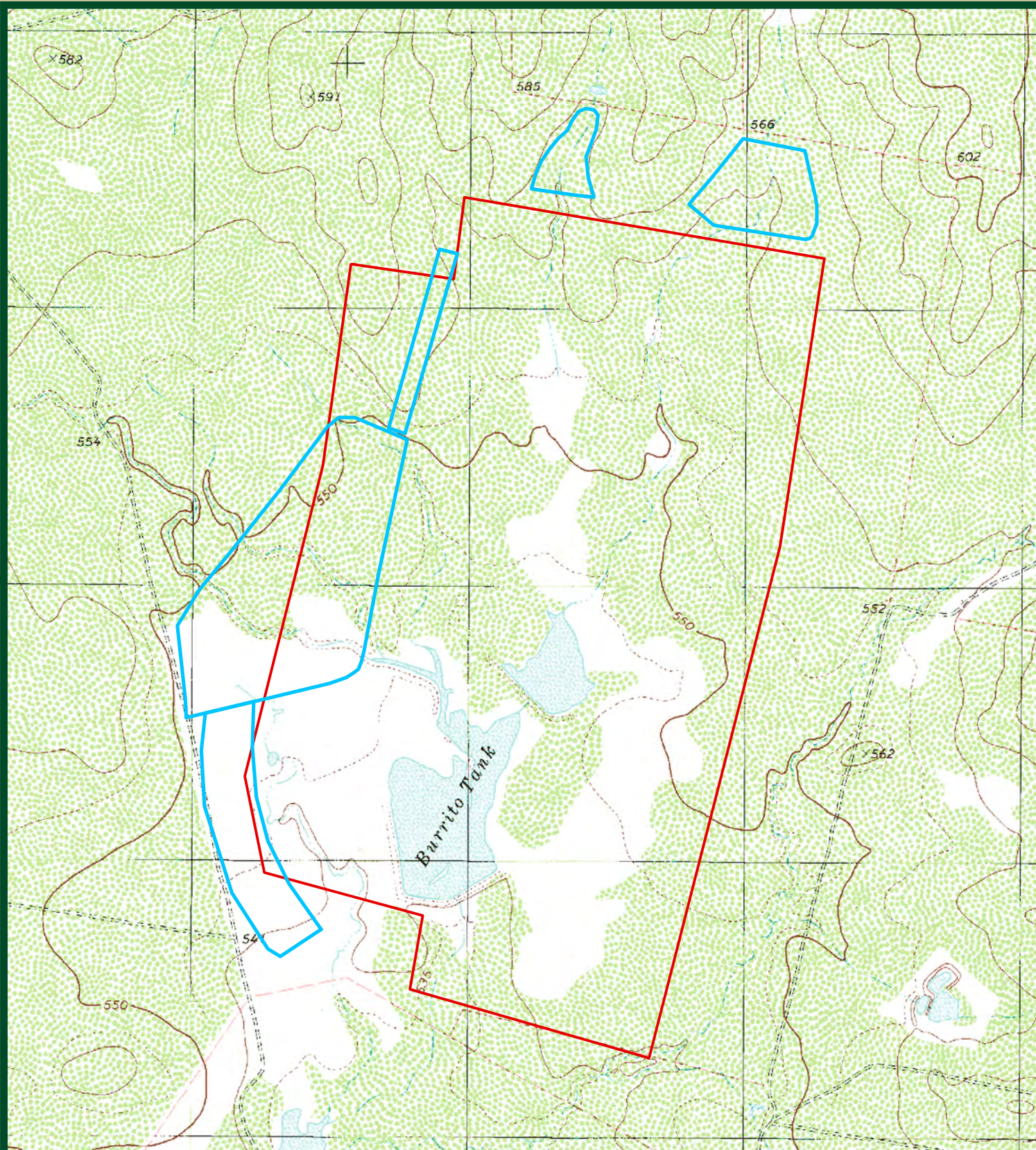
This map is intended for planning purposes only. All map data should be considered preliminary. All boundaries and designations are subject to confirmation.



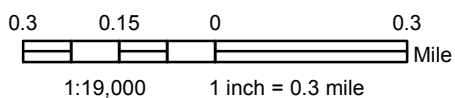
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- PERC Site







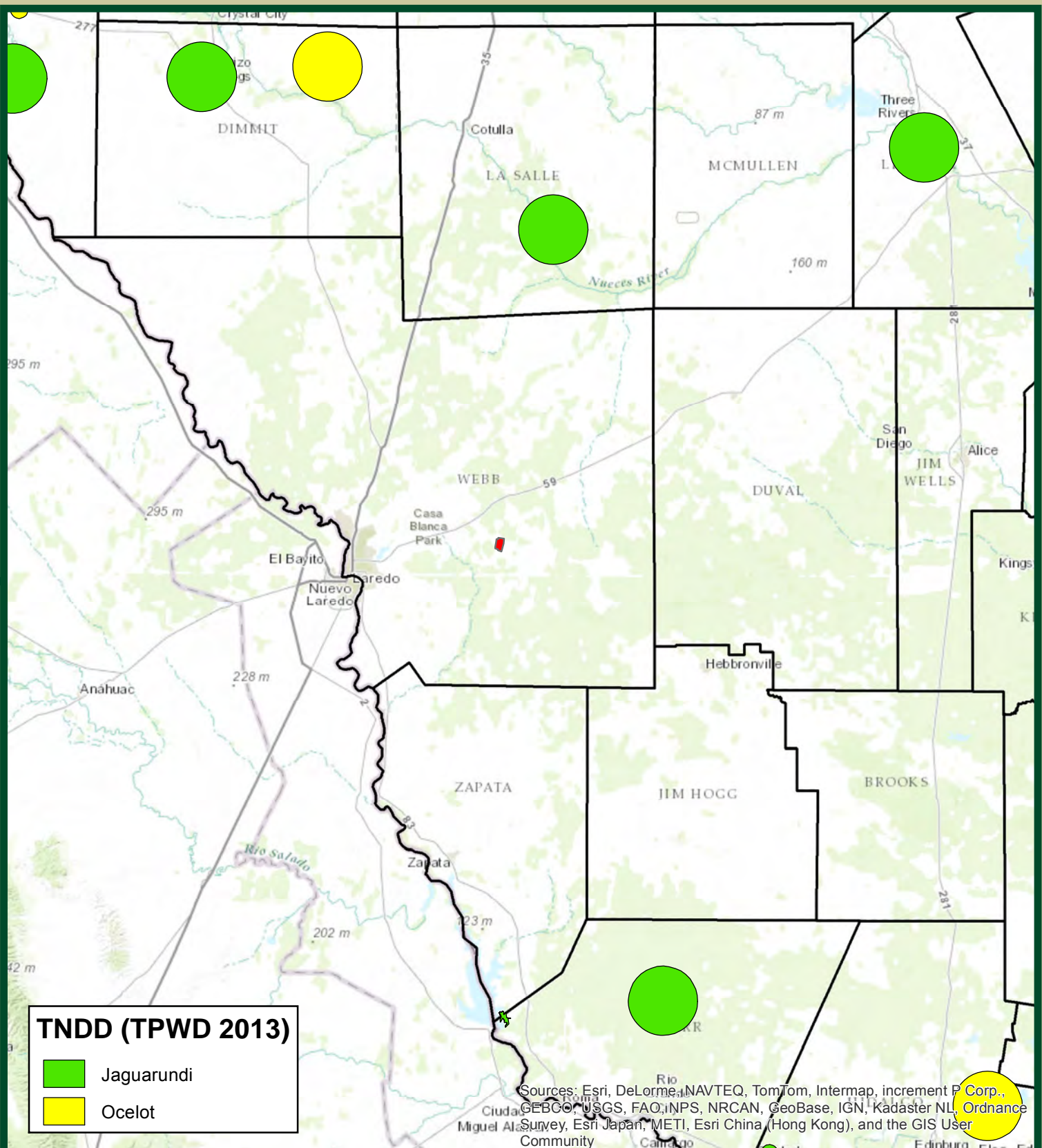
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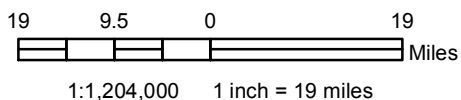
- FEMA Action Area
- PERC Site







This map is intended for planning purposes only. All map data should be considered preliminary. All boundaries and designations are subject to confirmation.



PERC Site

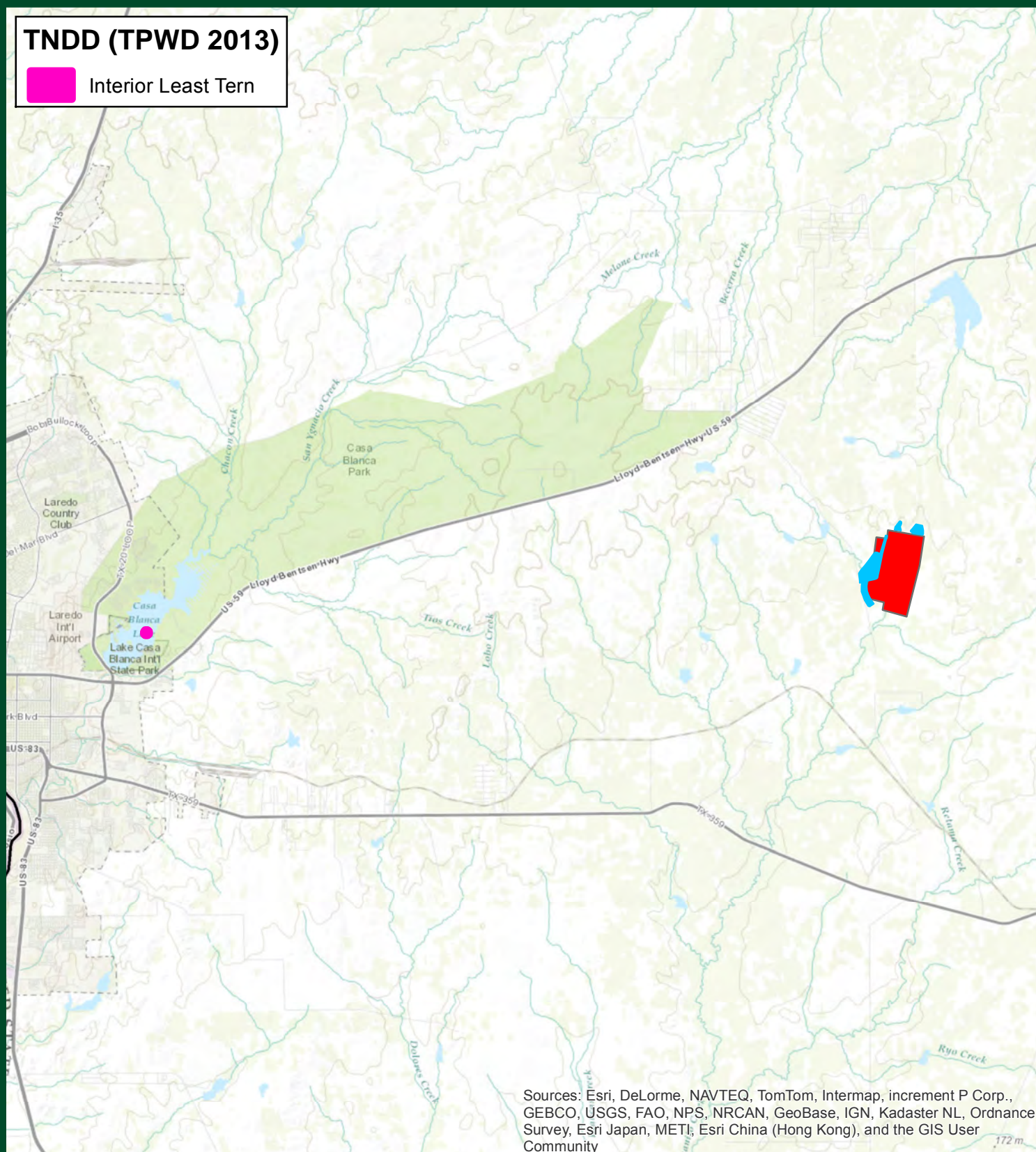




# TNDD (TPWD 2013)



Interior Least Tern



Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

This map is intended for planning purposes only. All map data should be considered preliminary. All boundaries and designations are subject to confirmation.



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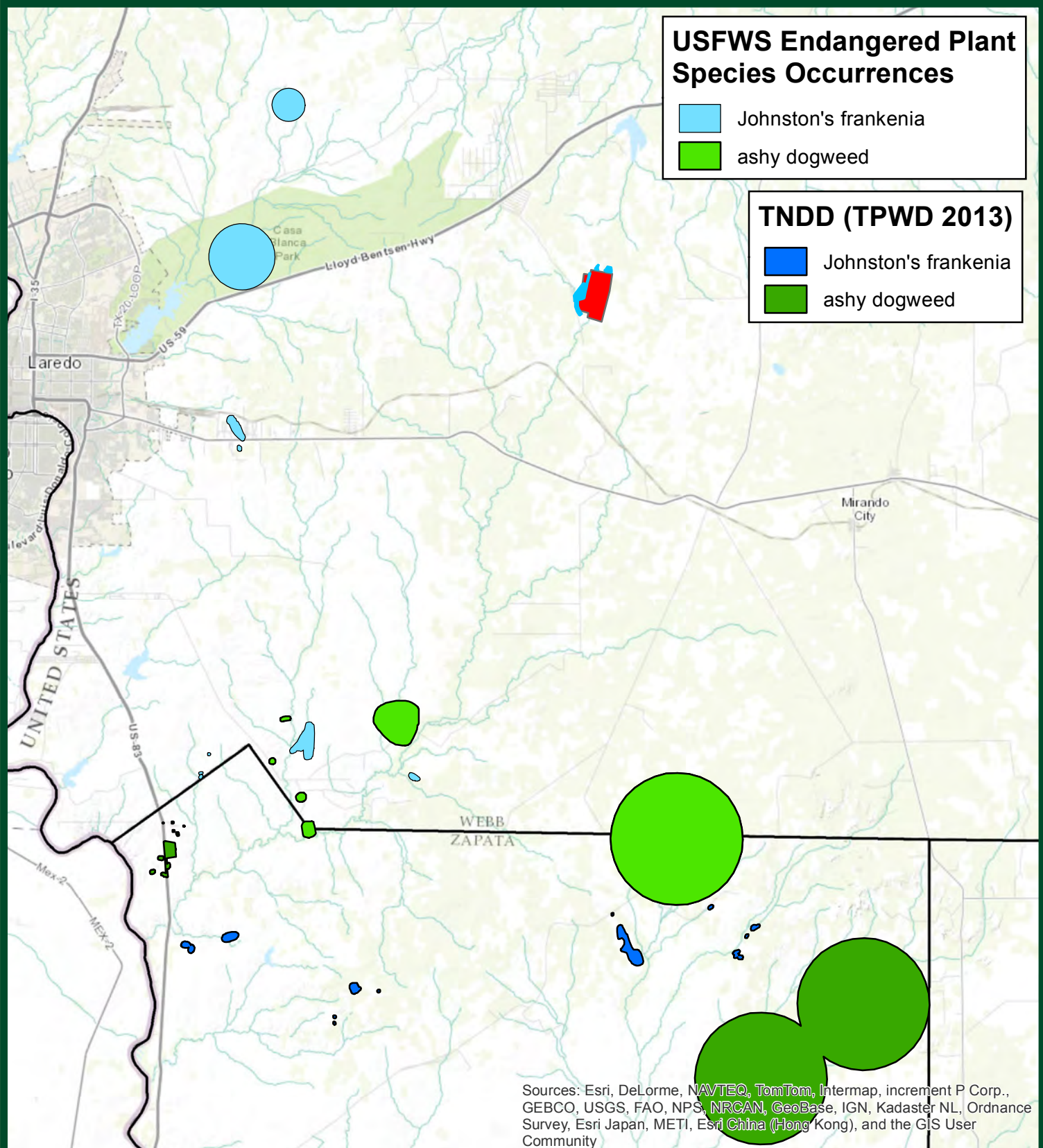
FEMA Action Area



PERC Site







This map is intended for planning purposes only. All map data should be considered preliminary. All boundaries and designations are subject to confirmation.



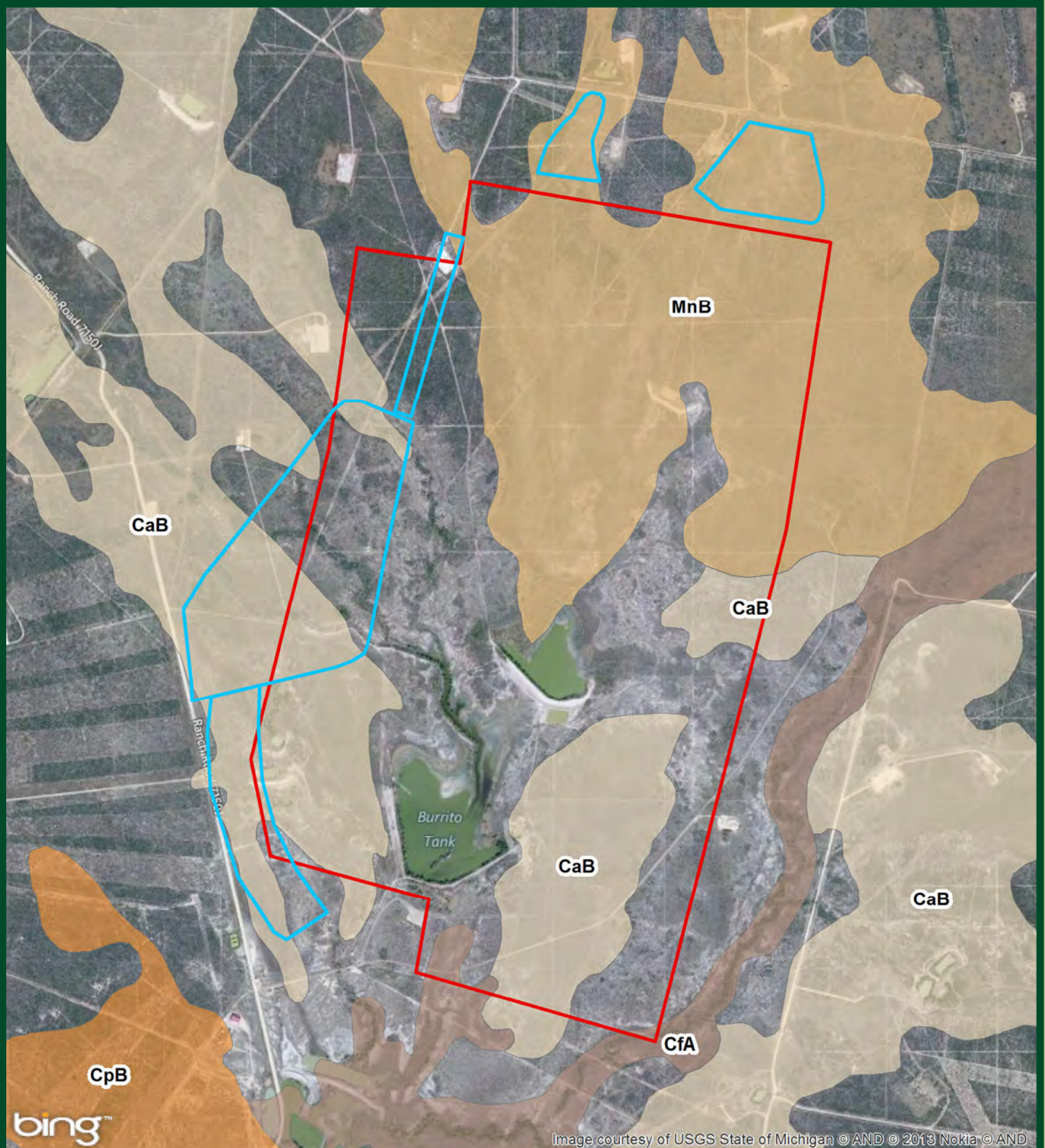
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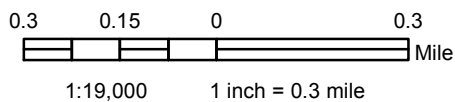
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PERC Site







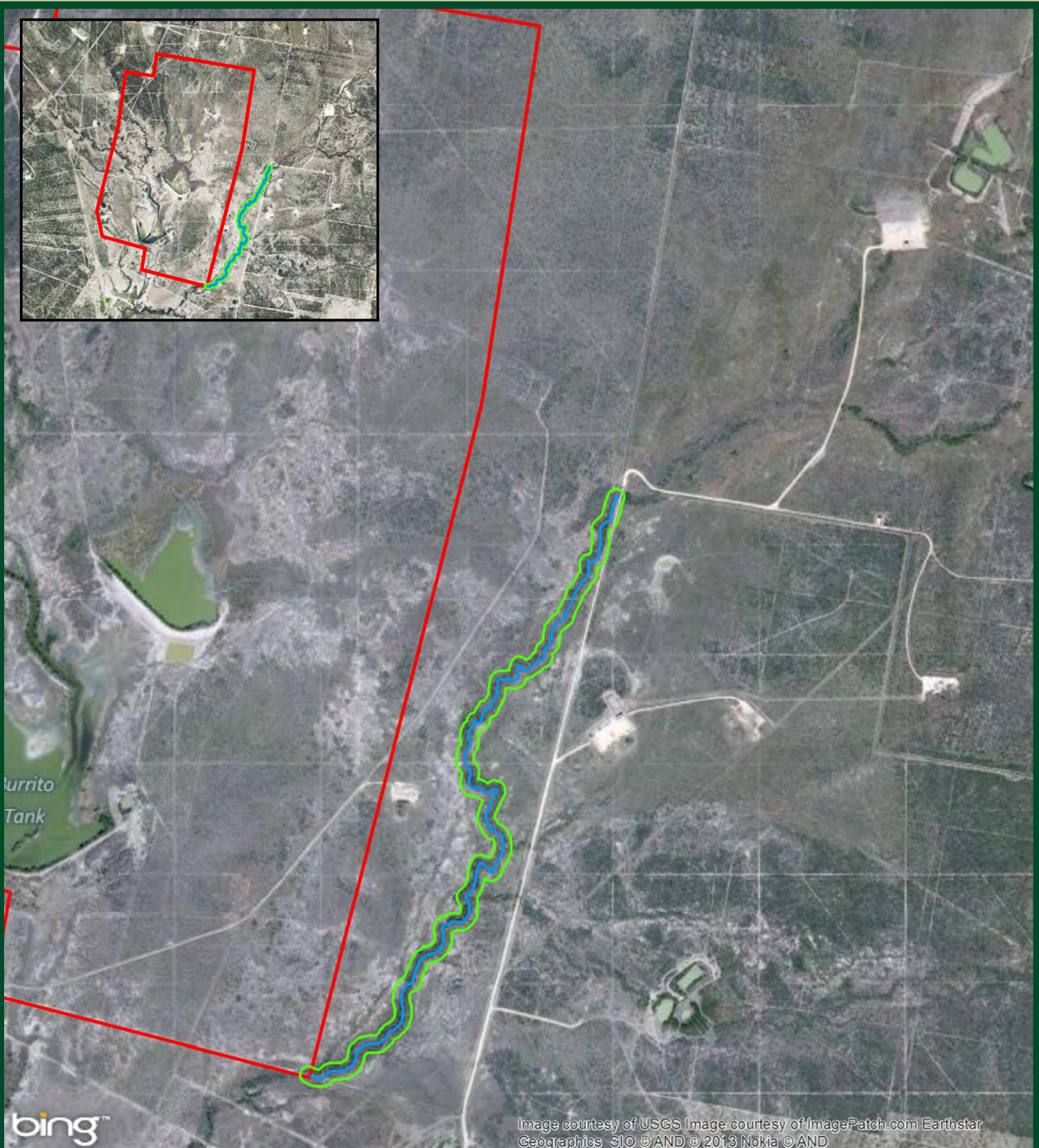
This map is intended for planning purposes only. All map data should be considered preliminary. All boundaries and designations are subject to confirmation.



- FEMA Action Area
- PERC Site







This map is intended for planning purposes only. All map data should be considered preliminary. All boundaries and designations are subject to confirmation.



1,200 600 0 1,200  
1:14,400 1 inch = 1,200 Feet  
Feet

- PERC Site
- 75ft Buffer
- Riparian



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## **Attachment B: FEMA ESA Guidance**

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**FEMA**

August 18, 2010

**MEMORANDUM FOR:** Regional Division Directors  
Regions I - X

A handwritten signature in black ink, appearing to read "Doug Bellomo", written over a horizontal line.

**FROM:** Doug Bellomo, P.E.  
Director, Risk Analysis Division

**SUBJECT:** Procedure Memorandum 64 – Compliance with the Endangered Species Act (ESA) for Letters of Map Change

**EFFECTIVE DATE:** All Conditional Letter of Map Change submittals received as of October 1, 2010

**Background:** The purpose of the ESA is to conserve threatened and endangered species and the ecosystems upon which they depend. Congress passed the ESA in 1973 with recognition that the natural heritage of the United States was of “esthetic, ecological, educational, recreational, and scientific value to our Nation and its people.” Congress understood that, without protection, many of our nation’s living resources would become extinct. Species at risk of extinction are considered endangered, whereas species that are likely to become endangered in the foreseeable future are considered threatened. At present approximately 1,900 species are listed as threatened or endangered under the ESA. The U.S. Department of Interior’s Fish and Wildlife Service and the U.S. Department of Commerce’s National Marine Fisheries Service (collectively known as “the Services”) share responsibility for implementing the ESA.

Section 7 of the ESA requires each federal agency to insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any listed species or result in the destruction of adverse modification of designated critical habitat<sup>1</sup>.

Section 9 of the ESA prohibits anyone from “taking” or “harming” endangered wildlife and similar prohibitions are generally extended through regulations for threatened wildlife. If an action might harm<sup>2</sup> a threatened or endangered species, an incidental take authorization is required from the Services under Sections 7 or 10 of the ESA.

**Issue:** Conditional Letters of Map Change (LOMCs) are issued before a physical action occurs in the floodplain and are FEMA’s comments as to whether the proposed project would meet minimum National Flood Insurance Program (NFIP) requirements and how the proposed changes would impact the NFIP maps. Because Conditional Letters of Map Revision based-on Fill (CLOMR-Fs) and Conditional Letters

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<sup>1</sup> In accordance with Section 4 of the ESA, critical habitat includes specific areas essential to conservation of a species and those areas which may require special management considerations or protection.

<sup>2</sup> Harm can arise from “significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering” [50 CFR Part 17.3].

of Map Revision (CLOMRs) are submitted to FEMA prior to construction, there is an opportunity to identify if threatened and endangered species may be affected by the potential project. If potential adverse impacts could occur, then the Services may require changes to the proposed activity and/or mitigation.

For LOMC requests involving floodplain activities that have already occurred, private individuals and local and state jurisdictions are required to comply with the ESA independently of FEMA's process. These requests do not provide the same opportunity as Conditional LOMCs for FEMA to comment on the project because map changes are issued only after the physical action has been undertaken.

The following table provides a general summary of FEMA's ESA requirements.

Request	ESA-related Action	ESA Requirement Related to FEMA Process
<i>Conditional LOMC Requests</i>		
CLOMA	No physical modification to floodplain is proposed.	ESA compliance is required independently of FEMA's process. The community needs to ensure that permits are obtained per requirement under Section 60.3(a)(2) of FEMA's regulations.
CLOMR-F	Proposed placement of fill in the floodplain.	ESA compliance must be documented to FEMA prior to issuance of CLOMR-F. FEMA must receive confirmation of ESA compliance from the Services.
CLOMR	Proposed modifications of floodplains, floodways, or flood elevations based on physical and/or structural changes.	ESA compliance must be documented to FEMA prior to issuance of CLOMR. FEMA must receive confirmation of ESA compliance from the Services.
<i>LOMC Requests</i>		
LOMA	No physical modification to floodplain has occurred.	ESA compliance is required independently of FEMA's process. The community needs to ensure that permits are obtained per requirement under Section 60.3(a)(2) of FEMA's regulations.
LOMR-F	Placement of fill in floodplain has occurred.	ESA compliance is required independently of FEMA's process. The community needs to ensure that permits are obtained per requirement under Section 60.3(a)(2) of FEMA's regulations.
LOMR	Modifications of floodplains, floodways, or flood elevations have occurred based on physical and/or structural changes.	ESA compliance is required independently of FEMA's process. The community needs to ensure that permits are obtained per requirement under Section 60.3(a)(2) of FEMA's regulations.

**Action Taken:** For CLOMR-F and CLOMR applications, the submittal will be reviewed based on:

- Required data elements cited in the NFIP regulations
- Required data elements cited in the MT-1 and MT-2 Application/Certification Form instructions
- Demonstrated compliance with the ESA



The CLOMR-F or CLOMR request will be processed by FEMA only after FEMA receives documentation from the requestor that demonstrates compliance with the ESA. The requestor must demonstrate ESA compliance by submitting to FEMA either an Incidental Take Permit, Incidental Take Statement, “not likely to adversely affect” determination from the Services or an official letter from the Services concurring that the project has “No Effect” on listed species or critical habitat. If the project is likely to cause jeopardy to listed species or adverse modification of critical habitat, then FEMA shall deny the Conditional LOMC request. This Procedure Memorandum will not change the review process for Conditional Letters of Map Amendment (CLOMA), Letter of Map Amendment (LOMA), Letter of Map Revision based-on Fill (LOMR-F), or Letter of Map Revision (LOMR) applications. In addition, FEMA’s Cooperating Technical Partners will be required to comply with this Procedure Memorandum.

**Attachment:**

Guidance for Compliance with the Endangered Species Act for Conditional Letters of Map Change

Cc: See Distribution List

**Distribution List** (electronic distribution only):

Office of Chief Counsel

Risk Analysis Division

Risk Reduction Division

Environmental and Historic Preservation Unit

Regional Mitigation Divisions

Regional Environmental Officers

Legislative Affairs Division

Production and Technical Services Contractors

Customer and Data Services Contractor

Cooperating Technical Partners

## **Guidance for Compliance with the Endangered Species Act for Conditional Letters of Map Change**

This document supplements the Federal Emergency Management Agency's (FEMA's) Procedure Memorandum No. 64. It highlights additional resources and frequently asked questions to help guide Conditional Letter of Map Revision (CLOMR) and Conditional Letter of Map Revision based on Fill (CLOMR-F) applicants in the Endangered Species Act (ESA) compliance process. The following sections identify helpful web resources, while the final section includes responses to frequently asked questions.

### **NATIONAL FLOOD INSURANCE PROGRAM AND LETTERS OF MAP CHANGE**

Additional information about the National Flood Insurance Program (NFIP) and Letters of Map Change (LOMC) is available from FEMA.

NFIP: <http://www.fema.gov/hazard/flood/info.shtm>

LOMCs: <http://www.fema.gov/hazard/map/lomc.shtm>

### **ESA OF 1973**

Additional information about the ESA and Endangered Species Programs is available from the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS). These two agencies, collectively known as "the Services," share responsibility for implementing the ESA and assisting all individuals (public and private) in the ESA compliance process.

NMFS: <http://www.nmfs.noaa.gov/pr/laws/esa/>

USFWS: <http://www.fws.gov/endangered/whatwedo.html>

### **GETTING STARTED WITH ESA COMPLIANCE AND WHO TO CONTACT**

CLOMR and CLOMR-F applicants are responsible for demonstrating to FEMA that ESA compliance has been achieved prior to FEMA's review of a CLOMR or CLOMR-F application. The applicant may begin by contacting a local Service office, State wildlife agency office, or independent biologist to identify whether threatened or endangered species exist on the subject property and whether the project associated with the CLOMR or CLOMR-F request would adversely affect the species. These entities are also available to discuss questions pertaining to listed species and ESA compliance.

NMFS Regional Offices: <http://www.nmfs.noaa.gov/regional.htm>

USFWS Office Directory: <http://www.fws.gov/offices/>

### **DEMONSTRATING COMPLIANCE WITH THE ESA**

If species may be affected adversely by the project, the applicant (as a non-Federal entity) would be required to obtain compliance through the Section 10 process. This process includes applying for an Incidental Take Permit (ITP) and preparing a habitat conservation plan (HCP). Additional information about Section 10 requirements and the permit application process is available from NMFS and USFWS.

ITPs and NMFS: [http://www.nmfs.noaa.gov/pr/permits/faq\\_esapermits.htm](http://www.nmfs.noaa.gov/pr/permits/faq_esapermits.htm)

ITPs and USFWS: <http://www.fws.gov/endangered/hcp/hcpplan.html>

HCPs and NMFS: <http://www.nwr.noaa.gov/Salmon-Habitat/Habitat-Conservation-Plans/Index.cfm>

HCPs and USFWS: <http://www.fws.gov/endangered/hcp/index.html>

NMFS Permit applications: [http://www.nmfs.noaa.gov/pr/permits/esa\\_permits.htm](http://www.nmfs.noaa.gov/pr/permits/esa_permits.htm)

USFWS Permit application: <http://www.fws.gov/forms/3-200-56.pdf>

To demonstrate to FEMA that ESA compliance has been achieved, the requestor must provide an ITP, an Incidental Take Statement, a “not likely to adversely affect” determination from the Services, or an official letter from the Services concurring that the project has “No Effect” on proposed or listed species or designated critical habitat. If the project is likely to cause jeopardy of a species’ continued existence or adverse modification to designated critical habitat, then FEMA shall refuse to review the CLOMR or CLOMR-F request without prior project approval from the Services. If a Federal entity is involved in a proposal or project for which a CLOMR or CLOMR-F has been requested, then the applicant may coordinate with that agency to demonstrate to FEMA that Section 7 ESA compliance has been achieved through that other Federal agency.

## **Frequently Asked Questions**

### ***For which map change applications does FEMA require demonstrated ESA compliance?***

FEMA requires applicants to demonstrate compliance for CLOMRs and CLOMR-Fs only.

### ***Why is ESA compliance required before FEMA can review my CLOMR or CLOMR-F application?***

All individuals in this country (private and public) have a legal responsibility to comply with the ESA. FEMA recognizes that potential projects for which a CLOMR or CLOMR-F has been requested may affect threatened and endangered species. As a result, FEMA requires documentation to show that potential projects comply with the ESA before a CLOMR or CLOMR-F application can be reviewed.

### ***Why does FEMA not require demonstration of ESA compliance for other LOMC applications?***

Many LOMC requests involve floodplain activities that have occurred already. As a result, FEMA does not have the opportunity to comment on these projects in terms of ESA compliance prior to the physical changes taking place. Private individuals and local and state jurisdictions are required to comply with the ESA independently of FEMA’s process.

### ***What will FEMA require from CLOMR and CLOMR-F applicants to demonstrate ESA compliance?***

As part of the CLOMR or CLOMR-F application, the requestor must provide an ITP, an Incidental Take Statement, a “not likely to adversely affect” determination from the Services, or an official letter from the Services concurring that the project has “No Effect” on proposed or listed species or designated critical habitat.

### ***How much time will be required to achieve ESA Compliance?***

The timeframe needed to achieve ESA compliance will depend entirely on the complexity of the project, the extent to which species may be affected by the project, the quality of biological analyses conducted by the applicant, and the review process as determined by the Services. Therefore, we recommend that LOMC applicants coordinate with the Services as soon as possible within the project development process.

### ***Who is available to answer my questions about ESA compliance?***

NMFS and the USFWS both have staff available around the country to answer questions about threatened and endangered species and ESA compliance. Refer to the *NMFS Regional Offices* and *USFWS Office Directory* links on Page 1 of this guidance document to identify the nearest available Service office. FEMA does not have staff available to assist with this process.

### ***How do I determine if there are threatened or endangered species or critical habitat in my project area?***

The applicant may begin by contacting a local Service office, state wildlife agency office, or independent biologist to identify whether threatened or endangered species exist on the subject property and whether the project associated with the CLOMR or CLOMR-F would adversely affect the species.

***Do I need to hire a biologist for this process?***

While hiring a biologist may be unnecessary, doing so may help facilitate the process. Biologists familiar with subject species and the regulatory process can help adequately complete many of the studies required as part of the Section 10 process and fulfill other Section 10 requirements.

***How are the following ESA-related terms defined?***

“Take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct and may include habitat modification or degradation.

“Harm” can arise from significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

“Section 7” requires all Federal agencies, in consultation with USFWS or NMFS, to use their authorities to further the purpose of the ESA and to ensure that their actions are not likely to jeopardize the continued existence of listed species or result in destruction or adverse modification of critical habitat.

“Section 10” lays out the guidelines under which a permit may be issued to non-Federal parties to authorize prohibited activities, such as take of endangered or threatened species.

“ITP” or incidental take permit is a permit issued under section 10(a)(1)(B) of the ESA to a non-Federal party undertaking an otherwise lawful project that might result in the “take” of an endangered or threatened species. Application for an incidental take permit is subject to certain requirements, including preparation by the permit applicant of a HCP.

“HCP” or habitat conservation plan is a legally binding plan that outlines ways of maintaining, enhancing, and protecting a given habitat type needed to protect species. It usually includes measures to minimize impacts and may include provisions for permanently protecting land, restoring habitat, and relocating plants or animals to another area. An HCP is required before an incidental take permit may be issued to non-Federal parties.

Other ESA-related terms not described here may be defined on the following website:

<http://www.fws.gov/endangered/pdfs/glossary.pdf>

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**Attachment C: Potential Presence of Jaguarundi and Their Habitat on the  
Proposed Site of the Pescadito Environmental Resource Center in Webb  
County, Texas (Tewes, 2012)**

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A report on

**Potential Presence of Jaguarundi and Their Habitat on  
the Proposed Site of the Pescadito Environmental Resource Center  
in Webb County, Texas**

by

Dr. Michael E. Tewes  
Certified Wildlife Biologist  
Cat Research and Management Consultants

**Potential Presence of Jaguarundi and Their Habitat on  
the Proposed Site of the Pescadito Environmental Resource Center  
in Webb County, Texas**

Michael E. Tewes, Ph.D.  
Certified Wildlife Biologist  
Cat Research and Management Consultants

**Summary**

The objective of this brief assessment was to visit the Yugo Ranch in Webb County and evaluate a proposed disposal site for the possible occurrence of endangered jaguarundi (*Herpailurus yagouaroundi*) and their habitat. The occurrence of a resident jaguarundi is extremely unlikely. This conclusion is based, in large part, to the absence of recent or historical records of these cats in this area, and the lack of extensive dense thornshrub communities currently occurring on the project site. Extremely dense thornshrub communities were believed to be important to historical occurrence of jaguarundi in the Lower Rio Grande Valley of South Texas. Most of the proposed project site and surrounding area is open rangeland dominated by a forb-grass-cactus community lacking a dominant shrub or tree layer. One site that was less than 10 acres supported some woody cover of approximately 75-85% horizontal cover, and this canopy cover was too sparse to be considered jaguarundi habitat. A dispersing or transient jaguarundi is extremely unlikely.

## **Introduction**

The possible presence of jaguarundi and their habitat were evaluated on the proposed site of the Pescadito Environmental Resource Center in Webb County, Texas, during 4 March 2012. This report describes the relevant biology of this endangered cat and discusses the findings of the site visit.

The jaguarundi is represented in the United States only by their occurrence in southern Texas (Tewes 1986, Tewes and Everett 1986, Tewes and Schmidly 1987). It is listed as endangered by the U.S. Fish and Wildlife Service and the Texas Parks and Wildlife Department (TPWD) (Tewes and Schmidly 1987).

Considerable concern over the persistence of this cat in Texas has been expressed by resource managers and research scientists in recent years (Tewes 1983, Tewes and Miller 1987, Tewes 1988, Tewes 1990, Tewes 2001). Also, project developers and various governmental agencies often request impact evaluations of projects upon endangered cats. Finally, the development of the federal Jaguarundi Recovery Plan is currently in progress, and will discuss the status of the jaguarundi.

Tewes and Everett (1986) reported on the status and distribution of jaguarundi in Texas. The survey was initially performed in 1982 and surveys have continued to the present in Texas and northeast Mexico. In addition, Arturo Caso and Michael Tewes initiated field research on the jaguarundi in Mexico during 1990.

## **Background**

Information about jaguarundi habitat is scarce and mostly anecdotal. We have radio-collared several jaguarundis in Mexico. Data from these studies

indicated that jaguarundis co-occurred with radio-collared ocelots on the same ranches. The jaguarundis occupied sites covered with dense forest canopies, riparian strips, and areas void of woody cover but heavily dominated with tall, dense bunchgrasses. Continuous bunchgrass communities can also provide the dense vertical cover in the lower layer that seems important to these cats. However, the location of these bunchgrass communities near extremely dense woody communities that can be used for escape cover may be a requisite for jaguarundi use. Because previous studies in Mexico demonstrated the co-occurrence of jaguarundi and ocelot in the same thornshrub communities, many biologists use information about ocelot habitat as a surrogate for jaguarundi habitat.

Considerable field research has occurred in the Lower Rio Grande Valley and, to a lesser extent, over other portions of southern Texas. This research has indicated that ocelots are primarily nocturnal, secretive, and occupy extremely dense cover (Tewes and Schmidly 1987).

The ocelot requires dense thornshrub canopies for optimal cover. Shindle and Tewes (1998) examined the species composition of several thornshrub tracts used intensively by ocelots on the Laguna Atascosa Refuge in Cameron County. These are the same woody species also believed to have been previously used by jaguarundis in the Lower Rio Grande Valley. The primary thornshrub species constituting ocelot cover (>5% canopy cover) included Berlandier fiddlewood (*Citharexylum berlandieri*), colima (*Zanthoxylum fagara*), crucita (*Eupatorium adorum*), desert olive (*Forestiera angustifolia*), granjeno (*Celtis pallida*), and snake-eyes (*Phaulothamnus spinescens*).

Optimal cover (i.e., Class A) consists of dense, mostly continuous stands of

thornshrub with greater than 95% horizontal cover within the shrub layer. This community type of dense shrubs is uncommon, covering less than 1% of southern Texas (Tewes and Everitt 1986). "Sub-optimal" or "marginal" cover has a horizontal canopy ranging 75-95% closure of the shrub layer. Discussion of the value of suboptimal or marginal cover for ocelots is relevant primarily when these marginal tracts occur near optimal tracts. These categories provide an objective basis of evaluating the presence and potential utility of ocelot cover, and in turn as an ecological surrogate for jaguarundi.

The lower stratum (i.e., shrub layer) is most important to the jaguarundi because they spend most of their time at that level. Our previous research on the jaguarundi indicated the critical reliance of this feline on dense woody cover for foraging and social interactions. Also, dense vertical cover may provide some niche segregation from ocelots, bobcats, and probably coyotes, three carnivores that are suspected as potential competitors or antagonists of the jaguarundi.

### **Potential Presence of Jaguarundi**

The presence of jaguarundis are difficult to detect. The size and shape of tracks and scats (i.e., feces) overlap with feral cats, young bobcats, and young ocelots. There are few inferential or diagnostic techniques that can identify the presence of jaguarundis, although use of remote cameras to identify jaguarundi presence has been successful in Mexico (Tewes, personal observation). The use of these techniques on this project site is not recommended because of the extremely low probability of jaguarundi presence.

The last documented jaguarundi (Class A) report in the United States occurred a short distance east of Brownsville, Texas, during April 1986. A

photograph of a possible jaguarundi occurred on the U.S. Fish and Wildlife tract adjacent to the Audubon Sabal Palm Wildlife Sanctuary during the early 1990s. The observer declared it was a jaguarundi and the poor quality photograph suggested it may have been a jaguarundi.

Another verbal account described a trapper who caught two jaguarundis in Willacy County and released them on the Voshell Unit of the Texas Parks and Wildlife Department located near Brownsville, Texas, during the early 1970s. I observed photographs of these two jaguarundis in a captive environment. Other reports of jaguarundis have been documented in the Lower Rio Grande Valley during the 1900s. However, a Class A or documented report of a jaguarundi throughout the remaining area of Texas has never been documented or successfully verified, either during the 1800s or 1900s. And with the prevalence of remote wildlife cameras (Heilbrun et al. 2003) or “deer cams”, a jaguarundi population would have likely been identified over the past 10 years.

We have documented road mortality of jaguarundis in Mexico, and it should be expected in areas supporting a jaguarundi population. The last documented jaguarundi road mortality in Texas occurred in 1986 about 2 miles east of Brownsville. This paucity of records is another reason we believe jaguarundis are rare or nonexistent in the Rio Grande Valley of Texas.

## **Site Evaluation**

The site visit of the Yugo Ranch occurred on 4 March 2012 in order to qualitatively observe the thornshrub cover.

During the site visit, the following criteria were used to evaluate the value (good, marginal, poor) of the thornshrub communities on and around the proposed

project site (Tewes 1986). Thornshrub communities with >85% horizontal cover (HC) and >6 ft height (HT) were identified as good quality. Sites with 75-85% HC and >6 ft HT were assessed as marginal quality. If the thornshrub layer was generally <75% HC or <6 ft HT, then the sites were evaluated as poor quality.

No areas were identified as good quality, and only one small area (about 10 acres) was considered as marginal quality. Most of the area lacked a significant tree or shrub layer, and was dominated with a grass-forb-cactus community. The reported salinity in some of the soil is likely responsible for the poor habitat conditions for endangered cats.

An important consideration in assessing thornshrub for endangered cat cover is the presence of proper soil types (Harveson et al. 2004). Many of the soils on the proposed site of the Pescadito Environmental Resource Center are shallow, rocky, and offer poor support for the dense thornshrub that jaguarundis prefer. In addition, some areas reportedly have saline soils, further reducing the likelihood of thornshrub development for endangered cats (Harveson et al. 2004). The small 10 acres of thornshrub of marginal quality has no value for jaguarundis because the surrounding landscape matrix is poor habitat and isolates this small tract. It is insufficient to support even an individual jaguarundi.

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**Attachment D: Presence/Absence Survey for Johnston's Frankenia and Ashy  
Dogweed, Pescadito Environmental Resource Center, Webb County, Texas  
(TRC, 2011b)**

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# **Presence/Absence Survey for Johnston's Frankenia and Ashy Dogweed**

## **Pescadito Environmental Resource Center Project Webb County, Texas**

**Prepared For:    Rancho Viejo Waste Management, LLC  
Webb County, Texas**

**Prepared By:    TRC Environmental Corporation  
Austin, Texas**



August 2011

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# **Presence/Absence Survey for Johnston's Frankenia and Ashy Dogweed**

## **Pescadito Environmental Resource Center Project Webb County, Texas**

### **Submitted By:**

TRC Environmental Corporation  
505 East Huntland Drive, Suite 250  
Austin, Texas 78752

512.329.6080 (phone)  
512.329.8750 (fax)

August 2011

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## 1.0 INTRODUCTION

TRC Environmental Corporation (TRC) was contracted by Rancho Viejo Waste Management, LLC to obtain environmental clearances and consultations for a proposed 1,110-acre landfill facility near Laredo, Webb County, Texas (Project). A site location map is included as Figure 1. The Project area is located within open ranchland currently stocked with cattle.

There are two federally and state-listed endangered plants that may occur in Webb County (USFWS 2011; TPWD 2011): Johnston's frankenia (*Frankenia johnstonii*) and ashy dogweed (*Thymophylla tephroleuca*). A TRC field reconnaissance survey of the Project area in November 2009 identified potentially suitable habitat for Johnston's frankenia and ashy dogweed. Subsequently, TRC conducted a presence/absence survey for the two protected plant species within the Project survey area. This report describes the results of the presence/absence survey conducted in March 29 to 31, 2011.

## 2.0 METHODS

In Texas, Johnston's frankenia is typically found on saline or clayey soils having high gypsum content, including Maverick, Catarina, Copita, Montell, and Zapata soils (USFWS 1988). Known populations of ashy dogweed are located on sandy pockets of Maverick-Catarina, Copita-Zapata, and Nueces-Comita soils near the border of Webb and Zapata counties, with the nearest recorded occurrence of this species located approximately 20 miles southwest of the Project area (TXNDD 2011).

A review of the United States Department of Agriculture (USDA) National Resource Conservation Service (NRCS) Web Soil Survey (USDA – NRCS 2011) identified four soil map units within the Project area: Aguilares sandy clay loam (AgB), Montell clay (MnB), Catarina clay (CaB), and Brundage fine sandy loam (Bd; Figure 2). Areas consisting of Montell and Catarina clays would be surveyed for Johnston's frankenia and ashy dogweed. Since one known occurrence of ashy dogweed occurs along the border of Hebbbronville soils and Aguilares soils (TxNDD 2011), it was determined that areas consisting of Aguilares sandy clay loam would also be surveyed for ashy dogweed. No known occurrences of either ashy dogweed or Johnston's frankenia exist for Brundage fine sandy loam; therefore, this soil map unit was not included in the survey.

Surveys were performed by two qualified biologists, Gena Janssen and Barrett Clark, along multiple transects within individual soil map units. Transect widths varied based on field conditions (e.g., narrow widths in areas of dense vegetation and wider widths in areas of open to sparse vegetation). Representative plant lists were recorded by soil map unit (with the exception of the Brundage fine sandy loam), and illustrative digital photographs were taken as the landscape or habitats changed.

## 3.0 RESULTS

Overall range conditions of the Project area were extremely dry from drought and severely overgrazed, with some areas mechanically altered by root-plowing or similar clearing methods in the past. Large areas of bare ground were present, including notably absent herbaceous cover across much of the Project area. The survey results, including observed species of vegetation, are presented by the three high priority soil map unit classifications: Aguilares fine sandy loam, Montell clay, and Catarina clay.

### 3.1 Aguilares Fine Sandy Loam

Vegetation within the Aguilares fine sandy loam was relatively dense compared to the other soil map units within the Project area. Vegetation within this soil map unit was particularly dense along the northern portion of the Project area. Species diversity was relatively higher within this soil map unit than those of the other soil map units. Ashy dogweed was not observed during the survey. Johnston's frankenia was not expected to be present in this soil type and none were observed. Representative vegetation communities of the Aguilares fine sandy loam soil map units are presented in Photos 1 – 3.

Observed woody species included honey mesquite (*Prosopis glandulosa*), dwarf screw-bean mesquite (*Prosopis reptans*), common goldenweed (*Isocoma coronopifolia*), knife-leaf condalia (*Condalia spathulata*), desert yaupon (*Schaefferia cuneifolia*), guayacan (*Guaiacum angustifolium*), allthorn (*Koeberlinia spinosa*), lotebush (*Ziziphus obtusifolia*), oreja de perro (*Tiquilia canescens*), blackbrush (*Acacia rigidula*), whitebrush (*Aloysia gratissima*), saladillo (*Varilla texana*), coma (*Sideroxylon celastrina*), creosote (*Larrea tridentata*), Tulipan del monte (*Hibiscus martianus*), goat-bush (*Castela texana*), orange zexmenia (*Wedelia texana*), paloverde (*Parkinsonia texana*), guajillo (*Acacia berlandieri*), coppery false fanpetals (*Billieturnera helleri*), leather stem (*Jatropha dioica*), and popote (*Ephedra antisyphilitica*).

Observed herbaceous species included sueada (*Sueada* sp.), Dahlberg daisy (*Thymophylla tenuiloba*), and buffelgrass (*Pennisetum ciliare*). Observed cacti species included Texas prickly pear (*Opuntia engelmannii*), tasajillo (*Opuntia leptocaulis*), dog cholla (*Opuntia schottii*), pitaya (*Echinocereus enneacanthus*), rat-tail cactus (*Wilcoxia poselgeri*), horse creeper (*Echinocactus texensis*), nipple cactus (*Mammillaria heyderi*), Berlandier's alicocha (*Echinocereus berlandieri*), and Fitch's hedgehog cactus (*Echinocereus reichenbachii* var. *fitchii*).



**Photo 1. Typical Aguilares fine sandy loam vegetation. Dominant species included honey mesquite and Texas prickly pear.**





**Photo 2. Typical Aguilares fine sandy loam vegetation. A mosaic of bare ground was present throughout this soil map unit.**



**Photo 3. Typical Aguilares fine sandy loam vegetation. Dense vegetation was present in many areas.**



### 3.2 Montell Clay

Areas of Montell clay within the Project area were dominated by clusters of saladillo and Texas prickly pear, forming a mosaic with large expanses of bare ground and other woody species. Vegetation density was variable across the Montell clay soil map units. The dominant landscape feature in many areas consisted of bare ground while some areas exhibited higher vegetation density, such as along drainages and swales. Johnston's frankenia was not observed during the survey. Ashy dogweed was not expected to be present in this soil type and none were observed. Representative vegetation communities of the Montell clay soil map units are presented in Photos 4 – 6.

Observed woody species included honey mesquite, dwarf screw-bean mesquite, saladillo, blackbrush, lotebush, common goldenweed, goat-bush, coppery false fanpetals, desert yaupon, guayacan, allthorn, white brush, knife-leaf condalia, leather stem, sueada, rough agave (*Agave scabra*), snake-eyes (*Phaulothamnus spinescens*), twisted acacia (*Acacia schaffneri*), Texas broomweed (*Gutierrezia texana*), palma pita (*Yucca treculeana*), and sea ox-eye daisy (*Borrchia frutescens*).

Observed herbaceous species included jicamilla (*Jatropha cathartica*), bitterweed (*Hymenoxys odorata*), whorled dropseed (*Sporobolus pyramidatus*), and buffelgrass. Observed cacti species included Texas prickly pear, tasajillo, pitaya, Fitch's hedgehog cactus, horse crippler, nipple cactus, longmamma nipple cactus (*Mammillaria sphaerica*), and miniature barrel cactus (*Thelocactus setispinus*). Species recorded near the stock ponds included smallhead sneezeweed (*Helenium microcephalum*), Plains coreopsis (*Coreopsis tinctoria*), bearded dalea (*Dalea pogonantha*), Carolina wolfberry (*Lycium carolinianum*), retama (*Parkinsonia aculeata*), and Gregg keelpod (*Synthlipsis greggii*).



**Photo 4. Typical Montell clay vegetation. Many areas consisted of a mosaic of saladillo and Texas prickly pear clusters, bare ground, and clusters of other woody species.**





**Photo 5. Typical Montell clay vegetation. Some areas exhibited increased vegetation density(background).**



**Photo 6. Typical Montell clay vegetation. In many areas, bare ground was the dominant landscape feature.**

### 3.3 Catarina Clay

Areas of Catarina clay soil map units within the Project area contained relatively low species diversity and were dominated by honey mesquite, Texas prickly pear, saladillo, and (in the western portion of the Project area) Texas broomweed. Vegetation density was variable across the Catarina clay soil map units and ranged from large areas of bare ground to areas of higher density shrubland. Johnston's frankenia and ashy dogweed were not observed during the survey. Representative vegetation communities of the Catarina clay soil map units are presented in Photos 7 – 10.

Observed woody species included saladillo, honey mesquite, dwarf screw-bean mesquite, goat-bush, guayacan, knife-leaf condalia, common goldenweed, lotebush, snake-eyes, leather stem, jicamilla, palma pita, broomweed, sueada, coppery false fanpetals, Dahlberg daisy, Texas prickly pear, tasajillo, horse crippler, pitaya, Fitch's hedgehog cactus, miniature barrel cactus, nipple cactus, and root cactus (*Ancistrocactus scheeri*). The two identifiable grasses in these areas were whorled dropseed and red grama (*Bouteloua trifida*).



**Photo 7. Typical Catarina clay vegetation. In some areas, bare ground was the dominant landscape feature.**





**Photo 8. Typical Catarina clay vegetation. Severe overgrazing was evident throughout the Project area.**



**Photo 9. Typical Catarina clay vegetation. Increased vegetation density was located in the southeastern Catarina clay soil map unit.**





**Photo 10. Typical Catarina clay vegetation. Within the western Catarina clay soil map unit, broomweed was an additional dominant species.**

#### **4.0 CONCLUSION**

TRC was contracted by Rancho Viejo Waste Management, LLC to conduct a biological survey in order to identify the presence of two federally and state-listed endangered plant species, ashy dogweed and Johnston's frankenia, for the proposed Project. Ashy dogweed and Johnston's frankenia were not observed within any of the high priority soil map units of the Project area during the March 2011 survey. Based on review of background data and the results of the field investigation, qualified biologists from TRC determined that ashy dogweed and Johnston's frankenia are not present within the Project survey area.

#### **5.0 REFERENCES**

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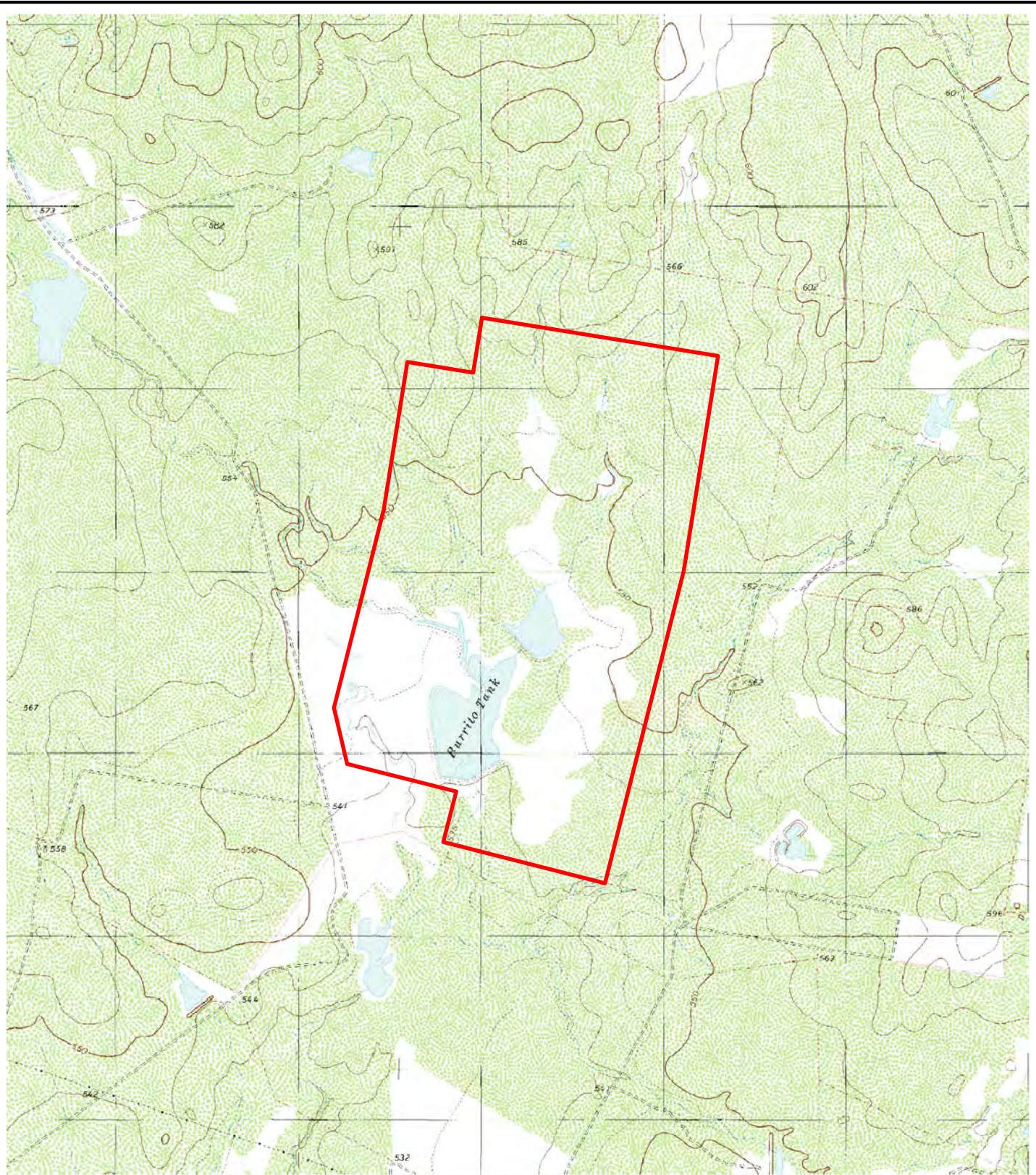
USFWS 1988. Johnston's Frankenia (*Frankenia johnstonii*) Recovery Plan. USFWS, Region 2. Albuquerque, New Mexico: J.M. Poole, Texas Natural Heritage Program, TPWD, Austin, Texas. C. McDonald (Ed.).

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**FIGURE 1**  
**SITE LOCATION MAP**

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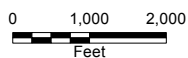


# **LEGEND**

— Survey Area



Source: U.S.G.S 7.5-Minute Series Topographic Map, Burrito Tank (1980), Texas.



## **SITE LOCATION MAP**

WEBB COUNTY, TEXAS

PROJECT NO.: 182277

DATE: 5/18/2011



505 EAST HUNTLAND DRIVE  
SUITE 250  
AUSTIN, TEXAS 78752  
512-329-6080

**FIGURE**  
**1**

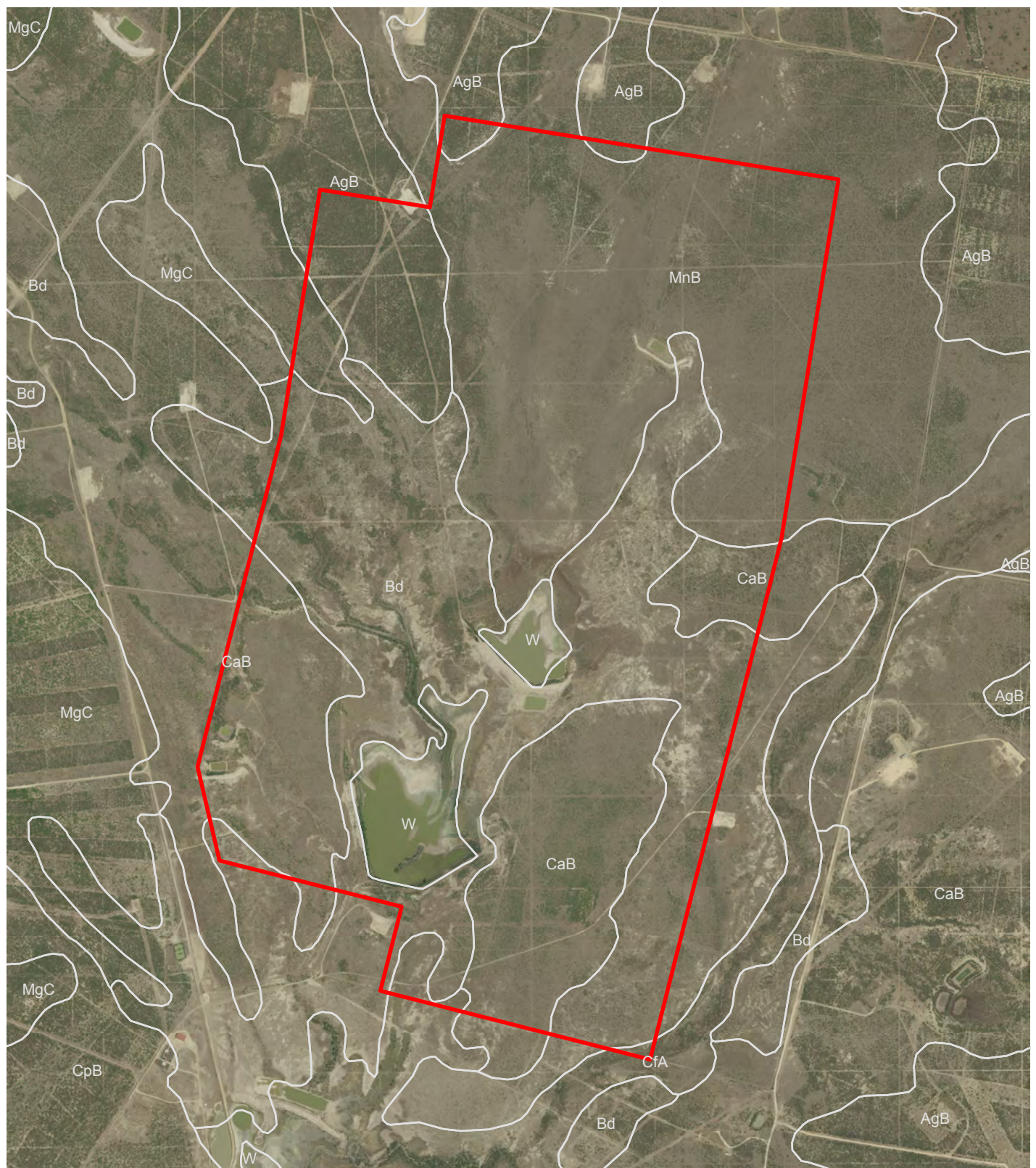


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**FIGURE 2**  
**SOILS MAP**

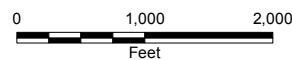
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# LEGEND

— Survey Area

N



Source: Soil Survey Geographic (SSURGO)  
Database for Webb County, Texas

## SOILS MAP

WEBB COUNTY, TEXAS

PROJECT NO.: 182277

DATE: 5/18/2011



505 EAST HUNTLAND DRIVE  
SUITE 250  
AUSTIN, TEXAS 78752  
512-329-6080

FIGURE  
**2**

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**Attachment E: Proposed Conservation Measures for the Benefit of the Jaguarundi**

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## **Pescadito Environmental Resource Center, Webb County**

### **Proposed Conservation Measures for the Benefit of the Jaguarundi**

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- **Riparian Conservation Corridor:** Ranch Viejo Waste Management will set aside Riparian Conservation Corridor (RCC) east of the PERC site. The RCC will include a 75-foot buffer on either side of a drainage corridor. The RCC is approximately 7,700 linear feet long as proposed. The area would be set aside in conservation easement or deed restriction. The RCC is shown as Figure 7 in Attachment A of this biological assessment.
- **FEMA Flood Control Structures Revegetation:** The detention basins will be constructed in upland areas from onsite soil, top dressed with topsoil, and vegetated with native grasses and forbs. The three dams will also be vegetated with native grasses and forbs. Both diversion channels will be open, grass lined drainage swales. Woody vegetation will be controlled within the drainage swales for flow control purposes; however, native tree and shrub growth will be encouraged outside of the swales. Where necessary the dams and swales will be reinforced with erosion control blankets (ECB) or turf reinforcement mats (TRM). The Caesar Kleberg Wildlife Research Institute's South Texas Natives seed project has tested different native species; the program works with commercial growers to provide commercially available seed sources for those that are specifically adapted to South Texas. Not all the species are always commercially available and economical; therefore, the native species to be planted may be limited. Other ground cover species or stabilization may be required for high erosion areas, however native species will be the preferred method of restoration.
- **Light Limitations:** To avoid impacts to nocturnal wildlife, where outdoor lighting is required to provide supplemental light on facilities or parking areas, downshield lighting will be utilized. This lighting will be kept to the minimum necessary to safely illuminate areas accessed by personnel. Lighting will be installed to not shine on adjacent undeveloped areas.
- **Speed Reduction:** Vehicle travel speeds on access and infrastructure roads within the subject area will be determined by the site development engineer. The maximum allowed travel speed may vary between daylight and nighttime hours based on line-of-sight in order to limit encounters with and impacts to nocturnal wildlife. Speed limits may be decreased if the frequency of wildlife encounters increases beyond what was originally anticipated but may not be increased above the engineered design speed.
- **Vehicle Traffic Control:** Vehicle movements will be restricted to only what is necessary for PERC Site operations within designated road/infrastructure corridors. Any off-road vehicle movement will require prior coordination with site management.

- **Training:** All Rancho Viejo Waste Management, LLC personnel and contractors whose duties require them to regularly operate beyond the primary entrance of the subject area will complete environmental training regarding wildlife.

**Attachment F: Endangered Species Habitat Evaluation and Presence/Absence  
Survey for the Pescadito Environmental Resource Center FEMA Action  
Areas, Webb County, Texas (aci 2013)**

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**ENDANGERED SPECIES HABITAT EVALUATION AND PRESENCE/ABSENCE  
SURVEY FOR THE PESCADITO ENVIRONMENTAL RESOURCE CENTER FEMA  
ACTION AREAS**

Webb County, Texas

October 2013

Submitted to:  
Rancho Viejo Waste Management, LLC  
1116 Calle del Norte  
Laredo, TX, 78041

Prepared By:  
aci consulting  
1001 Mopac Circle  
Austin, Texas 78746

aci Project No.: 05-12-053

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- Figure 5: Endangered Plant Species Soils
- Figure 6: Endangered Plants Species Occurrence
- Figure 7: Vegetation Assessment Points / Photo Log Locations

### **Appendix B: Photo Log**



October 2013

## **Endangered Species Habitat Evaluation and Presence/Absence Survey for the Pescadito Environmental Resource Center FEMA Action Area**

### **1.0 INTRODUCTION**

The purpose of this report is to assess the potential for federally-listed endangered species within the additional Federal Emergency Management Agency (FEMA) action area associated with the proposed Pescadito Environmental Resource Center (PERC) site in Webb County, Texas. This report presents the findings of a habitat evaluation for the least tern, ocelot, and jaguarundi and the findings of a presence/absence survey for ashly dogweed and Johnston's frankenia.

This report is to supplement previous endangered species investigations by others for areas within the 1,110 acre PERC site.

Species listed as endangered or threatened by the U.S. Fish and Wildlife Service (USFWS) are protected by the Endangered Species Act, which prohibits "take." "Take" is defined in the Act as "harass, harm, pursue, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." "Harm" has been defined to include activities that modify or degrade habitat in a way that significantly impairs essential behavior patterns and results in death or injury. Alteration of the quality and/or quantity of endangered species habitat may "harm" the listed species that inhabit those areas. A number of potential impacts, directly or indirectly related to human activities, are of concern to USFWS and may be regulated by that agency to prevent "take" or "harm" of these listed species.

### **2.0 PROJECT LOCATION AND BACKGROUND**

The existing PERC site is approximately 1,110 acres in rural Webb County, south of U.S. Highway 59, approximately 20 miles east of Laredo, Texas. Rancho Viejo Waste Management proposes to construct and operate a municipal solid waste landfill on site.

The FEMA action area includes approximately 225 acres inside and outside of the PERC site. The FEMA action area includes approximately 141 acres outside of the PERC site, located to the north and west of the existing PERC site. For the purposes of this report, the study area will focus on these additional 141 acres, hereafter referred to as the subject area, located outside of the existing PERC site (Figure 1).

The proposed FEMA flood control project includes floodwater detention basin and diversion channels. Specifically, the proposed FEMA flood control structures include:

- Northwest Basin, North Basin and West Basin: three floodwater detention basins north and west of the PERC site,
- Northwest Channel: one diversion channel connecting the north and northwest detention basins to the west detention basin, and
- West Channel: one channel connecting the west detention basin to areas south and downstream of the PERC site.

### 3.0 EXISTING ENVIRONMENT

#### 3.1 Vegetation

According to the Texas Parks and Wildlife “Vegetation Types of Texas” map, the subject area is located within two vegetation types: Mesquite-Blackbrush Brush and Other Native or Introduced Grasses (McMahan et al. 1984). The majority of the FEMA action area is located within the Mesquite-Blackbrush Brush vegetation type and the remaining acreage is classified within the Other Native or Introduced Grasses vegetation type.

Common plants associated with the Mesquite-Blackbrush Brush vegetation type include, but are not limited to: lotebush (*Ziziphus obtusifolia*), cenizo (*Leucophyllum frutescens*), guajillo (*Acacia berlandieri*), desert olive (*Forestiera pubescens* var. *pubescens*), althorn (*Koeberlinia spinosa*), whitebrush (*Aloysia gratissima*), bluewood (*Condalia hookeri*), granjeno (*Celtis pallida*), guayacan (*Guaiaacum angustifolium*), leatherstem (*Jatropha dioca*), Texas prickly pear (*Opuntia engelmannii*), tasajillo (*Opuntia leptocaulis*), kidneywood (*Eysenhardtia texana*), yucca (*Yucca* spp.), desert yaupon (*Schaefferia cuneifolia*), goatbush (*Castela erecta* subsp. *texana*), purple three-awn (*Aristida purpurea*), pink pappusgrass (*Pappophorum bicolor*), hairy tridens (*Erioneuron pilosum*), slim tridens (*Tridens muticus*), hairy grama (*Bouteloua hirsute*), mat euphorbia (*Euphorbia* spp.), coldenia (*Coldenia* spp.), dogweed (*Thymophylla* spp.), knotweed leafflower (*Polygonum* spp.), and two-leaved senna (*Senna roemeriana*).

Common plants associated with the Other Native or Introduced Grasses vegetation type include, but are not limited to: mixed native or introduced grasses and forbs within grassland sites or mixed herbaceous areas that form from the clearing of woody vegetation. This vegetation type is found in areas where brush has been cleared and is subject to change due to the regrowth of brush.

#### 3.2 Topography

According to the *Burrito Tank* USGS 7.5 Minute Topographic Quadrangle Map the elevation of the subject area ranges from 540 feet above mean sea level (MSL) to 570 feet above MSL (Figure 2).

### 3.3 Soils

Five soil units are present within the FEMA action area (SCS 1985). The five soil units are as follows:

- *Aguilares sandy clay loam, 0 to 3 percent slopes (AgB)*
- *Brundage fine sandy loam, occasionally flooded (Bd)*
- *Catarina clay, 0 to 2 percent slopes (CaB)*
- *Moglia clay loam, 1 to 5 percent slopes (MgC)*
- *Montell clay, saline, 0 to 2 percent slopes (MnB)*

## 4.0 ENDANGERED SPECIES BACKGROUND

According to USFWS (2013a), five species are federally-listed as endangered in Webb County, Texas: 1) Gulf Coast jaguarundi, 2) ocelot, 3) least tern, 4) ashy dogweed, and 5) Johnston's frankenia.

### 4.1 Jaguarundi and Ocelot

The jaguarundi (*Herpailurus yagouaruondi*) was federally-listed as endangered on June 14, 1976 (41 FR 24062-24067). The jaguarundi is a small, slender-bodied cat with a small, flattened head and long tail. According to the Texas Parks and Wildlife (TPWD), large patches (100 acres) of canopy cover and dense shrubs, or smaller patches connected by dense vegetation corridors, are vital to jaguarundi habitat (Campbell 2003). This species is considered very rare in Texas, and the probability of encountering a jaguarundi is highly unlikely.

Texas Parks and Wildlife maintains a database of rare species occurrence in Texas, the Texas Natural Diversity Database (TNDD). Review of the Texas Natural Diversity Database (TNDD) managed by TPWD showed no known occurrences in Webb County (TPWD 2013c). It also indicated that the closest known occurrence of the jaguarundi observed to the north of the subject area was in 1988, and is approximately 44 miles away in La Salle County, Texas (EO# 8138). Review of the element occurrence information provided by TPWD, noted the sighting was generally described as crossing FM 625 (or FM 624) 20 miles east of Cotulla and continued southeast. The radius of this polygon is 8000 meters. It is interpreted through the TPWD TNDD "Shapefile Data Interpretation and Use" document that an element polygon with a radius of 8000m was a general location which had the least precision and was used when the location description was vague (TPWD 2013c).

The closest known occurrence of the jaguarundi observed to the south of the subject area was in 1992 and is approximately 69 miles away in Starr County, Texas (EO# 2074) (Figure 3). Based on review of the element occurrence information, this element

occurrence was cited from 1987 to 1993 by various TPWD performance reports. The sighting was very generally described as being along El Negro Ranch Road. The radius of this polygon is also 8000 meters; therefore, it is also believed to be less precise element polygon with a vague location description (TPWD 2013c). The last Class A documented jaguarundi report in the United States occurred in 1986 east of Brownsville, Texas (Tewes 2012).

The ocelot (*Leopardus pardalis*) was federally-listed as endangered on June 21, 1982 (47 FR 31670-31672). The ocelot is a medium-sized gray or buff spotted cat with variable dark spots, rings, blotches, and bars. Ocelots occur in the dense thorny shrub lands of the Lower Rio Grande Valley and Rio Grande Plains in areas of deep, fertile clay or loamy soils (Campbell 2003). According to TPWD, large patches (100 acres) of canopy cover and dense shrubs, or smaller patches connected by dense vegetation corridors, are also vital to ocelot habitat (Campbell 2003). This species is predominately active at night, and spends the daytime hiding in thick brush (Campbell 2003). As this species is predominately active at night, the probability of encountering an ocelot is highly unlikely.

Review of the TNDD data (TPWD 2013c) indicates the closest occurrence of the ocelot was observed in 1991, approximately 67 miles northwest of the subject area in Dimmit County, Texas (EO# 4510) (Figure 3).

#### Previous Studies

Previous studies conducted by Michael Tewes on Rancho Viejo, including the 1,110-acre PERC landfill site (Tewes 2012), found the ranch to not be jaguarundi habitat. Tewes (2012) noted a 10-acre patch of thornscrub in the northwest section of the PERC site as containing 75-85% horizontal cover, but that the area was too sparse to be considered jaguarundi habitat.

Studies by aci consulting (2012) of the 3,980 acres south of the PERC site found open rangeland mixed with open thornshrub. Areas containing thornshrub and woody vegetation did not include the requisite density, canopy cover, and acreage to be considered jaguarundi habitat. Similar to the jaguarundi, the site does not provide the requisite thornshrub/riparian density, canopy cover, and acreage to be considered ocelot habitat (aci consulting 2012).

#### **4.2 Least tern**

The least tern (*Sterna antillarum athalassos*) was federally-listed as endangered on May 28, 1985 (USFWS 1985). The least tern is a migrant species whose breeding range in Texas includes three reservoirs along the Rio Grande River, the Canadian River in the northern Panhandle, the Prairie Dog Town Fork of the Red River in the eastern

Panhandle, and along the Red River (Texas/Oklahoma boundary) into Arkansas. The species winters along the Central American coast and the northern coast of South America from Venezuela to northeastern Brazil. USFWS has listed the least tern as a possible migrant through most of Texas. From late April to August, this tern uses barren to sparsely vegetated sand, shell, and gravel beaches; sandbars; islands; and salt flats associated with rivers and reservoirs. These terns prefer open habitat and avoid thick vegetation and narrow beaches. As natural nesting sites have become scarce, the terns have used sand and gravel pits, ash disposal areas of power plants, reservoir shorelines, and other manmade sites. The terns nest in a shallow hole scraped in an open sandy area, gravelly patch, or exposed flat (Campbell 2003).

Review of TWPD TNDD data (2013c) indicates that the closest known occurrence of the least tern is approximately 16 miles west of the subject area (Figure 4). The occurrence site was documented in 1994 at Casa Blanca Lake (EO# 4157).

#### Previous Studies

Review of the PERC site by TRC Consultants (2011a) found no potential for shore habitat for the least tern.

Studies of the 3,980 acres south of the PERC site by aci consulting (2012) found no additional areas of potential shore habitat for the least tern within the area.

### **4.3 Ashy Dogweed and Johnston's Frankenia**

Ashy dogweed (*Thymophylla tephroleuca*) was federally-listed as endangered on July 19, 1984 (49 FR 29232-29234). This plant forms dense, circular clumps in open areas on sandy pockets in the Maverick-Catarina, Copita-Zapata, and Nueces-Comita soils of southern Webb and northern Zapata Counties, Texas (TPWD 2007), occurring in level areas or in gentle, rolling topography (USFWS 2013). Ashy dogweed has been observed in areas of ground disturbance; it is unknown if the plant prefers disturbed areas or would also flourish in undisturbed areas (TPWD 2007). Ashy dogweed grows among shrubs including mesquite (*Prosopis* spp.), calderona (*Krameria ramosissima*), Texas lantana (*Lantana urticoides*), goatbush, anacahuita (*Cordia boissieri*), and cenizo.

Johnston's frankenia (*Frankenia johnstonii*) was federally-listed as endangered on August 7, 1984 (49 FR 31418-31421). On May 22, 2003, the species was proposed for delisting (68 FR 27961). This low, sprawling shrub generally grows on open or sparsely vegetated rocky hillsides or saline flats in saline sandy or clayey soils with high gypsum content (USFWS 1988). Johnston's frankenia is historically known from Nuevo Leon, Mexico, and Starr and Zapata Counties, in south Texas (USFWS 1988).

According to the TPWD species pages (2013a), Johnston's frankenia and ashy dogweed require specific soil types. Johnston's frankenia prefers high saline soils that are often rocky or eroding and reddish in color such as the Maverick soil series. TPWD references ashy dogweed associated with sandy pocket areas from the Maverick-Catarina, Copita-Zapata, and Nueces-Comita soil series (TPWD 2013b).

A review of the Natural Resource Conservation Service Soil Survey for Webb County, Texas (SCS 1985), found that two out of the five soils found in the subject area correspond with the soil series conducive to the two endangered plants (Figure 5). These soils include the Catarina clay, 0 to 2 percent slopes (CaB) and the Montell clay, saline, 0 to 2 percent slopes (MnB) soils series.

Review of the TNDD data (2013c) indicates that the closest known occurrence of Johnston's frankenia was observed in 1999, approximately 23 miles south of the subject area in Zapata County, Texas (EO# 4180). TNDD data indicated the closest known occurrence of ashy dogweed was observed in the 1980's, approximately 18 miles south of the subject area in Webb and Zapata Counties, Texas (EO# 1456). In addition to TNDD, USFWS provided aci consulting with endangered plant site occurrence data at an August, 2013 project meeting. A review of USFWS species occurrence (2013b) found that the closest observation for Johnston's frankenia is approximately 11 miles west of the subject area and ashy dogweed is approximately 16 miles southwest of the subject area (Figure 6).

#### Previous Studies

Previous investigations on the PERC landfill site included a presence/absence survey for ashy dogweed and Johnston's frankenia (TRC 2011b). This survey was conducted within the specific soil series' with the potential to contain the two species: the Catarina clay, 0 to 2 percent slopes (CaB) and the Montell clay, saline, 0 to 2 percent slopes (MnB) soils series. The results of the survey found no ashy dogweed or Johnston's frankenia within the PERC site.

## **5.0 METHODOLOGY**

In August 2013, aci consulting ecologists surveyed the 141-acre subject area for endangered species. Field investigations included habitat evaluations for ocelot, jaguarundi, and least tern and a presence/absence survey for ashy dogweed and Johnston's frankenia within the conducive soil series'.

aci consulting surveyors walked transects across the subject area particularly focusing on areas with the soil series' determined to have potential for the endangered plant



species' growth (Figure 5). While conducting the presence/absence survey for the endangered plants, aci consulting documented and assessed the vegetative communities within the subject area, where forty-six vegetation assessment points were recorded. At each vegetation assessment point, aci consulting recorded vegetation height, percent canopy cover of thornshrub, where, if present, and the dominant woody vegetation observed. aci consulting additionally documented the existing site conditions by recording photographs in the four cardinal directions at each vegetation assessment point. Locations of waypoints were recorded using a Garmin Global Positioning System (GPS) Receiver. Digital photographs were taken using the Theodolite application on an iPhone 5 running the iOS operating system Version 6.1.4.

The locations of the 46 investigation locations are delineated in Figure 7 and the corresponding photographic log of the points is contained in Appendix B.

## **6.0 FINDINGS**

The findings of the field investigations from the assessments performed in August, 2013, by **aci consulting** ecologists for each of the five federally-listed species is listed below.

### **6.1 Jaguarundi and Ocelot**

The FEMA action area includes five different flood control structures (three basins and two diversion channels). The vegetative elements of each feature are summarized in Table 1.

Table 1: Vegetative Assessment of FEMA Action Area

Feature	Vegetation Max Height (Average of area)	Percent Canopy Cover (Average of area)	Dominant Vegetation	Potential Jaguarundi / Ocelot Habitat
<b>Northeast Dam Site</b>	4.2 - 4.8 feet	4% - 6%	Mesquite, Cactus	Very low
<b>Northwest Dam Site</b>	3.3 - 9.4 feet	13.8% - 18.1%	Mesquite	Very low
<b>Diversion Channel to West Dam</b>	4.5 - 9 feet	5% - 10%	Mesquite	Very low
<b>West Dam Site</b>	3.1 - 7.3 feet	7.9% - 9.5%	Mesquite	Very low
<b>Proposed Channel</b>	3.2 - 6.5 feet	7% - 8.2%	Mesquite	Very low
<b>141-acre Composite</b>	3.6 - 7.4 feet	7.5% - 10.4%	Mesquite	Very low

The vegetation within the 141-acre FEMA action area is very similar to the 1,110-acre PERC site, consisting of open ranchland dominated by forb-grass-cactus vegetation. Appendix B contains representative photographs from the study area. As a whole the study subject area contains low height of woody vegetation (3.6 to 7.4 feet), low canopy cover of thornscrub (7.5% to 10.4%), and is dominated by open rangeland or mesquite growth, when present. Select areas contained up to 50% close canopy thornscrub up to 15 feet in height; however, these select areas were not common or contiguous throughout the landscape.

The investigations found that, similar to other regional studies, the FEMA action area did not contain the structural or compositional elements to be regularly utilized by jaguarundi or ocelot.

## 6.2 Least tern

Field investigations of the 141-acre FEMA action area by aci consulting found no potential shoreline or sandbar habitat conducive for least tern habitation. The FEMA action area did not contain the structural or compositional elements to be regularly utilized by least tern.

## 6.3 Ashy Dogweed and Johnston's Frankenia

aci consulting surveyed the FEMA study area, with particular focus on the two soil series' with the potential for occurrence of ashy dogweed and Johnston's frankenia in August 2013; however, transects were walked across the entire 141-acre FEMA action area. The results of the survey found no ashy dogweed or Johnston's frankenia within the FEMA action area.

## 7.0 CONCLUSION

Rancho Viejo Waste Management is evaluating a site in Webb County, Texas, for the development of a municipal solid waste/industrial landfill, the PERC site. This evaluation began within the review of a 1,110-acre original landfill site. Five FEMA floodplain control structures are associated with the project extent outside of the PERC site. Accordingly, the endangered species evaluation has been expanded to include approximately 141 acres to the north and west of the proposed PERC landfill site. This report evaluated the potential for federally-listed threatened and endangered species habitat within the 141-acre subject area, and builds upon previous studies conducted on the original landfill site.

Five species are federally-listed as threatened or endangered in Webb County, Texas. Summaries of the findings for each species are as follows:

- **Jaguarundi and Ocelot:** The proposed landfill site was previously reviewed by Dr. Michael Tewes (2012), the preeminent expert on the species. Dr. Tewes dismissed the original landfill site as habitat for the species based primarily on the lack of developed canopy cover and riparian corridor, and the long distance from the Rio Grande River. In 2012, aci consulting investigated 3,980 acres south and west of the PERC site and found that these areas did not provide the requisite thornshrub/riparian density, canopy cover, and minimum acreage to be considered jaguarundi or ocelot habitat (aci consulting 2012). In August 2013, aci consulting evaluated the FEMA action area for the constituent elements of jaguarundi and ocelot habitat. The investigations found that, similar to other regional studies, the FEMA action area did not contain the structural or compositional elements to be regularly utilized by jaguarundi or ocelot.

- **Interior Least Tern:** Field investigations of the 141-acre FEMA action area by aci consulting found no potential shoreline or sandbar habitat conducive for least tern habitation. The FEMA action area did not contain the structural or compositional elements to be regularly utilized by least tern.
- **Ashy Dogweed and Johnston's Frankenia:** aci consulting surveyed the FEMA study area, with particular focus on the two soil series' with the potential for occurrence of ashy dogweed and Johnston's frankenia in August 2013. The results of the survey found no ashy dogweed or Johnston's frankenia within the FEMA action area.

## 8.0 REFERENCES

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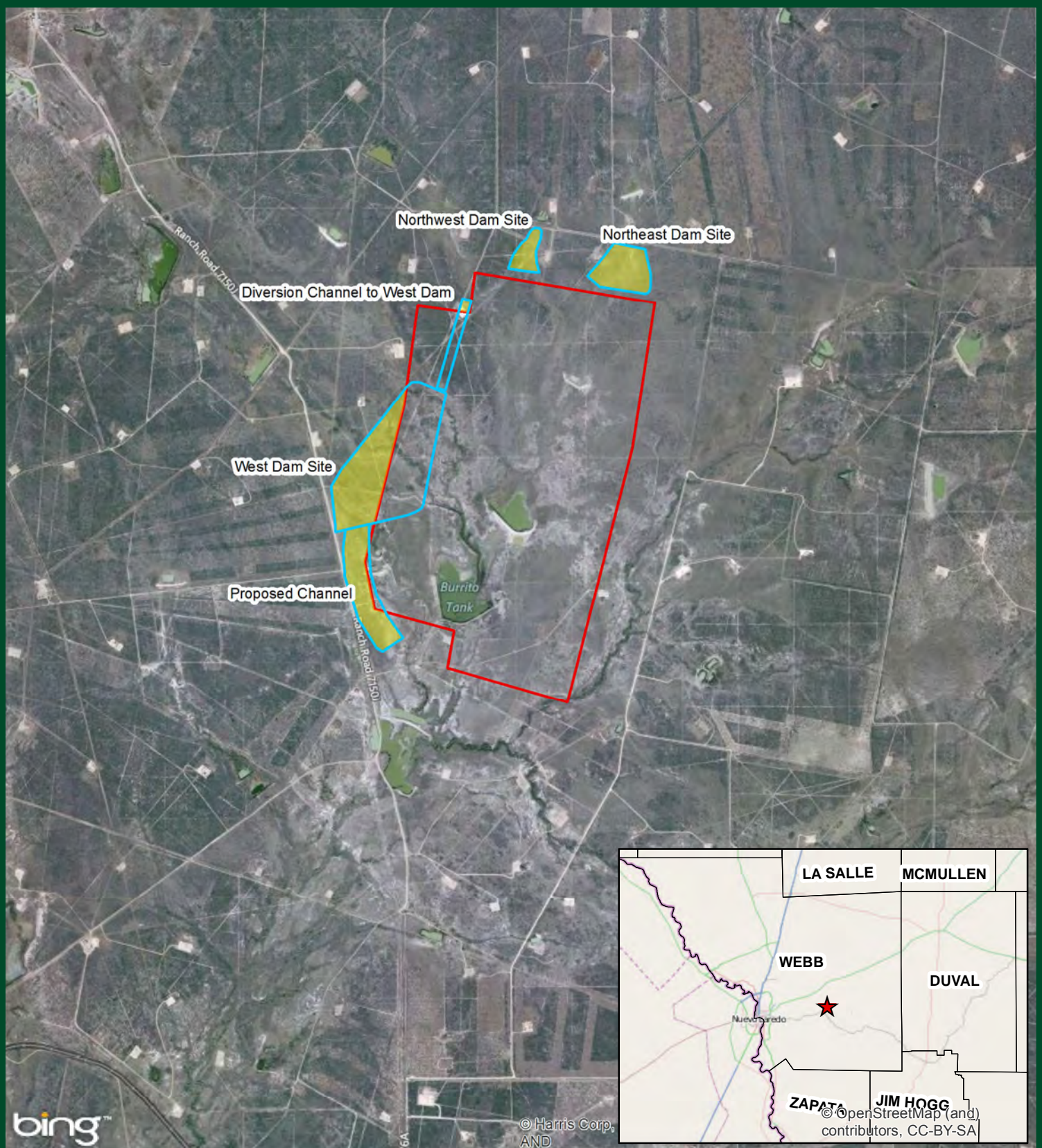
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- (USFWS) U.S. Fish and Wildlife Service. 1985. Endangered and Threatened Wildlife and Plants; Interior Population of the Least Tern Determined to be Endangered. 50 FR 21784 21792. May 28, 1985.
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## Appendix A: Figures

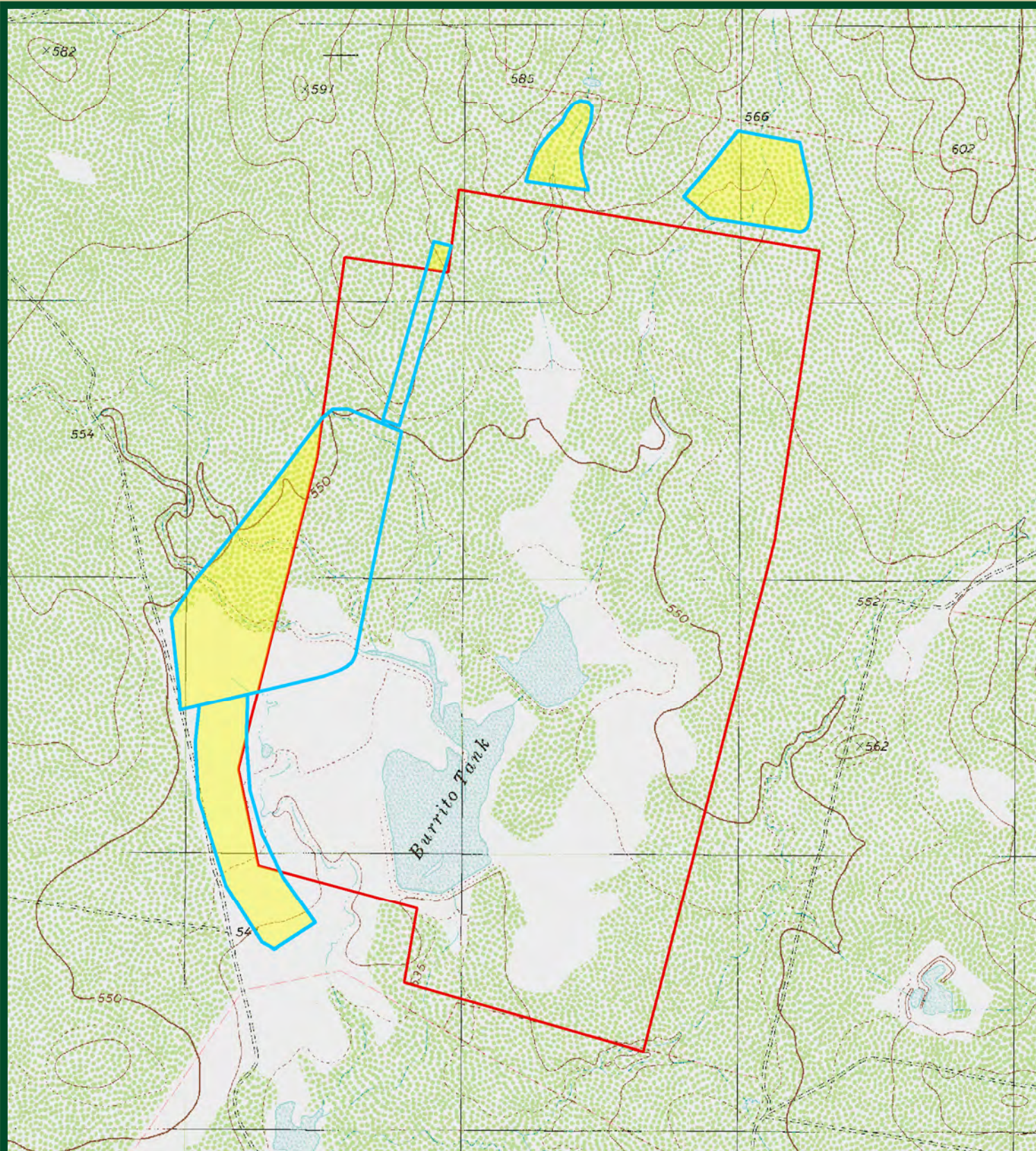
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PERC FEMA Action Area Endangered Species Report  
Figure 1: Subject Area

October 2013





This map is intended for planning purposes only. All map data should be considered preliminary. All boundaries and designations are subject to confirmation.

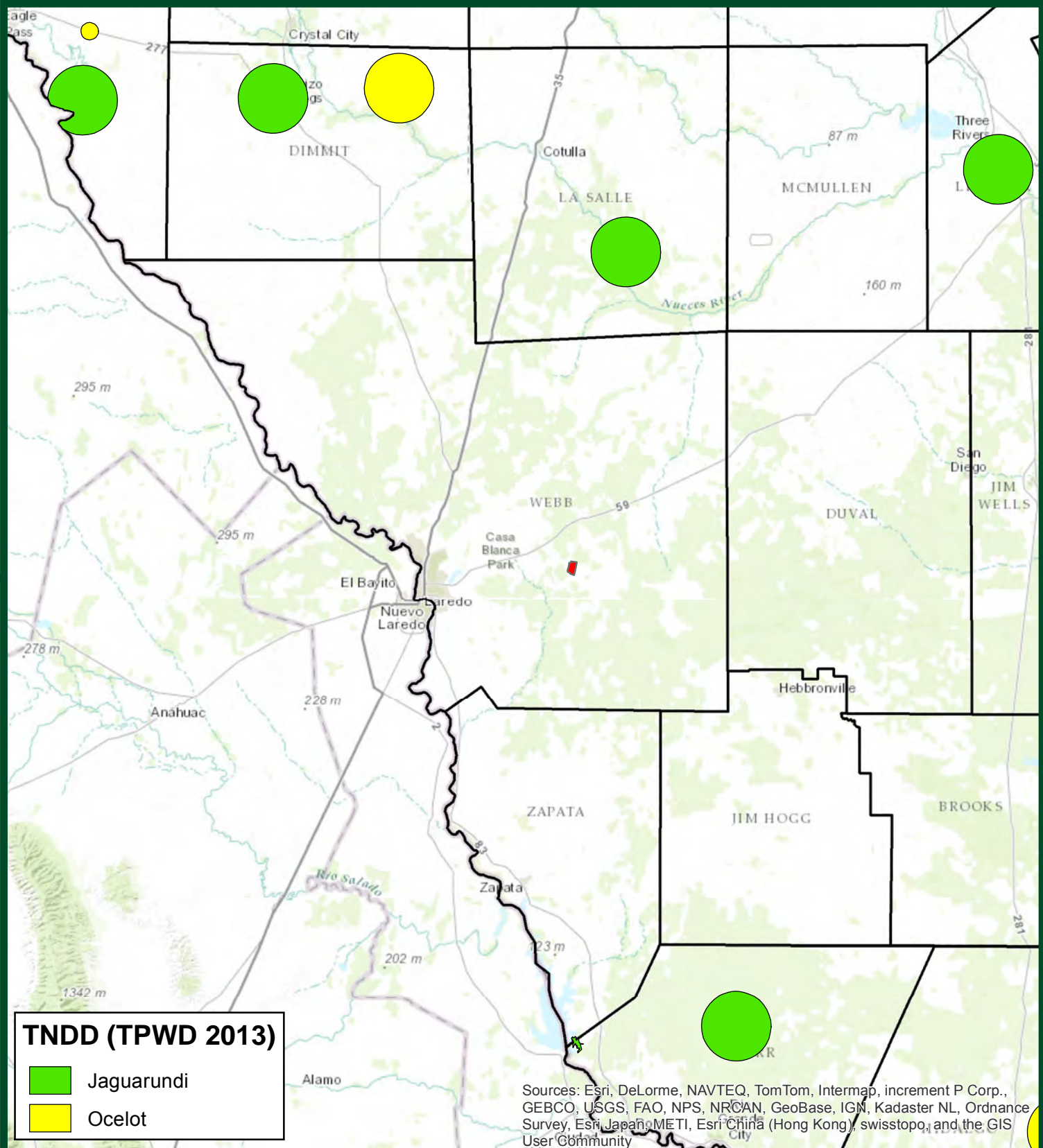


0.3 0.15 0 0.3 Miles  
1:19,000 1 inch = 0.3 mile

- Subject Area (141 ac)
- FEMA Action Area (225 ac)
- PERC Site (1,110 ac)







This map is intended for planning purposes only. All map data should be considered preliminary. All boundaries and designations are subject to confirmation.



19 9.5 0 19 Miles  
1:1,204,000 1 inch = 19 miles



PERC Site

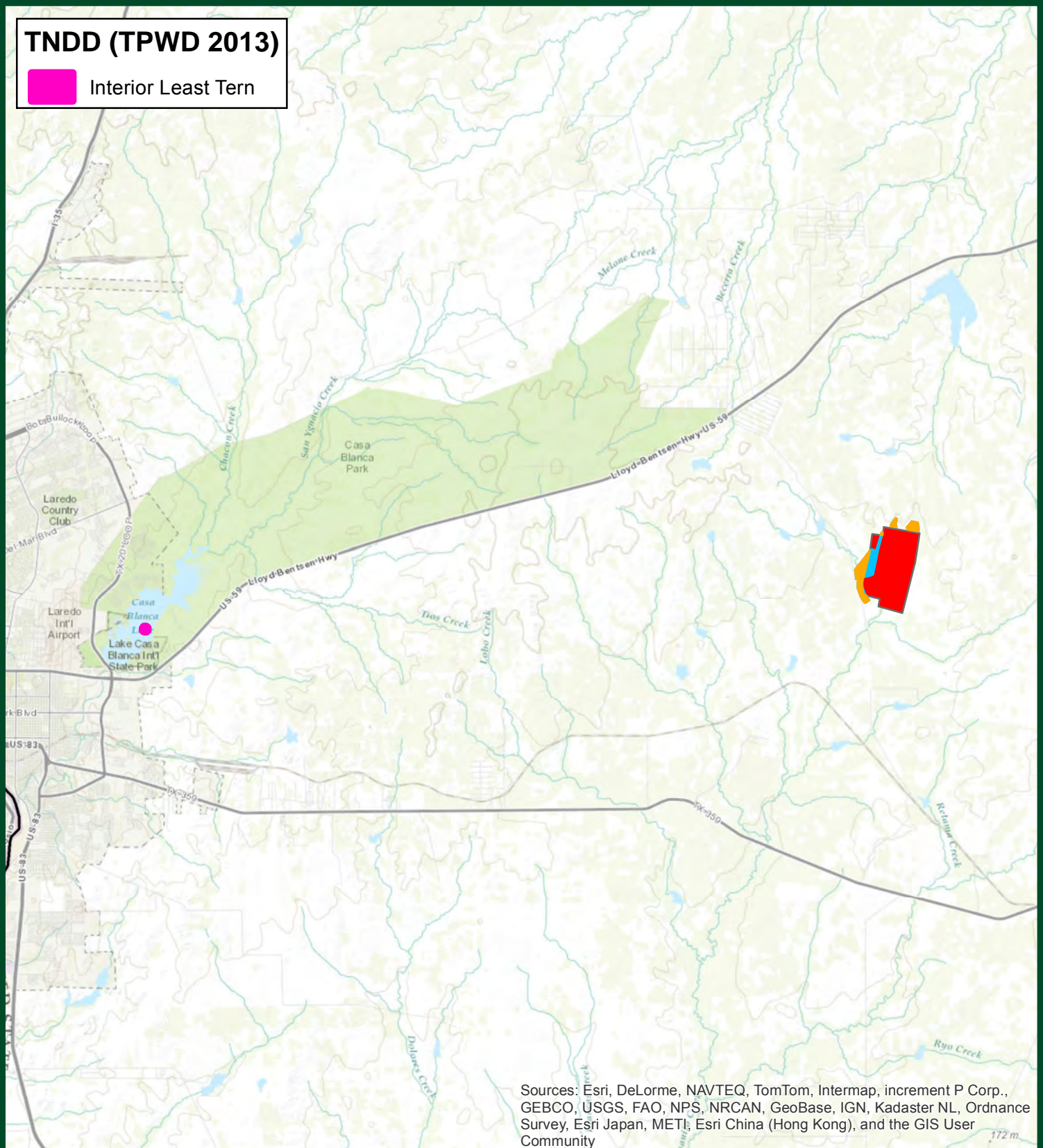




# TNDD (TPWD 2013)



Interior Least Tern



Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

This map is intended for planning purposes only. All map data should be considered preliminary. All boundaries and designations are subject to confirmation.



3 1.5 0 3 Miles  
1:190,000 1 inch = 3 miles



Subject Area



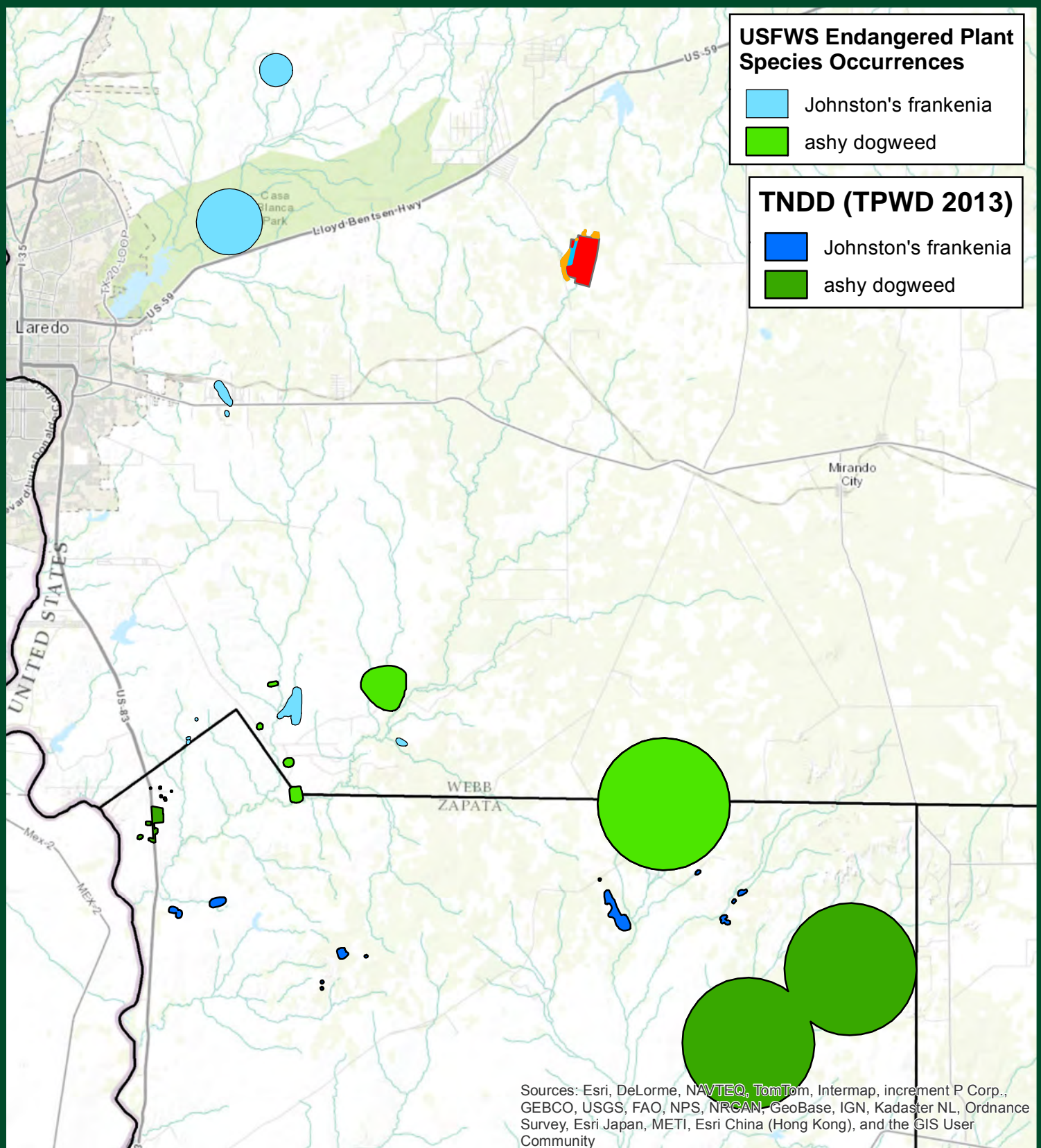
FEMA Action Area



PERC Site







This map is intended for planning purposes only. All map data should be considered preliminary. All boundaries and designations are subject to confirmation.



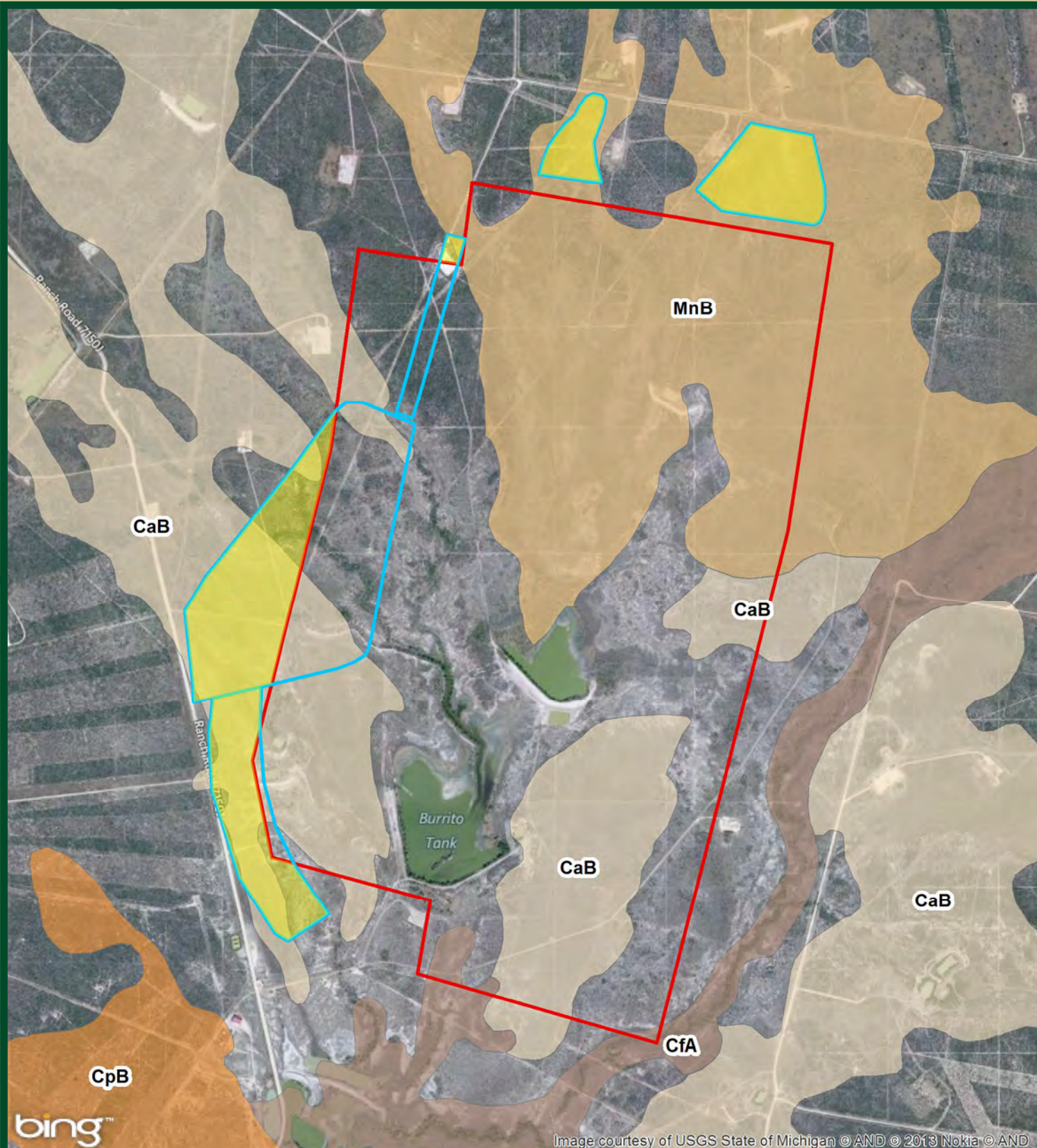
5 2.5 0 5 Miles  
1:317,000 1 inch = 5 miles



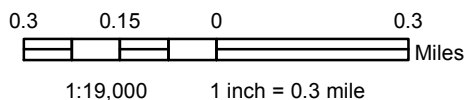
Subject Area  
FEMA Action Area  
PERC Site







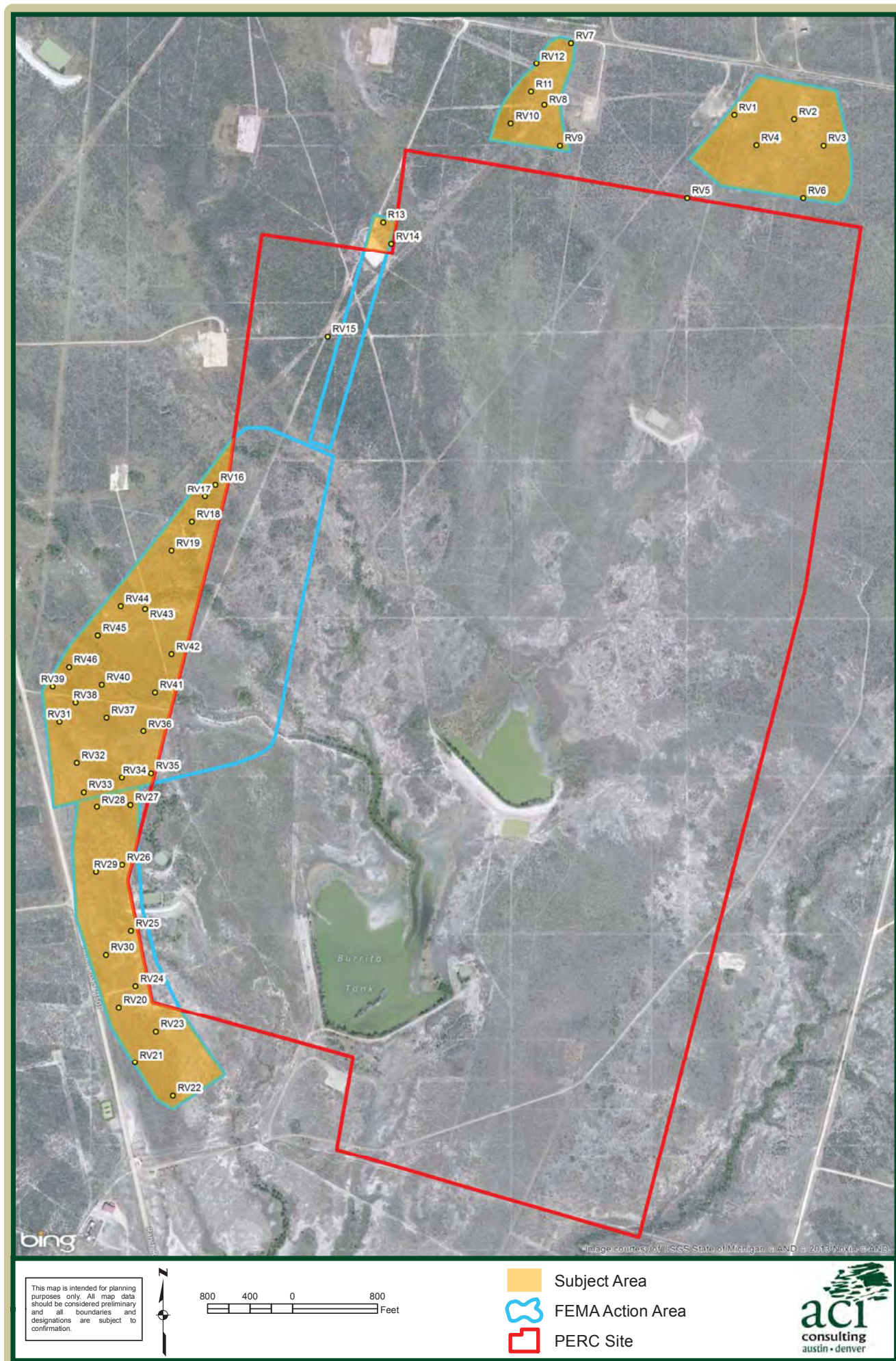
This map is intended for planning purposes only. All map data should be considered preliminary. All boundaries and designations are subject to confirmation.



- Subject Area
- FEMA Action Area
- PERC Site







PERC FEMA Action Area Endangered Species Report  
Figure 7: Field Investigation Waypoints (Corresponds to Photo Log in Appendix B)

October 2013

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## Appendix B: Photo Log



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**Date Taken**  
August 21, 2013

**Photo #**  
1

**Direction**  
Northeast

**Location**  
RV1

**Description**  
No vegetative cover

Date & Time: Wed Aug 21 08:02:40 CDT 2013  
Position: +027.5802 / -099.1530  
Altitude: 172m  
Azimuth/Bearing: 132° S48E 2347mils (Magnetic)  
Elevation Angle: +00.2°  
Horizon Angle: +00.1°  
Zoom: 1X  
rv 1



**Date Taken**  
August 21, 2013

**Photo #**  
2

**Direction**  
Northeast

**Location**  
RV1

**Description**  
No vegetative cover

Date & Time: Wed Aug 21 08:02:06 CDT 2013  
Position: +027.5802 / -099.1530  
Altitude: 172m  
Azimuth/Bearing: 034° N34E 0604mils (Magnetic)  
Elevation Angle: -00.9°  
Horizon Angle: +00.2°  
Zoom: 1X  
rv 1



Date Taken Photo #  
August 21, 2013 3

Direction  
Southwest

Location  
RV1

Description  
No vegetative cover



Date Taken Photo #  
August 21, 2013 4

Direction  
West

Location  
RV1

Description  
No vegetative cover





**Date Taken**      **Photo #**  
August 21, 2013      5

**Direction**  
East

**Location**  
RV2

**Description**  
Scrub Shrub Cover = 0-5%  
Vegetation HT = maximum height  
was 6 feet  
Species Observed = mesquite  
Notes = low veg cover

Date & Time: Wed Aug 21 08:07:37 CDT 2013  
Position: +027.5801° / -099.1513°  
Altitude: 172m  
Azimuth/Bearing: 085° N85E 1511mils (Magnetic)  
Elevation Angle: -07.0°  
Horizon Angle: +00.3°  
Zoom: 1X  
rv 2



**Date Taken**      **Photo #**  
August 21, 2013      6

**Direction**  
North

**Location**  
RV2

**Description**  
Scrub Shrub Cover = 0-5%  
Vegetation HT = maximum height  
was 6 feet  
Species Observed = mesquite  
Notes = low veg cover

Date & Time: Wed Aug 21 08:07:25 CDT 2013  
Position: +027.5801° / -099.1513°  
Altitude: 172m  
Azimuth/Bearing: 352° N08W 6258mils (Magnetic)  
Elevation Angle: -04.8°  
Horizon Angle: +00.7°  
Zoom: 1X  
rv 2



Date Taken Photo #  
August 21, 2013 7

Direction  
South

Location  
RV2

Description  
Scrub Shrub Cover = 0-5%  
Vegetation HT = maximum height  
was 6 feet  
Species Observed = mesquite  
Notes = low veg cover

Date & Time: Wed Aug 21 08:07:45 CDT 2013  
Position: +027.5801° / -099.1513°  
Altitude: 172m  
Azimuth/Bearing: 190° S10W 3370mils (Magnetic)  
Elevation Angle: -04.6°  
Horizon Angle: +01.4°  
Zoom: 1X  
rv 2



Date Taken Photo #  
August 21, 2013 8

Direction  
West

Location  
RV2

Description  
Scrub Shrub Cover = 0-5%  
Vegetation HT = maximum height  
was 6 feet  
Species Observed = mesquite  
Notes = low veg cover

Date & Time: Wed Aug 21 08:07:51 CDT 2013  
Position: +027.5801° / -099.1513°  
Altitude: 172m  
Azimuth/Bearing: 269° S69W 4782mils (Magnetic)  
Elevation Angle: -02.1°  
Horizon Angle: +01.8°  
Zoom: 1X  
rv 2





Date Taken Photo #  
August 21, 2013 9

Direction  
East

Location  
RV3

Description  
Scrub Shrub Cover = 0-5%  
Vegetation HT = 6 feet  
Species Observed = mesquite  
(isolated)  
Notes = no veg cover

Date & Time: Wed Aug 21 08:14:48 CDT 2013  
Position: +027.5794° / -099.1504°  
Altitude: 173m  
Azimuth/Bearing: 092° S88E 1636mils (Magnetic)  
Elevation Angle: -06.7°  
Horizon Angle: +01.9°  
Zoom: 1X  
rv 3



Date Taken Photo #  
August 21, 2013 10

Direction  
North

Location  
RV3

Description  
Scrub Shrub Cover = 0-5%  
Vegetation HT = 6 feet  
Species Observed = mesquite  
(isolated)  
Notes = no veg cover

Date & Time: Wed Aug 21 08:14:36 CDT 2013  
Position: +027.5794° / -099.1504°  
Altitude: 172m  
Azimuth/Bearing: 008° N08E 0142mils (Magnetic)  
Elevation Angle: -06.7°  
Horizon Angle: +01.0°  
Zoom: 1X  
rv 3





Date Taken Photo #  
August 21, 2013 11

Direction  
South

Location  
RV3

#### Description

Scrub Shrub Cover = 0-5%

Vegetation HT = 6 feet

Species Observed = mesquite  
(isolated)

Notes = no veg cover



Date Taken Photo #  
August 21, 2013 12

Direction  
West

Location  
RV3

#### Description

Scrub Shrub Cover = 0-5%

Vegetation HT = 6 feet

Species Observed = mesquite  
(isolated)

Notes = no veg cover





**Date Taken**      **Photo #**  
August 21, 2013      13

**Direction**  
East

**Location**  
RV4

**Description**

Scrub Shrub Cover = None  
Vegetation HT = 3 feet  
Species Observed = cactus  
Notes = no veg cover

Date & Time: Wed Aug 21 08:18:37 CDT 2013  
Position: +027.5794° / -099.1524°  
Altitude: 173m  
Azimuth/Bearing: 092° S88E 1636mils (Magnetic)  
Elevation Angle: -05.5°  
Horizon Angle: +00.1°  
Zoom: 1X  
rv 4



**Date Taken**      **Photo #**  
August 21, 2013      14

**Direction**  
North

**Location**  
RV4

**Description**

Scrub Shrub Cover = None  
Vegetation HT = 3 feet  
Species Observed = cactus  
Notes = no veg cover

Date & Time: Wed Aug 21 08:18:24 CDT 2013  
Position: +027.5794° / -099.1524°  
Altitude: 174m  
Azimuth/Bearing: 002° N02E 0036mils (Magnetic)  
Elevation Angle: -06.1°  
Horizon Angle: -00.1°  
Zoom: 1X  
rv 4





Date Taken Photo #  
August 21, 2013 15

Direction  
South

Location  
RV4

**Description**

Scrub Shrub Cover = None  
Vegetation HT = 3 feet  
Species Observed = cactus  
Notes = no veg cover

Date & Time: Wed Aug 21 08:18:46 CDT 2013  
Position: +027.5794° / -099.1524°  
Altitude: 172m  
Azimuth/Bearing: 180° S00W 3200mils (Magnetic)  
Elevation Angle: -08.1°  
Horizon Angle: -00.4°  
Zoom: 1X  
rv 4



Date Taken Photo #  
August 21, 2013 16

Direction  
West

Location  
RV4

**Description**

Scrub Shrub Cover = None  
Vegetation HT = 3 feet  
Species Observed = cactus  
Notes = no veg cover

Date & Time: Wed Aug 21 08:18:52 CDT 2013  
Position: +027.5794° / -099.1524°  
Altitude: 172m  
Azimuth/Bearing: 269° S89W 4782mils (Magnetic)  
Elevation Angle: -02.9°  
Horizon Angle: +00.5°  
Zoom: 1X  
rv 4





Date Taken Photo #  
August 21, 2013 17

Direction  
East

Location  
RV5

#### Description

Scrub Shrub Cover = None

Vegetation HT = 2-3 feet

Species Observed = cactus,  
mesquite

Notes = no veg cover

Date & Time: Wed Aug 21 08:28:56 CDT 2013  
Position: +027.5781° / -099.1544°  
Altitude: 171m  
Azimuth/Bearing: 088° N88E 1564mils (Magnetic)  
Elevation Angle: -04.2°  
Horizon Angle: +00.2°  
Zoom: 1X  
rv 5



Date Taken Photo #  
August 21, 2013 18

Direction  
North

Location  
RV5

#### Description

Scrub Shrub Cover = None

Vegetation HT = 2-3 feet

Species Observed = cactus,  
mesquite

Notes = no veg cover

Date & Time: Wed Aug 21 08:28:46 CDT 2013  
Position: +027.5781° / -099.1544°  
Altitude: 172m  
Azimuth/Bearing: 004° N04E 0071mils (Magnetic)  
Elevation Angle: -04.8°  
Horizon Angle: +00.2°  
Zoom: 1X  
rv 5





Date Taken Photo #  
August 21, 2013 19

Direction  
South

Location  
RV5

#### Description

Scrub Shrub Cover = None

Vegetation HT = 2-3 feet

Species Observed = cactus,  
mesquite

Notes = no veg cover

Date & Time: Wed Aug 21 08:29:04 CDT 2013  
Position: +027.5781° / -099.1544°  
Altitude: 171m  
Azimuth/Bearing: 179° S01E 3162mils (Magnetic)  
Elevation Angle: -04.8°  
Horizon Angle: +00.8°  
Zoom: 1X  
rv 5



Date Taken Photo #  
August 21, 2013 20

Direction  
West

Location  
RV5

#### Description

Scrub Shrub Cover = None

Vegetation HT = 2-3 feet

Species Observed = cactus,  
mesquite

Notes = no veg cover

Date & Time: Wed Aug 21 08:29:12 CDT 2013  
Position: +027.5781° / -099.1544°  
Altitude: 171m  
Azimuth/Bearing: 269° S69W 4762mils (Magnetic)  
Elevation Angle: -05.0°  
Horizon Angle: -00.1°  
Zoom: 1X  
rv 5





Date Taken Photo #  
August 21, 2013 21

Direction  
East

Location  
RV6

Description  
Scrub Shrub Cover = 20%  
Vegetation HT = 4-6 feet  
Species Observed = cactus, quail  
Notes = no veg cover

Date & Time: Wed Aug 21 08:35:34 CDT 2013  
Position: +027.5781° / -099.1510°  
Altitude: 173m  
Azimuth/Bearing: 090° N90E 1600mils (Magnetic)  
Elevation Angle: -08.8°  
Horizon Angle: -03.2°  
Zoom: 1X  
rv 6



Date Taken Photo #  
August 21, 2013 22

Direction  
North

Location  
RV6

Description  
Scrub Shrub Cover = 20%  
Vegetation HT = 4-6 feet  
Species Observed = cactus, quail  
Notes = no veg cover

Date & Time: Wed Aug 21 08:35:23 CDT 2013  
Position: +027.5781° / -099.1510°  
Altitude: 173m  
Azimuth/Bearing: 000° N00E 0000mils (Magnetic)  
Elevation Angle: -06.8°  
Horizon Angle: +01.1°  
Zoom: 1X  
rv 6





Date Taken Photo #  
August 21, 2013 23

Direction  
South

Location  
RV6

#### Description

Scrub Shrub Cover = 20%  
Vegetation HT = 4-6 feet  
Species Observed = cactus, quail  
Notes = no veg cover

Date & Time: Wed Aug 21 08:35:40 CDT 2013  
Position: +027.5780° / -099.1510°  
Altitude: 173m  
Azimuth/Bearing: 178° S02E 3164mils (Magnetic)  
Elevation Angle: -02.2°  
Horizon Angle: -00.1°  
Zoom: 1X  
rv 6



Date Taken Photo #  
August 21, 2013 24

Direction  
West

Location  
RV6

#### Description

Scrub Shrub Cover = 20%  
Vegetation HT = 4-6 feet  
Species Observed = cactus, quail  
Notes = no veg cover

Date & Time: Wed Aug 21 08:35:50 CDT 2013  
Position: +027.5780° / -099.1511°  
Altitude: 172m  
Azimuth/Bearing: 270° S90W 4800mils (Magnetic)  
Elevation Angle: -04.8°  
Horizon Angle: +00.3°  
Zoom: 1X  
rv 6





**Date Taken** Photo #  
August 21, 2013 25

**Direction**  
Northeast

**Location**  
RV7

**Description**

Scrub Shrub Cover = 15%  
Vegetation HT = 4-15 feet  
Species Observed = mesquite  
Notes = no dense cover



**Date Taken** Photo #  
August 21, 2013 26

**Direction**  
Northeast

**Location**  
RV7

**Description**

Scrub Shrub Cover = 15%  
Vegetation HT = 4-15 feet  
Species Observed = mesquite  
Notes = no dense cover





Date Taken Photo #  
August 21, 2013 27

Direction  
South

Location  
RV7

#### Description

Scrub Shrub Cover = 15%  
Vegetation HT = 4-15 feet  
Species Observed = mesquite  
Notes = no dense cover



Date Taken Photo #  
August 21, 2013 28

Direction  
West

Location  
RV7

#### Description

Scrub Shrub Cover = 15%  
Vegetation HT = 4-15 feet  
Species Observed = mesquite  
Notes = no dense cover





Date Taken Photo #  
August 21, 2013 29

Direction  
East

Location  
RV8

**Description**

Scrub Shrub Cover = None

Vegetation HT = 2-6 feet

Species Observed = mesquite

Date & Time: Wed Aug 21 08:57:05 CDT 2013  
Position: +027.5804° / -099.1586°  
Altitude: 175m  
Azimuth/Bearing: 089° N08E 1562mils (Magnetic)  
Elevation Angle: -08.8°  
Horizon Angle: +00.0°  
Zoom: 1X  
rv 8



Date Taken Photo #  
August 21, 2013 30

Direction  
North

Location  
RV8

**Description**

Scrub Shrub Cover = None

Vegetation HT = 2-6 feet

Species Observed = mesquite

Date & Time: Wed Aug 21 08:56:44 CDT 2013  
Position: +027.5804° / -099.1586°  
Altitude: 176m  
Azimuth/Bearing: 001° N01E 0018mils (Magnetic)  
Elevation Angle: -08.1°  
Horizon Angle: +00.3°  
Zoom: 1X  
rv 8





Date Taken Photo #  
August 21, 2013 31

Direction  
South

Location  
RV8

**Description**

Scrub Shrub Cover = None  
Vegetation HT = 2-6 feet  
Species Observed = mesquite



Date Taken Photo #  
August 21, 2013 32

Direction  
West

Location  
RV8

**Description**

Scrub Shrub Cover = None  
Vegetation HT = 2-6 feet  
Species Observed = mesquite





Date Taken Photo #  
August 21, 2013 33

Direction  
East

Location  
RV9

Description  
Scrub Shrub Cover = 10-15%  
Vegetation HT = 3-8 feet  
Species Observed = mesquite  
(isolated)



Date Taken Photo #  
August 21, 2013 34

Direction  
North

Location  
RV9

Description  
Scrub Shrub Cover = 10-15%  
Vegetation HT = 3-8 feet  
Species Observed = mesquite  
(isolated)





Date Taken Photo #  
August 21, 2013 35

Direction  
South

Location  
RV9

#### Description

Scrub Shrub Cover = 10-15%

Vegetation HT = 3-8 feet

Species Observed = mesquite  
(isolated)

Date & Time: Wed Aug 21 09:01:37 CDT 2013  
Position: +027.5794° / -099.1582°  
Altitude: 174m  
Azimuth/Bearing: 180° S00E 3200mils (Magnetic)  
Elevation Angle: -06.1°  
Horizon Angle: -00.8°  
Zoom: 1X  
rv 9



Date Taken Photo #  
August 21, 2013 36

Direction  
West

Location  
RV9

#### Description

Scrub Shrub Cover = 10-15%

Vegetation HT = 3-8 feet

Species Observed = mesquite  
(isolated)

Date & Time: Wed Aug 21 09:01:45 CDT 2013  
Position: +027.5794° / -099.1582°  
Altitude: 174m  
Azimuth/Bearing: 269° S69W 4782mils (Magnetic)  
Elevation Angle: -06.1°  
Horizon Angle: -00.2°  
Zoom: 1X  
rv 9





**Date Taken**      **Photo #**  
August 21, 2013      37

**Direction**  
Southwest

**Location**  
RV9

**Description**  
Scrub Shrub Cover = 10-15%  
Vegetation HT = 3-8 feet  
Species Observed = mesquite  
(isolated)



**Date Taken**      **Photo #**  
August 21, 2013      38

**Direction**  
Southwest

**Location**  
RV9

**Description**  
Scrub Shrub Cover = 10-15%  
Vegetation HT = 3-8 feet  
Species Observed = mesquite  
(isolated)





Date Taken Photo #  
August 21, 2013 39

Direction  
East

Location  
RV10

Description  
Scrub Shrub Cover = 50-60%  
Vegetation HT = 4-10 feet  
Species Observed = mesquite,  
lotebush, cactus



Date Taken Photo #  
August 21, 2013 40

Direction  
North

Location  
RV10

Description  
Scrub Shrub Cover = 50-60%  
Vegetation HT = 4-10 feet  
Species Observed = mesquite,  
lotebush, cactus





Date Taken Photo #  
August 21, 2013 41

Direction  
South

Location  
RV10

Description  
Scrub Shrub Cover = 50-60%  
Vegetation HT = 4-10 feet  
Species Observed = mesquite,  
lotebush, cactus



Date Taken Photo #  
August 21, 2013 42

Direction  
West

Location  
RV10

Description  
Scrub Shrub Cover = 50-60%  
Vegetation HT = 4-10 feet  
Species Observed = mesquite,  
lotebush, cactus





Date Taken Photo #  
August 21, 2013 43

Direction  
East

Location  
RV11

## Description

Scrub Shrub Cover = 10-15%  
Vegetation HT = 4-10 feet  
Species Observed = mesquite  
Notes = low area

Date & Time: Wed Aug 21 09:12:09 CDT 2013  
Position: +027.5808° / -099.1590°  
Altitude: 175m  
Azimuth/Bearing: 092° S88E 1636mils (Magnetic)  
Elevation Angle: -04.0°  
Horizon Angle: +00.2°  
Zoom: 1X



Date Taken Photo #  
August 21, 2013 44

Direction  
North

Location  
RV11

## Description

Scrub Shrub Cover = 10-15%  
Vegetation HT = 4-10 feet  
Species Observed = mesquite  
Notes = low area

Date & Time: Wed Aug 21 09:12:01 CDT 2013  
Position: +027.5808° / -099.1590°  
Altitude: 175m  
Azimuth/Bearing: 003° N03E 0053mils (Magnetic)  
Elevation Angle: -04.1°  
Horizon Angle: -00.7°  
Zoom: 1X  
rv 11





Date Taken Photo #  
August 21, 2013 45

Direction  
South

Location  
RV11

#### Description

Scrub Shrub Cover = 10-15%  
Vegetation HT = 4-10 feet  
Species Observed = mesquite  
Notes = low area

Date & Time: Wed Aug 21 09:12:15 CDT 2013  
Position: +027.5808° / -099.1590°  
Altitude: 174m  
Azimuth/Bearing: 182° S02W 3236mils (Magnetic)  
Elevation Angle: -04.1°  
Horizon Angle: +01.3°  
Zoom: 1X  
rv 11



Date Taken Photo #  
August 21, 2013 46

Direction  
West

Location  
RV11

#### Description

Scrub Shrub Cover = 10-15%  
Vegetation HT = 4-10 feet  
Species Observed = mesquite  
Notes = low area

Date & Time: Wed Aug 21 09:12:22 CDT 2013  
Position: +027.5808° / -099.1590°  
Altitude: 174m  
Azimuth/Bearing: 272° N88W 4836mils (Magnetic)  
Elevation Angle: -02.2°  
Horizon Angle: -00.8°  
Zoom: 1X  
rv 11





Date Taken Photo #  
August 21, 2013 47

Direction  
East

Location  
RV12

#### Description

Scrub Shrub Cover = 0-5%  
Vegetation HT = 3-8 feet  
Species Observed = mesquite  
Notes = good surface visibility



Date Taken Photo #  
August 21, 2013 48

Direction  
Northeast

Location  
RV12

#### Description

Scrub Shrub Cover = 0-5%  
Vegetation HT = 3-8 feet  
Species Observed = mesquite  
Notes = good surface visibility





Date Taken Photo #  
August 21, 2013 49

Direction  
South

Location  
RV12

**Description**

Scrub Shrub Cover = 0-5%  
Vegetation HT = 3-8 feet  
Species Observed = mesquite  
Notes = good surface visibility

Date & Time: Wed Aug 21 09:18:05 CDT 2013  
Position: +027.5815° / -099.1588°  
Altitude: 175m  
Azimuth/Bearing: 181° S01W 3218mils (Magnetic)  
Elevation Angle: -04.7°  
Horizon Angle: +00.5°  
Zoom: 1X  
rv 12



Date Taken Photo #  
August 21, 2013 50

Direction  
West

Location  
RV12

**Description**

Scrub Shrub Cover = 0-5%  
Vegetation HT = 3-8 feet  
Species Observed = mesquite  
Notes = good surface visibility

Date & Time: Wed Aug 21 09:16:10 CDT 2013  
Position: +027.5815° / -099.1588°  
Altitude: 175m  
Azimuth/Bearing: 270° S90W 4800mils (Magnetic)  
Elevation Angle: -04.7°  
Horizon Angle: +01.8°  
Zoom: 1X  
rv 12





**Date Taken**      **Photo #**  
August 21, 2013      51

**Direction**  
East

**Location**  
RV13

**Description**

Scrub Shrub Cover = 5%  
Vegetation HT = 5-10 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 09:29:24 CDT 2013  
Position: +027.5774° / -099.1633°  
Altitude: 173m  
Azimuth/Bearing: 091° S89E 1618mils (Magnetic)  
Elevation Angle: -06.5°  
Horizon Angle: -00.8°  
Zoom: 1X  
rv 13



**Date Taken**      **Photo #**  
August 21, 2013      52

**Direction**  
North

**Location**  
RV13

**Description**

Scrub Shrub Cover = 5%  
Vegetation HT = 5-10 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 09:29:11 CDT 2013  
Position: +027.5774° / -099.1633°  
Altitude: 174m  
Azimuth/Bearing: 003° N03E 0053mils (Magnetic)  
Elevation Angle: -02.5°  
Horizon Angle: -00.2°  
Zoom: 1X  
rv 13





Date Taken Photo #  
August 21, 2013 53

Direction  
South

Location  
RV13

**Description**

Scrub Shrub Cover = 5%  
Vegetation HT = 5-10 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 09:29:30 CDT 2013  
Position: +027.5774° / -099.1632°  
Altitude: 173m  
Azimuth/Bearing: 182° S02W 3236mils (Magnetic)  
Elevation Angle: -06.0°  
Horizon Angle: +01.5°  
Zoom: 1X  
rv 13



Date Taken Photo #  
August 21, 2013 54

Direction  
West

Location  
RV13

**Description**

Scrub Shrub Cover = 5%  
Vegetation HT = 5-10 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 09:29:36 CDT 2013  
Position: +027.5774° / -099.1633°  
Altitude: 172m  
Azimuth/Bearing: 269° S89W 4764mils (Magnetic)  
Elevation Angle: -03.0°  
Horizon Angle: -00.3°  
Zoom: 1X  
rv 13





**Date Taken**      **Photo #**  
August 21, 2013      55

**Direction**  
East

**Location**  
RV14 - Just North of Pad Site

**Description**  
Scrub Shrub Cover = 5-15%  
Vegetation HT = 4-8 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 09:33:55 CDT 2013  
Position: +027.5768° / -099.1630°  
Altitude: 172m  
Azimuth/Bearing: 091° S89E 1618mils (Magnetic)  
Elevation Angle: -08.7°  
Horizon Angle: -02.1°  
Zoom: 1X



**Date Taken**      **Photo #**  
August 21, 2013      56

**Direction**  
North

**Location**  
RV14 - Just North of Pad Site

**Description**  
Scrub Shrub Cover = 5-15%  
Vegetation HT = 4-8 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 09:33:40 CDT 2013  
Position: +027.5768° / -099.1630°  
Altitude: 171m  
Azimuth/Bearing: 001° N01E 0018mils (Magnetic)  
Elevation Angle: -05.5°  
Horizon Angle: -00.8°  
Zoom: 1X





Date Taken Photo #  
August 21, 2013 57

Direction  
South

Location  
RV14 - Just North of Pad Site

Description  
Scrub Shrub Cover = 5-15%  
Vegetation HT = 4-8 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 09:34:02 CDT 2013  
Position: +027.5768° / -099.1830°  
Altitude: 171m  
Azimuth/Bearing: 180° S00W 3200mils (Magnetic)  
Elevation Angle: -08.0°  
Horizon Angle: -00.0°  
Zoom: 1X  
rv 14



Date Taken Photo #  
August 21, 2013 58

Direction  
West

Location  
RV14 - Just North of Pad Site

Description  
Scrub Shrub Cover = 5-15%  
Vegetation HT = 4-8 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 09:34:09 CDT 2013  
Position: +027.5768° / -099.1830°  
Altitude: 171m  
Azimuth/Bearing: 288° S88W 4764mils (Magnetic)  
Elevation Angle: -05.5°  
Horizon Angle: -01.2°  
Zoom: 1X  
rv 14





Date Taken Photo #  
August 21, 2013 59

Direction  
East

Location  
RV15 - Inside Project Area at Deer  
Stand

Description



Date Taken Photo #  
August 21, 2013 60

Direction  
Northeast

Location  
RV15 - Inside Project Area at Deer  
Stand

Description





Date Taken Photo #  
August 21, 2013 61

Direction  
South

Location  
RV15 - Inside Project Area at Deer  
Stand

Description

Date & Time: Wed Aug 21 09:42:16 CDT 2013  
Position: +027.5744° / -099.1648°  
Altitude: 178m  
Azimuth/Bearing: 179° S01E 3182mils (Magnetic)  
Elevation Angle: -09.0°  
Horizon Angle: +01.5°  
Zoom: 1X  
rv 15



Date Taken Photo #  
August 21, 2013 62

Direction  
West

Location  
RV15 - Inside Project Area at Deer  
Stand

Description

Date & Time: Wed Aug 21 09:42:21 CDT 2013  
Position: +027.5744° / -099.1648°  
Altitude: 178m  
Azimuth/Bearing: 268° S88W 4764mils (Magnetic)  
Elevation Angle: -06.7°  
Horizon Angle: +00.3°  
Zoom: 1X  
rv 15





**Date Taken**      **Photo #**  
August 21, 2013      63

**Direction**  
East

**Location**  
RV16 - West Dam

**Description**  
Scrub Shrub Cover = 10-15%  
Vegetation HT = 4-8 feet  
Species Observed = mesquite



**Date Taken**      **Photo #**  
August 21, 2013      64

**Direction**  
North

**Location**  
RV16 - West Dam

**Description**  
Scrub Shrub Cover = 10-15%  
Vegetation HT = 4-8 feet  
Species Observed = mesquite





**Date Taken**      **Photo #**  
August 21, 2013      65

**Direction**  
South

**Location**  
RV16 - West Dam

**Description**  
Scrub Shrub Cover = 10-15%  
Vegetation HT = 4-8 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 09:51:51 CDT 2013  
Position: +027.5705° / -099.1681°  
Altitude: 170m  
Azimuth/Bearing: 179° S01E 3162mils (Magnetic)  
Elevation Angle: -02.5°  
Horizon Angle: -00.2°  
Zoom: 1X  
rv.16



**Date Taken**      **Photo #**  
August 21, 2013      66

**Direction**  
West

**Location**  
RV16 - West Dam

**Description**  
Scrub Shrub Cover = 10-15%  
Vegetation HT = 4-8 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 09:51:55 CDT 2013  
Position: +027.5705° / -099.1681°  
Altitude: 170m  
Azimuth/Bearing: 270° N90W 4800mils (Magnetic)  
Elevation Angle: -04.7°  
Horizon Angle: +00.3°  
Zoom: 1X  
rv.16





**Date Taken**      **Photo #**  
August 21, 2013      67

**Direction**  
East

**Location**  
RV17 - Inside Endangered Plant  
Soils

**Description**  
Scrub Shrub Cover = 15%  
Vegetation HT = 5-8 feet  
Species Observed = mesquite



**Date Taken**      **Photo #**  
August 21, 2013      68

**Direction**  
North

**Location**  
RV17 - Inside Endangered Plant  
Soils

**Description**  
Scrub Shrub Cover = 15%  
Vegetation HT = 5-8 feet  
Species Observed = mesquite





**Date Taken**      **Photo #**  
August 21, 2013      69

**Direction**  
South

**Location**  
RV17 - Inside Endangered Plant  
Soils

**Description**  
Scrub Shrub Cover = 15%  
Vegetation HT = 5-8 feet  
Species Observed = mesquite



**Date Taken**      **Photo #**  
August 21, 2013      70

**Direction**  
West

**Location**  
RV17 - Inside Endangered Plant  
Soils

**Description**  
Scrub Shrub Cover = 15%  
Vegetation HT = 5-8 feet  
Species Observed = mesquite





Date Taken Photo #  
August 21, 2013 71

Direction  
South

Location  
RV18 - Inside Endangered Plant  
Soils

Description  
Scrub Shrub Cover = 10%  
Vegetation HT = 5 feet  
Species Observed = mesquite



Date Taken Photo #  
August 21, 2013 72

Direction  
East

Location  
RV18 - Inside Endangered Plant  
Soils

Description  
Scrub Shrub Cover = 10%  
Vegetation HT = 5 feet  
Species Observed = mesquite





**Date Taken**      **Photo #**  
August 21, 2013      73

**Direction**  
North

**Location**  
RV18 - Inside Endangered Plant  
Soils

**Description**  
Scrub Shrub Cover = 10%  
Vegetation HT = 5 feet  
Species Observed = mesquite



**Date Taken**      **Photo #**  
August 21, 2013      74

**Direction**  
West

**Location**  
RV18 - Inside Endangered Plant  
Soils

**Description**  
Scrub Shrub Cover = 10%  
Vegetation HT = 5 feet  
Species Observed = mesquite





Date Taken Photo #  
August 21, 2013 75

Direction  
East

Location  
RV19 - Outside of Endangered  
Plant Soils

Description  
Scrub Shrub Cover = 10-15%  
Vegetation HT = 3-10 feet  
Species Observed = mesquite,  
cactus



Date Taken Photo #  
August 21, 2013 76

Direction  
North

Location  
RV19 - Outside of Endangered  
Plant Soils

Description  
Scrub Shrub Cover = 10-15%  
Vegetation HT = 3-10 feet  
Species Observed = mesquite,  
cactus





Date Taken Photo #  
August 21, 2013 77

Direction  
South

Location  
RV19 - Outside of Endangered  
Plant Soils

Description  
Scrub Shrub Cover = 10-15%  
Vegetation HT = 3-10 feet  
Species Observed = mesquite,  
cactus

Date & Time: Wed Aug 21 10:08:35 CDT 2013  
Position: +027.5691° / -099.1691°  
Altitude: 167m  
Azimuth/Bearing: 184° S04W 3271mils (Magnetic)  
Elevation Angle: -08.7°  
Horizon Angle: +01.7°  
Zoom: 1X  
rv 19



Date Taken Photo #  
August 21, 2013 78

Direction  
West

Location  
RV19 - Outside of Endangered  
Plant Soils

Description  
Scrub Shrub Cover = 10-15%  
Vegetation HT = 3-10 feet  
Species Observed = mesquite,  
cactus

Date & Time: Wed Aug 21 10:08:38 CDT 2013  
Position: +027.5690° / -099.1691°  
Altitude: 166m  
Azimuth/Bearing: 272° N88W 4836mils (Magnetic)  
Elevation Angle: -05.2°  
Horizon Angle: +00.9°  
Zoom: 1X  
rv 19





Date Taken Photo #  
August 21, 2013 79

Direction  
East

Location  
RV20 - Proposed Channel

#### Description

Scrub Shrub Cover = 5%  
Vegetation HT = 3-6 feet  
Species Observed = mesquite  
Notes = overgrazed

Date & Time: Wed Aug 21 10:34:44 CDT 2013  
Position: +027.5570° / -099.1708°  
Altitude: 170m  
Azimuth/Bearing: 098° N08E 1562mils (Magnetic)  
Elevation Angle: -07.4°  
Horizon Angle: +00.2°  
Zoom: 1X  
rv 20



Date Taken Photo #  
August 21, 2013 80

Direction  
North

Location  
RV20 - Proposed Channel

#### Description

Scrub Shrub Cover = 5%  
Vegetation HT = 3-6 feet  
Species Observed = mesquite  
Notes = overgrazed

Date & Time: Wed Aug 21 10:34:18 CDT 2013  
Position: +027.5570° / -099.1708°  
Altitude: 170m  
Azimuth/Bearing: 380° N00W 6400mils (Magnetic)  
Elevation Angle: -08.5°  
Horizon Angle: +00.3°  
Zoom: 1X  
rv 20





Date Taken Photo #  
August 21, 2013 81

Direction  
South

Location  
RV20 - Proposed Channel

#### Description

Scrub Shrub Cover = 5%  
Vegetation HT = 3-6 feet  
Species Observed = mesquite  
Notes = overgrazed

Date & Time: Wed Aug 21 10:34:49 CDT 2013  
Position: +027.5570° / -099.1708°  
Altitude: 170m  
Azimuth/Bearing: 179° S01E 3162mils (Magnetic)  
Elevation Angle: -05.7°  
Horizon Angle: +01.8°  
Zoom: 1X  
rv 20



Date Taken Photo #  
August 21, 2013 82

Direction  
West

Location  
RV20 - Proposed Channel

#### Description

Scrub Shrub Cover = 5%  
Vegetation HT = 3-6 feet  
Species Observed = mesquite  
Notes = overgrazed

Date & Time: Wed Aug 21 10:34:54 CDT 2013  
Position: +027.5570° / -099.1708°  
Altitude: 172m  
Azimuth/Bearing: 295° S86W 4729mils (Magnetic)  
Elevation Angle: -05.8°  
Horizon Angle: +00.8°  
Zoom: 1X  
rv 20





Date Taken Photo #  
August 21, 2013 83

Direction  
East

Location  
RV21

Description  
Scrub Shrub Cover = 10%  
Vegetation HT = 3-5 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 10:39:39 CDT 2013  
Position: +027.5556° / -099.1703°  
Altitude: 166m  
Azimuth/Bearing: 098° N68E 1562mils (Magnetic)  
Elevation Angle: -13.8°  
Horizon Angle: -01.1°  
Zoom: 1X  
rv 21



Date Taken Photo #  
August 21, 2013 84

Direction  
North

Location  
RV21

Description  
Scrub Shrub Cover = 10%  
Vegetation HT = 3-5 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 10:39:28 CDT 2013  
Position: +027.5556° / -099.1703°  
Altitude: 167m  
Azimuth/Bearing: 359° N04W 6828mils (Magnetic)  
Elevation Angle: -09.2°  
Horizon Angle: +00.4°  
Zoom: 1X  
rv 21





Date Taken Photo #  
August 21, 2013 85

Direction  
South

Location  
RV21

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 3-5 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 10:39:45 CDT 2013  
Position: +027.5555° / -099.1703°  
Altitude: 168m  
Azimuth/Bearing: 190° S00E 4200mils (Magnetic)  
Elevation Angle: -14.3°  
Horizon Angle: -01.2°  
Zoom: 1X  
rv 21



Date Taken Photo #  
August 21, 2013 86

Direction  
West

Location  
RV21

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 3-5 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 10:39:50 CDT 2013  
Position: +027.5555° / -099.1703°  
Altitude: 167m  
Azimuth/Bearing: 268° S68W 4764mils (Magnetic)  
Elevation Angle: -11.6°  
Horizon Angle: -01.3°  
Zoom: 1X  
rv 21





Date Taken Photo #  
August 21, 2013 87

Direction  
East

Location  
RV22

#### Description

Scrub Shrub Cover = 15-20%  
Vegetation HT = 5-8 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 10:52:30 CDT 2013  
Position: +027.5547° / -099.1682°  
Altitude: 167m  
Azimuth/Bearing: 089° N089E 1582mils (Magnetic)  
Elevation Angle: -09.6°  
Horizon Angle: +00.5°  
Zoom: 1X  
rv 22



Date Taken Photo #  
August 21, 2013 88

Direction  
North

Location  
RV22

#### Description

Scrub Shrub Cover = 15-20%  
Vegetation HT = 5-8 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 10:52:22 CDT 2013  
Position: +027.5547° / -099.1682°  
Altitude: 167m  
Azimuth/Bearing: 298° N024W 6322mils (Magnetic)  
Elevation Angle: +10.5°  
Horizon Angle: 00.8°  
Zoom: 1X  
rv 22





Date Taken Photo #  
August 21, 2013 89

Direction  
South

Location  
RV22

#### Description

Scrub Shrub Cover = 15-20%  
Vegetation HT = 5-8 feet  
Species Observed = mesquite



Date Taken Photo #  
August 21, 2013 90

Direction  
West

Location  
RV22

#### Description

Scrub Shrub Cover = 15-20%  
Vegetation HT = 5-8 feet  
Species Observed = mesquite





**Date Taken**      **Photo #**  
August 21, 2013      91

**Direction**  
North

**Location**  
RV23

**Description**

Scrub Shrub Cover = None  
Vegetation HT = 2-4 feet  
Species Observed = mesquite  
Notes = good ground visibility



**Date Taken**      **Photo #**  
August 21, 2013      92

**Direction**  
East

**Location**  
RV23

**Description**

Scrub Shrub Cover = None  
Vegetation HT = 2-4 feet  
Species Observed = mesquite  
Notes = good ground visibility





Date Taken Photo #  
August 21, 2013 93

Direction  
South

Location  
RV23

#### Description

Scrub Shrub Cover = None  
Vegetation HT = 2-4 feet  
Species Observed = mesquite  
Notes = good ground visibility

Date & Time: Wed Aug 21 10:53:49 CDT 2013  
Position: +027.5553° / -099.1697°  
Altitude: 168m  
Azimuth/Bearing: 183° S03W 3253mils (Magnetic)  
Elevation Angle: -08.4°  
Horizon Angle: +00.2°  
Zoom: 1X  
rv 23



Date Taken Photo #  
August 21, 2013 94

Direction  
West

Location  
RV23

#### Description

Scrub Shrub Cover = None  
Vegetation HT = 2-4 feet  
Species Observed = mesquite  
Notes = good ground visibility

Date & Time: Wed Aug 21 10:58:53 CDT 2013  
Position: +027.5553° / -099.1697°  
Altitude: 167m  
Azimuth/Bearing: 270° N90W 4300mils (Magnetic)  
Elevation Angle: -07.2°  
Horizon Angle: +00.6°  
Zoom: 1X  
rv 23





Date Taken Photo #  
August 21, 2013 95

Direction  
North

Location  
RV24

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 4-7 feet  
Species Observed = mesquite



Date Taken Photo #  
August 21, 2013 96

Direction  
East

Location  
RV24

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 4-7 feet  
Species Observed = mesquite





Date Taken Photo #  
August 21, 2013 97

Direction  
South

Location  
RV24

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 4-7 feet  
Species Observed = mesquite



Date Taken Photo #  
August 21, 2013 98

Direction  
West

Location  
RV24

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 4-7 feet  
Species Observed = mesquite





Date Taken Photo #  
August 21, 2013 99

Direction  
North

Location  
RV25

#### Description

Scrub Shrub Cover = 10%  
Vegetation HT = 6-8 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 11:11:04 CDT 2013  
Position: +027.5590° / -099.1705°  
Altitude: 170m  
Azimuth/Bearing: 359° N01W 6382mils (Magnetic)  
Elevation Angle: -06.8°  
Horizon Angle: +00.3°  
Zoom: 1X  
rv:25



Date Taken Photo #  
August 21, 2013 100

Direction  
East

Location  
RV25

#### Description

Scrub Shrub Cover = 10%  
Vegetation HT = 6-8 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 11:11:18 CDT 2013  
Position: +027.5593° / -099.1705°  
Altitude: 173m  
Azimuth/Bearing: 089° N89E 1582mils (Magnetic)  
Elevation Angle: -08.0°  
Horizon Angle: -01.2°  
Zoom: 1X  
rv:25





**Date Taken**      **Photo #**  
August 21, 2013      101

**Direction**  
South

**Location**  
RV25

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 6-8 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 11:11:23 CDT 2013  
Position: +027.5589° / -099.1705°  
Altitude: 174m  
Azimuth/Bearing: 185° S05W 3289mils (Magnetic)  
Elevation Angle: -06.1°  
Horizon Angle: +01.4°  
Zoom: 1X  
rv 25



**Date Taken**      **Photo #**  
August 21, 2013      102

**Direction**  
West

**Location**  
RV25

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 6-8 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 11:11:27 CDT 2013  
Position: +027.5589° / -099.1705°  
Altitude: 173m  
Azimuth/Bearing: 269° S89W 4762mils (Magnetic)  
Elevation Angle: -07.6°  
Horizon Angle: +00.9°  
Zoom: 1X  
rv 25





**Date Taken**      **Photo #**  
August 21, 2013      103

**Direction**  
North

**Location**  
RV26

**Description**  
Scrub Shrub Cover = 0-2%  
Vegetation HT = 1-3 feet  
Species Observed = mesquite  
(isolated)  
Notes = overgrazed



**Date Taken**      **Photo #**  
August 21, 2013      104

**Direction**  
East

**Location**  
RV26

**Description**  
Scrub Shrub Cover = 0-2%  
Vegetation HT = 1-3 feet  
Species Observed = mesquite  
(isolated)  
Notes = overgrazed





**Date Taken**      **Photo #**  
August 21, 2013      105

**Direction**  
South

**Location**  
RV26

**Description**

Scrub Shrub Cover = 0-2%

Vegetation HT = 1-3 feet

Species Observed = mesquite  
(isolated)

Notes = overgrazed

Date & Time: Wed Aug 21 11:17:53 CDT 2013  
Position: +027.5606° / -099.1707°  
Altitude: 168m  
Azimuth/Bearing: 182° S02W 3236mils (Magnetic)  
Elevation Angle: -02.9°  
Horizon Angle: +00.8°  
Zoom: 1X  
rv 25



**Date Taken**      **Photo #**  
August 21, 2013      106

**Direction**  
West

**Location**  
RV26

**Description**

Scrub Shrub Cover = 0-2%

Vegetation HT = 1-3 feet

Species Observed = mesquite  
(isolated)

Notes = overgrazed

Date & Time: Wed Aug 21 11:17:57 CDT 2013  
Position: +027.5606° / -099.1707°  
Altitude: 169m  
Azimuth/Bearing: 270° S90W 4800mils (Magnetic)  
Elevation Angle: -07.5°  
Horizon Angle: -01.9°  
Zoom: 1X  
rv 2





Date Taken Photo #  
August 21, 2013 107

Direction  
North

Location  
RV27

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 4-10 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 11:22:10 CDT 2013  
Position: +027.5822° / -099.1705°  
Altitude: 165m  
Azimuth/Bearing: 356° N02W 6364mils (Magnetic)  
Elevation Angle: -08.7°  
Horizon Angle: -05.1°  
Zoom: 1X  
rv 27



Date Taken Photo #  
August 21, 2013 108

Direction  
East

Location  
RV27

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 4-10 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 11:22:24 CDT 2013  
Position: +027.5822° / -099.1705°  
Altitude: 164m  
Azimuth/Bearing: 099° N09E 1502mils (Magnetic)  
Elevation Angle: -05.2°  
Horizon Angle: -00.3°  
Zoom: 1X  
rv 27





Date Taken Photo #  
August 21, 2013 109

Direction  
South

Location  
RV27

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 4-10 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 11:22:29 CDT 2013  
Position: +027.5622° / -099.1705°  
Altitude: 164m  
Azimuth/Bearing: 180° S00W 3200mils (Magnetic)  
Elevation Angle: -03.4°  
Horizon Angle: +01.1°  
Zoom: 1X  
rv 27



Date Taken Photo #  
August 21, 2013 110

Direction  
West

Location  
RV27

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 4-10 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 11:22:36 CDT 2013  
Position: +027.5622° / -099.1705°  
Altitude: 163m  
Azimuth/Bearing: 257° S87W 4747mils (Magnetic)  
Elevation Angle: -04.7°  
Horizon Angle: +00.7°  
Zoom: 1X  
rv 27





Date Taken Photo #  
August 21, 2013 111

Direction  
North

Location  
RV28

**Description**

Scrub Shrub Cover = 5-10%  
Vegetation HT = 2-8 feet  
Species Observed = mesquite



Date Taken Photo #  
August 21, 2013 112

Direction  
Northeast

Location  
RV28

**Description**

Scrub Shrub Cover = 5-10%  
Vegetation HT = 2-8 feet  
Species Observed = mesquite





Date Taken Photo #  
August 21, 2013 113

Direction  
South

Location  
RV28

**Description**

Scrub Shrub Cover = 5-10%  
Vegetation HT = 2-8 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 11:31:17 CDT 2013  
Position: +027.5622° / -099.1714°  
Altitude: 165m  
Azimuth/Bearing: 182° S02W 3236mils (Magnetic)  
Elevation Angle: -10.8°  
Horizon Angle: -02.4°  
Zoom: 1X  
rv 28



Date Taken Photo #  
August 21, 2013 114

Direction  
West

Location  
RV28

**Description**

Scrub Shrub Cover = 5-10%  
Vegetation HT = 2-8 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 11:31:20 CDT 2013  
Position: +027.5622° / -099.1714°  
Altitude: 165m  
Azimuth/Bearing: 270° S90W 4800mils (Magnetic)  
Elevation Angle: -08.6°  
Horizon Angle: -01.7°  
Zoom: 1X  
rv 28





**Date Taken**      **Photo #**  
August 21, 2013      115

**Direction**  
North

**Location**  
RV29

**Description**

Scrub Shrub Cover = 5%  
Vegetation HT = 2-6 feet  
Species Observed = mesquite  
Notes = overgrazed

Date & Time: Wed Aug 21 11:36:54 CDT 2013  
Position: +027.5605° / -099.1715°  
Altitude: 166m  
Azimuth/Bearing: 357° N08W 6347mils (Magnetic)  
Elevation Angle: -03.3°  
Horizon Angle: -00.7°  
Zoom: 1X  
rv 29



**Date Taken**      **Photo #**  
August 21, 2013      116

**Direction**  
East

**Location**  
RV29

**Description**

Scrub Shrub Cover = 5%  
Vegetation HT = 2-6 feet  
Species Observed = mesquite  
Notes = overgrazed

Date & Time: Wed Aug 21 11:37:03 CDT 2013  
Position: +027.5605° / -099.1715°  
Altitude: 166m  
Azimuth/Bearing: 083° N83E 1476mils (Magnetic)  
Elevation Angle: -07.7°  
Horizon Angle: +00.5°  
Zoom: 1X  
rv 29





Date Taken Photo #  
August 21, 2013 117

Direction  
Northeast

Location  
RV29

#### Description

Scrub Shrub Cover = 5%  
Vegetation HT = 2-6 feet  
Species Observed = mesquite  
Notes = overgrazed

Date & Time: Wed Aug 21 11:37:09 CDT 2013  
Position: +027.5805° / -099.1715°  
Altitude: 165m  
Azimuth/Bearing: 054° N54E 0980mils (Magnetic)  
Elevation Angle: -06.6°  
Horizon Angle: -00.3°  
Zoom: 1X  
rv 29



Date Taken Photo #  
August 21, 2013 118

Direction  
West

Location  
RV29

#### Description

Scrub Shrub Cover = 5%  
Vegetation HT = 2-6 feet  
Species Observed = mesquite  
Notes = overgrazed

Date & Time: Wed Aug 21 11:37:16 CDT 2013  
Position: +027.5805° / -099.1715°  
Altitude: 164m  
Azimuth/Bearing: 268° S88W 4764mils (Magnetic)  
Elevation Angle: -05.9°  
Horizon Angle: +00.2°  
Zoom: 1X  
rv 29





**Date Taken**      **Photo #**  
August 21, 2013      119

**Direction**  
North

**Location**  
RV31 - West Pond

**Description**  
Scrub Shrub Cover = 10%  
Vegetation HT = 2-15 feet  
Species Observed = mesquite



**Date Taken**      **Photo #**  
August 21, 2013      120

**Direction**  
East

**Location**  
RV31 - West Pond

**Description**  
Scrub Shrub Cover = 10%  
Vegetation HT = 2-15 feet  
Species Observed = mesquite





**Date Taken**      **Photo #**  
August 21, 2013      121

**Direction**  
South

**Location**  
RV31 - West Pond

**Description**  
Scrub Shrub Cover = 10%  
Vegetation HT = 2-15 feet  
Species Observed = mesquite



**Date Taken**      **Photo #**  
August 21, 2013      122

**Direction**  
West

**Location**  
RV31 - West Pond

**Description**  
Scrub Shrub Cover = 10%  
Vegetation HT = 2-15 feet  
Species Observed = mesquite





Date Taken Photo #  
August 21, 2013 123

Direction  
North

Location  
RV32

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 3-6 feet  
Species Observed = mesquite



Date Taken Photo #  
August 21, 2013 124

Direction  
East

Location  
RV32

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 3-6 feet  
Species Observed = mesquite





Date Taken Photo #  
August 21, 2013 125

Direction  
South

Location  
RV32

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 3-6 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 12:18:31 CDT 2013  
Position: +027.5634° / -099.1721°  
Altitude: 172m  
Azimuth/Bearing: 181° S01W 3216mils (Magnetic)  
Elevation Angle: -03.2°  
Horizon Angle: -00.5°  
Zoom: 1X  
rv 32



Date Taken Photo #  
August 21, 2013 126

Direction  
West

Location  
RV32

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 3-6 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 12:18:42 CDT 2013  
Position: +027.5633° / -099.1721°  
Altitude: 172m  
Azimuth/Bearing: 265° S85W 4711mils (Magnetic)  
Elevation Angle: -04.0°  
Horizon Angle: +00.7°  
Zoom: 1X  
rv 32





Date Taken Photo #  
August 21, 2013 127

Direction  
North

Location  
RV33

#### Description

Scrub Shrub Cover = 5%  
Vegetation HT = 4-6 feet  
Species Observed = mesquite



Date Taken Photo #  
August 21, 2013 128

Direction  
East

Location  
RV33

#### Description

Scrub Shrub Cover = 5%  
Vegetation HT = 4-6 feet  
Species Observed = mesquite





Date Taken Photo #  
August 21, 2013 129

Direction  
South

Location  
RV33

#### Description

Scrub Shrub Cover = 5%  
Vegetation HT = 4-6 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 12:22:29 CDT 2013  
Position: +027.5625° / -099.1719°  
Altitude: 164m  
Azimuth/Bearing: 181° S01W 3218mils (Magnetic)  
Elevation Angle: -05.4°  
Horizon Angle: -01.3°  
Zoom: 1X  
rv 33



Date Taken Photo #  
August 21, 2013 130

Direction  
West

Location  
RV33

#### Description

Scrub Shrub Cover = 5%  
Vegetation HT = 4-6 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 12:22:32 CDT 2013  
Position: +027.5625° / -099.1719°  
Altitude: 165m  
Azimuth/Bearing: 270° N90W 4600mils (Magnetic)  
Elevation Angle: -05.2°  
Horizon Angle: +02.0°  
Zoom: 1X  
rv 33





Date Taken Photo #  
August 21, 2013 131

Direction  
North

Location  
RV34

**Description**

Scrub Shrub Cover = 15%  
Vegetation HT = 5-10 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 12:28:44 CDT 2013  
Position: +027.5629° / -099.1708°  
Altitude: 167m  
Azimuth/Bearing: 001° N01E 0018mils (Magnetic)  
Elevation Angle: -01.3°  
Horizon Angle: +00.7°  
Zoom: 1X  
rv 34



Date Taken Photo #  
August 21, 2013 132

Direction  
East

Location  
RV34

**Description**

Scrub Shrub Cover = 15%  
Vegetation HT = 5-10 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 12:28:50 CDT 2013  
Position: +027.5629° / -099.1708°  
Altitude: 167m  
Azimuth/Bearing: 099° N09E 1502mils (Magnetic)  
Elevation Angle: -04.5°  
Horizon Angle: +01.1°  
Zoom: 1X  
rv 34





Date Taken Photo #  
August 21, 2013 133

Direction  
South

Location  
RV34

Description  
Scrub Shrub Cover = 15%  
Vegetation HT = 5-10 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 12:28:55 CDT 2013  
Position: +027.5629° / -099.1708°  
Altitude: 168m  
Azimuth/Bearing: 188° S09W 3360mils (Magnetic)  
Elevation Angle: -02.4°  
Horizon Angle: +00.4°  
Zoom: 1X  
rv 34



Date Taken Photo #  
August 21, 2013 134

Direction  
West

Location  
RV34

Description  
Scrub Shrub Cover = 15%  
Vegetation HT = 5-10 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 12:28:58 CDT 2013  
Position: +027.5629° / -099.1708°  
Altitude: 169m  
Azimuth/Bearing: 266° S86W 4723mils (Magnetic)  
Elevation Angle: -02.6°  
Horizon Angle: +01.2°  
Zoom: 1X  
rv 34





**Date Taken**      **Photo #**  
August 21, 2013      135

**Direction**  
North

**Location**  
RV35

**Description**

Scrub Shrub Cover = 0-2%  
Vegetation HT = 1-3 feet  
Species Observed = mesquite



**Date Taken**      **Photo #**  
August 21, 2013      136

**Direction**  
East

**Location**  
RV35

**Description**

Scrub Shrub Cover = 0-2%  
Vegetation HT = 1-3 feet  
Species Observed = mesquite





Date Taken Photo #  
August 21, 2013 137

Direction  
South

Location  
RV35

**Description**

Scrub Shrub Cover = 0-2%  
Vegetation HT = 1-3 feet  
Species Observed = mesquite



Date Taken Photo #  
August 21, 2013 138

Direction  
West

Location  
RV35

**Description**

Scrub Shrub Cover = 0-2%  
Vegetation HT = 1-3 feet  
Species Observed = mesquite





**Date Taken**      **Photo #**  
August 21, 2013      139

**Direction**  
North

**Location**  
RV36

**Description**

Scrub Shrub Cover = 0-2%

Vegetation HT = 0-1 feet

Species Observed = mesquite

Date & Time: Wed Aug 21 12:35:54 CDT 2013  
Position: +027.5642° / -099.1702°  
Altitude: 171m  
Azimuth/Bearing: 356° N04W 6329mils (Magnetic)  
Elevation Angle: -02.3°  
Horizon Angle: +00.1°  
Zoom: 1X  
rv 36



**Date Taken**      **Photo #**  
August 21, 2013      140

**Direction**  
East

**Location**  
RV36

**Description**

Scrub Shrub Cover = 0-2%

Vegetation HT = 0-1 feet

Species Observed = mesquite

Date & Time: Wed Aug 21 12:36:03 CDT 2013  
Position: +027.5642° / -099.1702°  
Altitude: 170m  
Azimuth/Bearing: 088° N88E 1564mils (Magnetic)  
Elevation Angle: -00.5°  
Horizon Angle: +01.3°  
Zoom: 1X  
rv 36





Date Taken Photo #  
August 21, 2013 141

Direction  
South

Location  
RV36

**Description**

Scrub Shrub Cover = 0-2%  
Vegetation HT = 0-1 feet  
Species Observed = mesquite



Date Taken Photo #  
August 21, 2013 142

Direction  
North

Location  
RV37

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 1-3 feet  
Species Observed = mesquite





Date Taken Photo #  
August 21, 2013 143

Direction  
East

Location  
RV37

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 1-3 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 12:40:39 CDT 2013  
Position: +027.5646° / -099.1712°  
Altitude: 168m  
Azimuth/Bearing: 086° N86E 1564mils (Magnetic)  
Elevation Angle: -06.1°  
Horizon Angle: +00.0°  
Zoom: 1X  
rv 37



Date Taken Photo #  
August 21, 2013 144

Direction  
South

Location  
RV37

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 1-3 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 12:40:45 CDT 2013  
Position: +027.5645° / -099.1712°  
Altitude: 169m  
Azimuth/Bearing: 185° S05W 3289mils (Magnetic)  
Elevation Angle: -04.0°  
Horizon Angle: +02.1°  
Zoom: 1X  
rv 37





**Date Taken**      **Photo #**  
August 21, 2013      145

**Direction**  
West

**Location**  
RV37

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 1-3 feet  
Species Observed = mesquite



**Date Taken**      **Photo #**  
August 21, 2013      146

**Direction**  
North

**Location**  
RV38

**Description**

Scrub Shrub Cover = 5%  
Vegetation HT = 0-4 feet  
Species Observed = mesquite





Date Taken Photo #  
August 21, 2013 147

Direction  
East

Location  
RV38

**Description**

Scrub Shrub Cover = 5%  
Vegetation HT = 0-4 feet  
Species Observed = mesquite



Date Taken Photo #  
August 21, 2013 148

Direction  
South

Location  
RV38

**Description**

Scrub Shrub Cover = 5%  
Vegetation HT = 0-4 feet  
Species Observed = mesquite





**Date Taken**      **Photo #**  
August 21, 2013      149

**Direction**  
West

**Location**  
RV38

**Description**

Scrub Shrub Cover = 5%  
Vegetation HT = 0-4 feet  
Species Observed = mesquite



**Date Taken**      **Photo #**  
August 21, 2013      150

**Direction**  
North

**Location**  
RV39

**Description**

Scrub Shrub Cover = 5-10%  
Vegetation HT = 4-11 feet  
Species Observed = mesquite





Date Taken Photo #  
August 21, 2013 151

Direction  
East

Location  
RV39

#### Description

Scrub Shrub Cover = 5-10%  
Vegetation HT = 4-11 feet  
Species Observed = mesquite



Date Taken Photo #  
August 21, 2013 152

Direction  
South

Location  
RV39

#### Description

Scrub Shrub Cover = 5-10%  
Vegetation HT = 4-11 feet  
Species Observed = mesquite





**Date Taken**      **Photo #**  
August 21, 2013      153

**Direction**  
West

**Location**  
RV39

**Description**

Scrub Shrub Cover = 5-10%  
Vegetation HT = 4-11 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 13:02:13 CDT 2013  
Position: +027.5653° / -099.1728°  
Altitude: 168m  
Azimuth/Bearing: 269° S69W 4729mils (Magnetic)  
Elevation Angle: -00.6°  
Horizon Angle: +00.7°  
Zoom: 1X  
rv 39



**Date Taken**      **Photo #**  
August 21, 2013      154

**Direction**  
Northwest

**Location**  
RV40

**Description**

Scrub Shrub Cover = 0-2%  
Vegetation HT = 0-4 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 13:08:16 CDT 2013  
Position: +027.5653° / -099.1713°  
Altitude: 168m  
Azimuth/Bearing: 340° N20W 6044mils (Magnetic)  
Elevation Angle: -02.1°  
Horizon Angle: +01.0°  
Zoom: 1X  
rv 40





Date Taken Photo #  
August 21, 2013 155

Direction  
East

Location  
RV40

**Description**

Scrub Shrub Cover = 0-2%  
Vegetation HT = 0-4 feet  
Species Observed = mesquite



Date Taken Photo #  
August 21, 2013 156

Direction  
South

Location  
RV40

**Description**

Scrub Shrub Cover = 0-2%  
Vegetation HT = 0-4 feet  
Species Observed = mesquite





Date Taken Photo #  
August 21, 2013 157

Direction  
West

Location  
RV40

**Description**

Scrub Shrub Cover = 0-2%  
Vegetation HT = 0-4 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 13:06:31 CDT 2013  
Position: +027.5653° / -099.1714°  
Altitude: 167m  
Azimuth/Bearing: 268° S88W 4764mils (Magnetic)  
Elevation Angle: -04.8°  
Horizon Angle: +00.6°  
Zoom: 1X  
rv 40



Date Taken Photo #  
August 21, 2013 158

Direction  
North

Location  
RV41

**Description**

Scrub Shrub Cover = 10-15%  
Vegetation HT = 3-8 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 13:14:19 CDT 2013  
Position: +027.5652° / -099.1838°  
Altitude: 169m  
Azimuth/Bearing: 002° N02E 0038mils (Magnetic)  
Elevation Angle: +00.0°  
Horizon Angle: +01.2°  
Zoom: 1X  
rv 41





Date Taken Photo #  
August 21, 2013 159

Direction  
East

Location  
RV41

#### Description

Scrub Shrub Cover = 10-15%  
Vegetation HT = 3-8 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 13:14:25 CDT 2013  
Position: +027.5652° / -099.1698°  
Altitude: 168m  
Azimuth/Bearing: 092° S86E 1636mils (Magnetic)  
Elevation Angle: -03.1°  
Horizon Angle: -02.2°  
Zoom: 1X  
rv 41



Date Taken Photo #  
August 21, 2013 160

Direction  
South

Location  
RV41

#### Description

Scrub Shrub Cover = 10-15%  
Vegetation HT = 3-8 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 13:14:29 CDT 2013  
Position: +027.5652° / -099.1698°  
Altitude: 168m  
Azimuth/Bearing: 188° S06W 3307mils (Magnetic)  
Elevation Angle: -01.1°  
Horizon Angle: -01.4°  
Zoom: 1X  
rv 41





Date Taken Photo #  
August 21, 2013 161

Direction  
West

Location  
RV41

Description  
Scrub Shrub Cover = 10-15%  
Vegetation HT = 3-8 feet  
Species Observed = mesquite



Date Taken Photo #  
August 21, 2013 162

Direction  
North

Location  
RV42

Description  
Scrub Shrub Cover = 15%  
Vegetation HT = 4-11 feet  
Species Observed = mesquite





**Date Taken**      **Photo #**  
August 21, 2013      163

**Direction**  
East

**Location**  
RV42

**Description**  
Scrub Shrub Cover = 15%  
Vegetation HT = 4-11 feet  
Species Observed = mesquite



**Date Taken**      **Photo #**  
August 21, 2013      164

**Direction**  
South

**Location**  
RV42

**Description**  
Scrub Shrub Cover = 15%  
Vegetation HT = 4-11 feet  
Species Observed = mesquite





Date Taken Photo #  
August 21, 2013 165

Direction  
West

Location  
RV42

**Description**

Scrub Shrub Cover = 15%  
Vegetation HT = 4-11 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 13:19:30 CDT 2013  
Position: +027.5662° / -099.1689°  
Altitude: 768m  
Azimuth/Bearing: 239° S69W 4762mils (Magnetic)  
Elevation Angle: +09.0°  
Horizon Angle: +01.3°  
Zoom: 1X  
rv 4



Date Taken Photo #  
August 21, 2013 166

Direction  
North

Location  
RV43

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 8-12 feet  
Species Observed = mesquite,  
roadrunner

Date & Time: Wed Aug 21 13:25:32 CDT 2013  
Position: +027.5674° / -099.1701°  
Altitude: 170m  
Azimuth/Bearing: 001° N01E 0018mils (Magnetic)  
Elevation Angle: -04.7°  
Horizon Angle: +00.1°  
Zoom: 1X  
rv 43





**Date Taken**      **Photo #**  
August 21, 2013      167

**Direction**  
East

**Location**  
RV43

**Description**  
Scrub Shrub Cover = 10%  
Vegetation HT = 8-12 feet  
Species Observed = mesquite,  
roadrunner



**Date Taken**      **Photo #**  
August 21, 2013      168

**Direction**  
South

**Location**  
RV43

**Description**  
Scrub Shrub Cover = 10%  
Vegetation HT = 8-12 feet  
Species Observed = mesquite,  
roadrunner





Date Taken Photo #  
August 21, 2013 169

Direction  
West

Location  
RV43

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 8-12 feet  
Species Observed = mesquite,  
roadrunner

Date & Time: Wed Aug 21 13:25:50 CDT 2013  
Position: +027.5674° / -099.1701°  
Altitude: 168m  
Azimuth/Bearing: 271° N89W 4818mils (Magnetic)  
Elevation Angle: -04.7°  
Horizon Angle: -00.2°  
Zoom: 1X  
rv 4



Date Taken Photo #  
August 21, 2013 170

Direction  
North

Location  
RV44

**Description**

Scrub Shrub Cover = 10%  
Vegetation HT = 4-7 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 13:29:40 CDT 2013  
Position: +027.5674° / -099.1703°  
Altitude: 171m  
Azimuth/Bearing: 357° N03W 6347mils (Magnetic)  
Elevation Angle: +00.5°  
Horizon Angle: +00.2°  
Zoom: 1X  
rv 44





Date Taken Photo #  
August 21, 2013 171

Direction  
East

Location  
RV44

Description  
Scrub Shrub Cover = 10%  
Vegetation HT = 4-7 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 13:29:49 CDT 2013  
Position: +027.5574° / -099.1708°  
Altitude: 168m  
Azimuth/Bearing: 098° N88E 1582mils (Magnetic)  
Elevation Angle: -02.7°  
Horizon Angle: -00.3°  
Zoom: 1X  
rv 44



Date Taken Photo #  
August 21, 2013 172

Direction  
South

Location  
RV44

Description  
Scrub Shrub Cover = 10%  
Vegetation HT = 4-7 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 13:29:58 CDT 2013  
Position: +027.5574° / -099.1708°  
Altitude: 170m  
Azimuth/Bearing: 179° S01E 3182mils (Magnetic)  
Elevation Angle: -01.4°  
Horizon Angle: 400.6°  
Zoom: 1X  
rv 44





**Date Taken**      **Photo #**  
August 21, 2013      173

**Direction**  
West

**Location**  
RV44

## Description

Scrub Shrub Cover = 10%  
Vegetation HT = 4-7 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 13:30:06 CDT 2013  
Position: +027.5674° / -099.1708°  
Altitude: 170m  
Azimuth/Bearing: 272° N88W 4836mils (Magnetic)  
Elevation Angle: +00.2°  
Horizon Angle: -00.0°  
Zoom: 1X  
rv 44



**Date Taken**      **Photo #**  
August 21, 2013      174

**Direction**  
North

**Location**  
RV45

## Description

Scrub Shrub Cover = 5-10%  
Vegetation HT = 3-8 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 13:34:11 CDT 2013  
Position: +027.5688° / -099.1715°  
Altitude: 169m  
Azimuth/Bearing: 001° N01E 0018mils (Magnetic)  
Elevation Angle: -04.7°  
Horizon Angle: -03.5°  
Zoom: 1X  
rv 45





Date Taken Photo #  
August 21, 2013 175

Direction  
East

Location  
RV45

**Description**

Scrub Shrub Cover = 5-10%  
Vegetation HT = 3-8 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 13:34:19 CDT 2013  
Position: +027.5686° / -099.1715°  
Altitude: 169m  
Azimuth/Bearing: 094° S66E 1671mils (Magnetic)  
Elevation Angle: -06.0°  
Horizon Angle: -00.3°  
Zoom: 1X  
rv 45



Date Taken Photo #  
August 21, 2013 176

Direction  
South

Location  
RV45

**Description**

Scrub Shrub Cover = 5-10%  
Vegetation HT = 3-8 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 13:34:22 CDT 2013  
Position: +027.5686° / -099.1715°  
Altitude: 169m  
Azimuth/Bearing: 181° S01W 3213mils (Magnetic)  
Elevation Angle: -07.2°  
Horizon Angle: -02.8°  
Zoom: 1X  
rv 45





Date Taken Photo #  
August 21, 2013 177

Direction  
West

Location  
RV45

#### Description

Scrub Shrub Cover = 5-10%  
Vegetation HT = 3-8 feet  
Species Observed = mesquite

Date & Time: Wed Aug 21 13:34:26 CDT 2013  
Position: +027.5666° / -099.1715°  
Altitude: 170m  
Azimuth/Bearing: 269° S89W 4782mils (Magnetic)  
Elevation Angle: -01.4°  
Horizon Angle: -00.5°  
Zoom: 1X  
rv 45



Date Taken Photo #  
August 21, 2013 178

Direction  
North

Location  
RV46

#### Description

Scrub Shrub Cover = 0-2%  
Vegetation HT = 1-4 feet  
Species Observed = mesquite,  
cactus

Date & Time: Wed Aug 21 13:42:19 CDT 2013  
Position: +027.5658° / -099.1723°  
Altitude: 169m  
Azimuth/Bearing: 001° N01E 0018mils (Magnetic)  
Elevation Angle: +00.3°  
Horizon Angle: -02.2°  
Zoom: 1X  
rv 46





Date Taken Photo #  
August 21, 2013 179

Direction  
East

Location  
RV46

#### Description

Scrub Shrub Cover = 0-2%  
Vegetation HT = 1-4 feet  
Species Observed = mesquite,  
cactus

Date & Time: Wed Aug 21 13:42:26 CDT 2013  
Position: +027.5858° / -099.1723°  
Altitude: 168m  
Azimuth/Bearing: 089° N89E 1582mils (Magnetic)  
Elevation Angle: -04.8°  
Horizon Angle: +00.4°  
Zoom: 1X  
rv 46



Date Taken Photo #  
August 21, 2013 180

Direction  
South

Location  
RV46

#### Description

Scrub Shrub Cover = 0-2%  
Vegetation HT = 1-4 feet  
Species Observed = mesquite,  
cactus

Date & Time: Wed Aug 21 13:42:32 CDT 2013  
Position: +027.5858° / -099.1723°  
Altitude: 168m  
Azimuth/Bearing: 184° S04W 3271mils (Magnetic)  
Elevation Angle: -02.6°  
Horizon Angle: -00.5°  
Zoom: 1X  
rv 48





Date Taken      Photo #  
August 21, 2013      181

Direction  
West

Location  
RV46

Description  
Scrub Shrub Cover = 0-2%  
Vegetation HT = 1-4 feet  
Species Observed = mesquite,  
cactus







**Rancho Viejo**  
**Delineation and Proposed Jurisdictional Determination**  
**Of**  
**Waters of the U.S**  
**March 2013**





**DELINEATION AND PROPOSED JURISDICTIONAL  
DETERMINATION OF WATERS OF THE U.S.  
FOR THE  
RANCHO VIEJO PROJECT  
SWF 2011-00398**

Webb County, Texas

March 2013

Submitted to:

USACE, Fort Worth District  
CESWF-PER-R  
819 Taylor Street, Room 3A37  
Fort Worth, Texas 76102

On Behalf of:

Rancho Viejo Waste Management, LLC  
1116 Calle del Norte  
Laredo, TX 78041

Prepared by:

aci consulting  
1001 Mopac Circle  
Austin, Texas 78746

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### Appendix C: Approved JD Forms

### Appendix D: POND-1 Wetland Datasheets

### Appendix E: POND-2 Wetland Datasheets

### Appendix F: Additional Wetland Datasheets

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## **Delineation and Proposed Jurisdictional Determination of Waters of the U.S. for the Rancho Viejo Project in Webb County, Texas**

**USACE Project No. SWF 2011-00398**

### **1.0 INTRODUCTION**

The purpose of this report is to request a formal determination of the extent of waters jurisdictional under Section 404 of the Clean Water Act on the Rancho Viejo tract in Webb County, Texas. This report summarizes the framework of Section 404 jurisdictional waters, presents the environmental conditions of the site and surrounding areas, and proposes areas that qualify as jurisdictional under Section 404.

This report presents the results of the jurisdictional waters determination of the Rancho Viejo project, hereafter referred to as the “Project Area,” in accordance with Section 404 of the Clean Water Act, the 1987 Wetland Delineation Manual (USACE 1987), and the Final Great Plains Regional Supplement to the Corps of Engineers Wetland Delineation Manual (USACE 2010). Specifically, this assessment identifies the locations and extents of potential waters of the United States, including wetlands.

The Project Area for the Rancho Viejo site is approximately 1,110 acres in rural Webb County, south of U.S. Highway 59, approximately 20 miles east of Laredo, Texas (Appendix A, Figure 1). In addition to the Project Area, a Downstream Study Area downstream of the Project Area was reviewed to investigate the hydrologic connection of the site downstream with traditionally navigable waterways.

This submittal supplements previous information provided to the U.S. Army Corps of Engineers (USACE) and specifically includes a detailed review of drainages and wetlands within the Project Area and Downstream Study Area. The purpose of this expanded study area is to review in the field and present the potential for a significant nexus to downstream Traditional Navigable Waters (TNW) from the study area.

### **2.0 CLEAN WATER ACT**

The Federal Water Pollution Control Act Amendments of 1972 established a comprehensive program of regulations and permits to control water pollution within the United States. Section 404 of the Clean Water Act (CWA) was created as a part of the above-mentioned amendments and has become the principal regulatory mechanism for controlling discharges into wetlands and waters of the United States.

Both the USACE and the Environmental Protection Agency (EPA) have assigned authorities under Section 404 of the CWA. The USACE has the authority to issue

permits for the discharge of fill materials after notice and an opportunity for public comment. The EPA, in conjunction with the USACE, has the authority to develop substantive water protection criteria as a part of the guidelines that individuals or other entities must meet when applying for a permit from the USACE. Enforcement authority with regard to Section 404 is divided between the two agencies.

## **2.1 Definition of Jurisdictional Waters**

(Both the USACE and the EPA use the same definition of waters covered under the CWA.)

The term “waters of the United States” is defined to include not only the traditionally navigable waters, but also a broad range of waters, including:

- all interstate waters, including wetlands;
- all other waters, such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sand flats, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce;
- all impoundments of water that fit these definitions;
- tributaries and wetlands that are determined to have a significant nexus to any traditional navigable water, including non-navigable tributaries and wetlands adjacent to non-navigable tributaries that are not relatively permanent, and wetlands adjacent to but that do not directly abut a relatively permanent non-navigable tributary;
- the territorial seas; and
- wetlands adjacent to waters, other than adjacent to other wetlands.

The USACE Jurisdictional Determination Form Instructional Guidebook (USACE 2007) references TNWs as including “all of the ‘navigable waters of the United States,’ as defined in 33 C.F.R. part 329 and by numerous decisions of the federal courts, plus all other waters that are navigable-in-fact....” These include “all waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide.” [33 CFR § 328(a)(1); 40 CFR §230.3(s)(1)].

### **2.1.1 Traditionally Navigable Waters**

Waters will be considered Traditionally Navigable Waters (TNWs) if:

- they are subject to Section 9 or 10 of the Rivers and Harbors Act; or
- a federal court has determined that the water body is navigable-in-fact under federal law; or



- they are waters currently being used for commercial navigation, including commercial waterborne recreation (for example, boat rentals, guided fishing trips, or water ski tournaments); or
- they have historically been used for commercial navigation, including commercial waterborne recreation; or
- they are susceptible to being used in the future for commercial navigation, including commercial waterborne recreation.

The USACE and EPA maintain lists of final determinations of navigability for purposes of USACE jurisdiction under Section 10 of the Rivers and Harbors Act of 1899. In Texas, the USACE prepared such a list in 1999 detailing all waters in the State of Texas determined to be “navigable” under Section 10 (USACE 1999).

### **2.1.2 Relative Permanent Waters**

The USACE and EPA further define non-TNW as two types: 1) relatively permanent waters (RPW) and 2) non-relatively permanent waters (non-RPW). The USACE Jurisdictional Guidebook (2007) defines a relatively permanent water as: “a tributary that is not a TNW and that typically flows year-round or has continuous flow at least ‘seasonally’ (e.g. typically 3 months).”

### **2.1.3 Non-Relatively Permanent Waters**

The USACE Jurisdictional Guidebook also notes that non-RPWs are jurisdictional under the CWA where there is a “significant nexus” with a TNW. A *significant nexus* exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical, and/or biological integrity of the downstream TNW.

The function of an area as it relates to the chemical, physical, and biological integrity of a TNW includes:

1. the ability for a tributary/wetland to carry pollutants and flood water to a TNW;
2. the ability for a tributary to provide habitat for aquatic species that also live in the TNW;
3. the ability for a wetland to trap and filter pollutants and store flood waters before reaching a TNW; and
4. the ability for a tributary/wetland to maintain the water quality of the TNW.

### **2.1.4 Jurisdictional Wetlands**

Wetlands are considered jurisdictional when they are adjacent to jurisdictional waters of the U.S. Wetlands can be considered adjacent if the wetland’s physical proximity is reasonably close to the jurisdictional water. Factors considered when determining the adjacency of a wetland to a jurisdictional waters may include: ecological interconnection, physical proximity, presence of manmade or natural berms or barriers, and floodplain.

Wetlands are required by the USACE 1987 Wetland Delineation Manual to contain all of the following three characteristics: 1) predominance of wetland vegetation, 2) wetland hydrology, and 3) wetland/hydric soils (USACE 1987).

### **3.0 AREA OF INVESTIGATION**

The total area of investigation consists of the 1,100-acre Project Area and a 1,377-acre Downstream Study Area. The Project Area for the Rancho Viejo site is located in rural Webb County, south of U.S. Highway 59, approximately 20 miles east of Laredo, Texas (Appendix A, Figures 1 and 2). Rancho Viejo is in uppermost headwaters of the Rio Grande, approximately 28 aerial miles north and 48 river miles upstream from the Rio Grande. The predominant land uses in the vicinity of the study area are rangeland, primarily for cattle grazing and wildlife habitat, and oil and gas exploration.

To provide a comprehensive understanding of the watershed and context of the Rancho Viejo site, field investigations included analysis of areas surrounding the site. The study area includes a Downstream Study Area immediately south of, and downgradient from, the Project Area. The Downstream Study Area was investigated to provide a greater context and understanding of the Project Area and the potential for hydrologic connectivity. The Downstream Study Area stretches approximately 2.6 linear miles downstream from the Project Area and encompasses approximately 1,377 acres. The Downstream Study Area is bound to the south by an existing railroad alignment, which was the southernmost extent of right-of-entry. The Downstream Study Area is also shown in Appendix A, Figure 2.

#### **3.1 Watershed**

The Project Area and Downstream Study Area are located in the northernmost portion of the Rio Grande basin just 0.70 mile south of the watershed divide into the Nueces River basin. The majority of the potential waters that intersect the Project Area and Downstream Study Area are primary and secondary tributaries of San Juanito Creek. San Juanito Creek is approximately 7.68 river miles south of the Project Area and 4.80 river miles south of the southernmost point within the Downstream Study Area. San Juanito Creek flows south from one unnamed tributary to the next before it reaches Blanacas Creek and then Dolores Creek. Dolores Creek empties into the Rio Grande, approximately 45.50 river miles from the southernmost point of the Downstream Study Area, which is approximately 14.23 river miles south of the Webb and Zapata County line (Appendix A, Figure 3).



### **3.1.1 Hydrologic Connection to Rio Grande**

The Rio Grande is defined as a navigable waterway under Section 10 of the River and Harbors Act of 1899 from the Webb/Zapata County line north, upstream to the Texas/New Mexico border (USACE 1999). San Juanito Creek connects to the Rio Grande in Zapata County south of the USACE-designated, Section 10 “navigable,” segment of the Rio Grande. Therefore, where San Juanito Creek connects to the Rio Grande may not qualify as a TNW under current Section 404 guidance; however, for the purposes of this report, it is assumed that the Rio Grande is considered a TNW at the point of confluence with San Juanito Creek in Zapata County.

### **3.1.2 Onsite Hydrology**

Review of the USGS 7.5-minute topographic quadrangle and aerial photographs of the Project Area revealed at least six potential USGS blue-line waters crossing the Project Area, with at least seven man-made stock ponds.

The Downstream Study Area contains Hornitos Tank, a pond complex. In the Downstream Study Area, below Hornitos Tank, the primary tributary drains north to south, with adjacent USGS blue-lines contributing from the west and the east. Also within the Downstream Study Area, three drainages collect at POND-1 (Hornitos Tank). Additionally, within the Downstream Study Area there are numerous other man-made stock tanks shown on aerial photography. These drainages and open water features were evaluated during the field investigations and are described in Section 5.0 below.

## **3.2 Landform**

The Project Area is located within the Texas-Tamaulipan Thornscrub ecoregion of the Southern Texas Plains (Griffith et al. 2007). This ecoregion is distinguishable by its lightly rolling plains, low-growing thorn shrubland, and noticeable cuts throughout the landscape created by arroyos and streams.

Near Laredo, Texas (approximately 19.6 miles west of the Project Area), the Texas-Tamaulipan Thornscrub ecoregion transitions to the Rio Grande Floodplain and Terraces ecoregion, which is unmistakably characterized by its dramatic change in elevation. The boundaries for the Rio Grande Floodplain and Terraces ecoregion’s alluvial floodplain and low terraces are influenced by soils, geology, and topographic features that help characterize the narrow riverine region from the neighboring upland sections of the Texas-Tamaulipan Thornscrub ecoregion. The Project Area lies within the headwaters of the Rio Grande Basin, about 20 miles from the Rio Grande, and is bordered to the immediate north by the Nueces River Basin (Griffith et al. 2007).

### 3.3 Climate

The Project Area and Downstream Study Area lie within District 9 created by the National Climatic Data Center (NCDC). District 9 (South Texas Plains) is identified as sub-tropical steppe or semi-arid brushland. The geographic location of the Project Area subjects this site to *El Niño Southern Oscillation* and air from the Gulf of Mexico that produces tropical storms. *El Niño Southern Oscillation* affects moisture patterns of the Pacific Ocean and causes long-lasting precipitation impacts to Texas, leading to moderate or severe drought (TWDB 2004).

The subtropical climate of the Texas-Tamaulipan Thornscrub ecoregion is distinguished by hot, dry summers and mild winters. Peak rainfall for this ecoregion usually occurs in the fall and spring. Precipitation is unpredictable, with extreme moisture variation from year to year. Fall rainfall usually originates from the tropics, while spring rainfall occurs because of frontal activity.

The Texas-Tamaulipan Thornscrub ecoregion is characterized by an annual mean of 22 to 26 inches of precipitation and an annual mean of 280 to 300 frost-free days (Griffith et al. 2007). More specific to the Project Area, the Webb County Soil Survey documents the average annual rainfall in Laredo, Texas from 1931-1979 as 19.8 inches annually and the average snowfall from 1965-1978 as 0.40 inch annually (SCS 1985).

### 3.4 Vegetation

According to the McMahan et al. (1984), the northern third of the Project Area and the southernmost extent of the Downstream Study Area are within Mesquite-Blackbrush Brush, while the remaining areas lie within Other Native and/or Introduced Grasses.

### 3.5 Topography

According to the *Burrito Tank* USGS 7.5-minute topographic quadrangle, the elevation of the Project Area ranges from approximately 535 feet above mean sea level (MSL) to approximately 570 feet above MSL. The Downstream Study Area ranges from approximately 535 feet above MSL to approximately 510 feet above MSL, with an internal high point at 550 MSL located in the lower western portion of the area (Appendix A, Figure 4).

### 3.6 Soils

Six soil units (Appendix A, Figure 5) are found within the Project Area (SCS 1985):

- *Aguilares sandy clay loam, 0 to 3 percent slopes (AgB),*
- *Brundage fine sandy loam, occasionally flooded (Bd),*



- *Catarina clay, 0 to 2 percent slopes (CaB),*
- *Catarina clay, occasionally flooded (CfA),*
- *Moglia clay loam, 1 to 5 percent slopes (MgC), and*
- *Montell clay, saline, 0 to 2 percent slopes (MnB).*

Six soil units (Appendix A, Figure 5) are found within the Downstream Study Area (SCS 1985):

- *Copita fine sandy loam, 0 to 3 percent slopes (CpB),*
- *Hebbronville loamy fine sand, 0 to 2 percent slopes (HeB),*
- *Brundage fine sandy loam, occasionally flooded (Bd),*
- *Catarina clay, 0 to 2 percent slopes (CaB),*
- *Catarina clay, occasionally flooded (CfA), and*
- *Moglia clay loam, 1 to 5 percent slopes (MgC).*

None of the soil units onsite are considered hydric according to the U.S. Department of Agriculture (USDA 2013).

### **3.7 National Wetlands Inventory**

Review of National Wetland Inventory (NWI) maps revealed numerous delineated linear and open water features within the Project Area and the Downstream Study Area.

## **4.0 JURISDICTIONAL WATERS AND WETLANDS DELINEATION METHODOLOGY**

**aci consulting** scientists conducted a desktop analysis of historic aerial photographs, National Wetlands Inventory maps, current aerial photographs, and the USGS topographic quadrangles prior to field investigations to identify any potential locations for waters of the United States and areas prone to wetland development.

**aci consulting** field personnel surveyed the Project Area and Downstream Study Area for potential waters of the U.S., including wetlands, on March 6 and 7, 2012; August 6 through August 10, 2012; August 21 and 22, 2012; and September 5, 2012. Where apparent, personnel measured the width of the ordinary high water mark (OHWM) along the length of the waterway. Locations of measurements for potential waters were recorded using a Garmin Rino 655t hand-held GPS unit, and locations of measurements for potential wetlands were recorded using a Trimble GeoXT hand-held GPS unit with sub-meter accuracy. Digital photographs were taken, one upstream and one downstream, within and at the upper and lower extents of potential waters and at potential wetlands.

## 5.0 DETERMINATION RESULTS

This assessment identifies the locations and extents of potential waters of the United States in accordance with Section 404 of the Clean Water Act, the 1987 Wetland Delineation Manual (USACE 1987), and the Final Great Plains Regional Supplement to the Corps of Engineers Wetland Delineation Manual (USACE 2010).

The results present findings not only within the Project Area but also the Downstream Study Area. The purpose for the analysis of the larger areas was to provide hydrologic context for the Rancho Viejo site and where it is located within the watershed.

The findings of the proposed jurisdictional determination of waters (including wetlands) are presented below for the Project Area and Downstream Study Area. The presentation includes:

- **Section 5.1:** Traditional Navigable Waters—None proposed within the study area;
- **Section 5.2:** Relatively Permanent Waters—None proposed within the study area;
- **Section 5.3:** Non-Relatively Permanent Waters—Few proposed within the Downstream Study Area, none proposed within the Rancho Viejo Project Area;
  - Significant Nexus Analysis for the Downstream Study Area Non-RPW
- **Section 5.4:** Non-jurisdictional Drainage Swales—Few proposed within the DSA and within the Rancho Viejo Project Area; and
  - Significant Nexus Analysis for the Project Area Non-Jurisdictional Drainage Swale
- **Section 5.5:** Non-jurisdictional, Isolated Open Water Features—Few proposed within the DSA and within the Rancho Viejo Project Area.

Field investigations in March, August, and September confirmed the Project Area and Downstream Study Area as typical of the thornscrub landscape with dry, semi-arid rolling topography. As confirmed by the land owner, the ranch has been grazed by cattle historically and continues to be used for that purpose. As expected in the landscape, numerous man-made tanks have been constructed to hold stormwater runoff and provide improved surface water for livestock and wildlife.



A preliminary reconnaissance of the Project Area and Downstream Study Area was completed in March 2012. This reconnaissance was followed by detailed field survey of the Downstream Study Area and Project Area from August to September 2012.

Of special note, field investigations in August 2012 immediately followed a seven-inch rain event on July 27, 2012 of the magnitude of a 105-year storm event. The rain event also equated to one third of the annual rainfall for the area. This event provided a very assistive opportunity to show the movement of stormwater and floodwater within the watershed.

### **5.1 Traditional Navigable Waters**

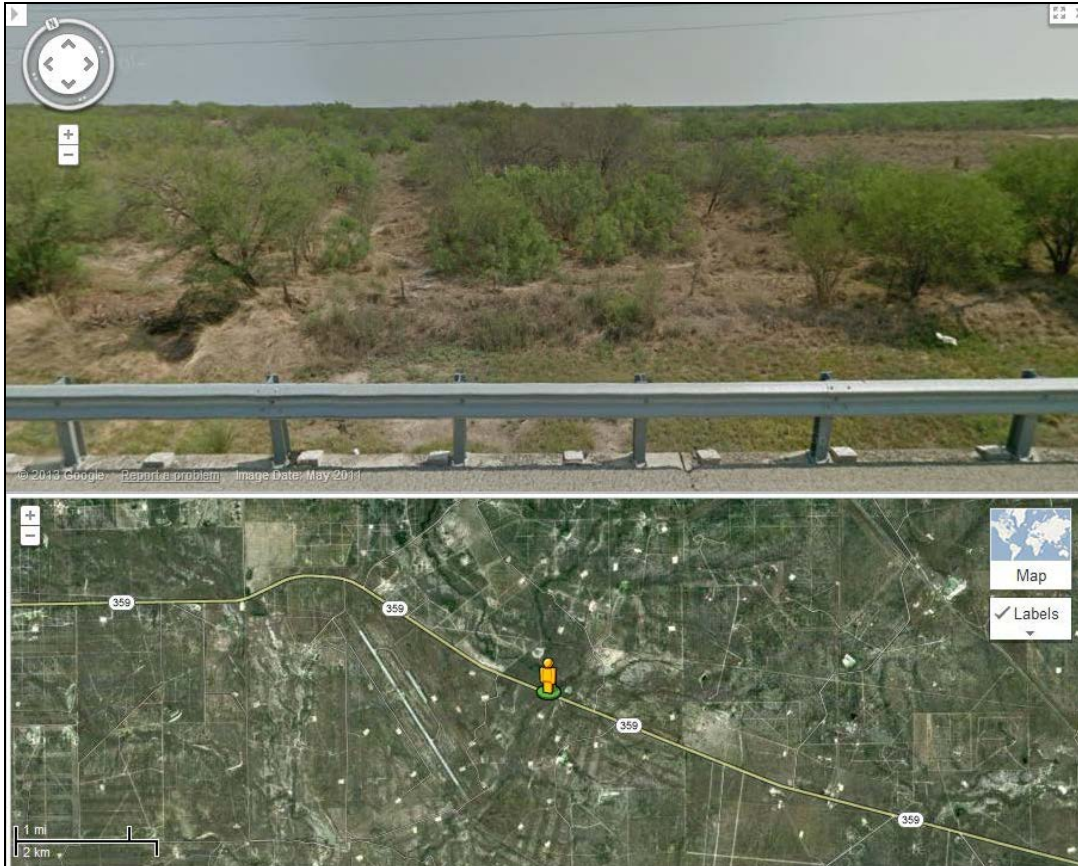
No TNWs occur within the Project Area or the Downstream Study Area. The closest potential TNW is the Rio Grande, which is approximately 48 river miles downstream from the Rancho Viejo Project Area. Where San Juanito Creek connects to the Rio Grande in Zapata County may not qualify as a TNW under current Section 404 guidance. However, for the purposes of this report, it is assumed that the Rio Grande is considered a TNW at the point of confluence with the San Juanito Creek.

### **5.2 Relatively Permanent Waters**

Based on review of historical and current aerial photography, review of previous site photographs from April 2011; site reconnaissance in March, August, and September 2012; and discussions with the landowner and land manager, the tributaries onsite do not appear to qualify as RPWs as defined by the USACE Jurisdictional Determination Form Instructional Guidebook (2007) and the USACE's Clean Water Act Jurisdiction Following the U.S. Supreme Court Decision in *Rapanos v. United States* (USACE 2008). The tributaries within the Downstream Study Area and further upstream within the Project Area do not appear to flow year round or have continuous flow at least "seasonally" (e.g. typically 3 months).

This finding is not based solely upon the review of historic and current desktop resources but includes the site review following the seven-inch rain event on July 27, 2012. This rain event of the magnitude of a 105-year storm did not generate base flow or maintained stormwater runoff in the tributaries onsite.

The closest potential RPW is San Juanito Creek several river miles downstream of the Project Area and the Downstream Study Area. Desktop review of aerials and photography at the Highway 359 crossing of San Juanito Creek showed no evidence of year-round significant seasonal flow (Photo 1). This location is approximately six aerial miles from the Project Area.



*Photo 1: Highway 359 crossing of San Juanito Creek approximately 6 miles downstream of Project Area with no appearance of year-round or seasonal flow.*

### **5.3 Non-Relatively Permanent Waters**

In this report, the presentation of non-RPWs begins at the farthest downstream point in the investigation area (the southernmost point in the Downstream Study Area) and moves northward (up the watershed). Detailed discussion of each non-RPW, open water body, and wetland is presented. All water features are assigned an alpha symbol code based on classification: Ephemeral (E), Drainage Swale (DS), and open water/wetland complexes (POND). Each water feature is then given a consecutive number classification. For example, Ephemeral Tributary #1 is assigned E-1.

Based on the tributaries within the Downstream Study Area and Project Area being defined as non-RPW, a significant nexus determination for connection to downstream TNW is presented below. A significant nexus evaluation was completed for the relative reach of the primary tributary within the Downstream Study Area, Ephemeral-1 (E-1), from the southernmost accessible point (the railroad crossing) upstream, north to POND-



1 (Hornitos Tank). Above POND-1, three higher-order drainages (E-7, E-6, and DS-14) contribute to POND-1. Two of these higher-order drainages (E-6 and DS-14) drain from the Project Area. E-7 collects from the northwest of POND-1, and DS-14 drains from the north downgradient from POND-2 (Burrito Tank). In Section 5.4, an additional significant nexus determination is also presented for the relative reach of DS-14 above POND-1. The locations of the water features are shown in Appendix A, Figure 6 and photographs of typical areas along the tributaries are included in Appendix B: Photolog.

### **5.3.1 Ephemeral 1 (E-1): Proposed Jurisdictional, Including Significant Nexus Determination**

Ephemeral 1 (E-1) is a non-RWP, ephemeral tributary within the Downstream Study Area, with consistent (but not fully contiguous) OHWM along the 2.6 miles from the downstream railroad crossing north to POND-1 (Hornitos Tank). At POND-1, three higher-order tributaries converge at the tank. The average width of E-1 within the Downstream Study Area is 8.3 feet.

On July 27, 2012, a rain event of approximately seven inches occurred within the watershed. During field investigations the following week, POND-1 showed no evidence of breach or outflow around bypass berms downstream to E-1 as a result of this rain event.

At the time of the field investigation, occasional ponded areas were observed in low lying areas along E-1 resulting from the recent seven-inch rain event, but there were no areas within E-1 where water was flowing.

### **5.3.2 POND-1: Open Water / Wetland Complex**

The POND-1 complex consists of three ponds at the upper extent of E-1 within the Downstream Study Area. POND-1 includes: a main large pond with a berm at its southern extent (POND-1A); a small adjacent pond to the west, which is separated from the main large pond by Ranch Road 7150J (POND-1B); and a small pond to the north, which is separated from the main large pond by a berm along its southern extent (POND-1C).

Approximately 30 wetlands shovel tests were performed surrounding POND-1. Open water was present in POND-1 at the time of the field investigations and the complex consists of both potential emergent fringe wetlands and open water. Field investigations identified 14.2 acres of open water and as many as 13 acres of wetlands surrounding the POND-1. These acreages may be larger than the typical conditions due to the seven-inch rain event immediately prior to field investigations.

The location of POND-1 is shown in Appendix A, Figure 6, photographs of typical areas within POND-1 are included in Appendix B, and wetland datasheets for POND-1 are included as Appendix D.

### **5.3.3 E-1 and POND-1: Significant Nexus Analysis**

#### ***E-1: Downstream Characteristics***

Downstream characteristics were reviewed below E-1 to determine how the USGS blue-line areas function as they relate to the chemical, physical, and biological integrity of the downstream TNW, the Rio Grande. Approximately 4.81 river miles (3.35 aerial miles) downstream of the Downstream Study Area, E-1 contributes to San Juanito Creek. San Juanito Creek flows downstream from one unnamed tributary to the next before it reaches Blanacas Creek and then Dolores Creek approximately 45.5 river miles (26.33 aerial miles) from its confluence with the Rio Grande in Zapata County, Texas. At this point of confluence, the Rio Grande is not on the USACE list of navigable waters of the U.S. within Texas (USACE 1999); however, the Rio Grande is likely considered a TNW.

#### ***E-1: Relevant Reach within Downstream Study Area***

E-1 within the Downstream Study Area (including POND-1) is proposed as an ephemeral, non-RPW that is jurisdictional under Section 404 of the CWA for the following reasons: 1) OHWM within the relative reach and, 2) E-1's ability for the tributary to carry pollutants and floodwater downstream to the Rio Grande.

Each of the four criteria for significant nexus determination is presented below for the relevant reach of E-1 based on field observations of the functional chemical, physical, and biological integrity of a downstream TNW. A completed jurisdictional determination form detailing the significant nexus analysis is included in Appendix C for the relevant reach of E-1 and POND-1.

1. The ability for a tributary/wetland to carry pollutants and floodwater to a TNW:
  - a. The relevant reach of E-1 may have a more-than-speculative ability to carry pollutants and flood water to a TNW. A consistently (but not fully contiguous) defined channel with bed, bank, and OHWM was present within the Downstream Study Areas (from the railroad track upgradient to POND-1);
  - b. this OHWM has the potential to connect E-1 downstream to San Juanito Creek and ultimately to the Rio Grande;
  - c. no flowing water was present along E-1 during field investigations, which included field investigations immediately following a seven-inch rain event (which equated to more than one third of the annual rainfall for the area); and



- d. the seven-inch rain event did not generate breach or flow from POND-1 downstream into the immediately proximate E-1.
2. The ability to provide habitat for aquatic species that also live in the TNW:
  - a. E-1 does not provide aquatic habitat;
  - b. no flowing water or dense stands of wetland vegetation were observed within the areas associated with E-1;
  - c. E-1 is not likely to support habitat for federally listed species, fish spawn areas, or other environmentally sensitive species; and
  - d. POND-1 may provide some aquatic habitat seasonally.
3. The ability for a wetland to trap and filter pollutants, and store flood water before reaching TNW:
  - a. E-1 does not contain wetland features that may trap, filter, or store floodwater and
  - b. POND-1 contains wetland fringe that may provide some limited ability to trap, filter and store floodwater.
4. The ability for a tributary/wetland to maintain water quality of the TNW:
  - a. E-1 has very minimal ability to maintain water quality within the Rio Grande. E-1 is located in the uppermost headwaters of the Rio Grande Basin (27 aerial miles from the Rio Grande and 2 miles from the Nueces River basin). E-1's influence on the water quality of the Rio Grande may be more than speculative, but it is very minimal.

#### **5.3.4 Contiguous Secondary Tributaries to E-1: Proposed Jurisdictional**

Within the Downstream Study Area, five higher-order ephemeral tributaries drain into E-1 or POND-1. If the relevant reach of E-1 is proposed jurisdictional within the Downstream Study Area, then the higher-order stream with contiguous OHWMs connecting to E-1 are also proposed jurisdictional. Each of these tributaries with a contiguous OHWM is presented below and shown in Appendix A, Figure 6 and photographs of typical areas along the tributaries are included in Appendix B.

- **Ephemeral 3 (E-3): Proposed Jurisdictional**

E-3 is a non-RPW, ephemeral tributary within the Downstream Study Area, with a general OHWM from its confluence with E-1 upstream approximately 1,570 feet before losing OHWM definition and transitioning to sheet flow. No water was present in E-3 during the field investigation. The average width of E-3's OHWM, where apparent, is 2.33 feet.

- **Ephemeral 6 (E-6): Proposed Jurisdictional**

E-6 is a non-RPW ephemeral tributary within the Downstream Study Area, with a general OHWM from its confluence with POND-1 upstream approximately 1,550 feet before losing OHWM definition and transitioning to sheet flow. At the time of the field investigation, occasional ponded areas were observed along E-6 resulting from the recent seven-inch rain event, but there were no areas within E-6 where water was flowing. The average width of E-6's OHWM, where apparent, is 17.14 feet.

- **Ephemeral 7 (E-7): Proposed Jurisdictional**

E-7 is a non-RPW ephemeral tributary within the Downstream Study Area, with a general OHWM from its confluence with POND-1 upstream approximately 1,290 feet before losing OHWM definition. At the time of the field investigation, occasional ponded areas were observed along E-7 resulting from the recent seven-inch rain event, but there were no areas within E-7 where water was flowing. The average width of E-7's OHWM, where apparent, is 10.92 feet.

- **Ephemeral 8 (E-8): Proposed Jurisdictional**

E-8 is a non-RPW ephemeral tributary within the Downstream Study Area, with a general OHWM from its confluence with E-6 upstream approximately 4,840 feet before losing OHWM definition. At the time of the field investigation, occasional ponded areas were observed along E-8 resulting from the recent seven-inch rain event, but there were no areas within E-8 where water was flowing. The average width of E-8's OHWM, where apparent, is 6.15 feet.

- **Ephemeral 10 (E-10): Proposed Jurisdictional**

E-10 is a non-RPW ephemeral tributary within the Downstream Study Area, with a general OHWM from its confluence with E-1 upstream approximately 1,390 feet before losing OHWM definition. At the time of the field investigation, occasional ponded areas were observed along E-10 resulting from the recent seven-inch rain event, but there were no areas within E-10 where water was flowing. The average width of E-10's OHWM, where apparent, is 16.13 feet.

#### **5.4 Non-Jurisdictional Drainage Swales**

Drainage swales, erosional drains, small washes, and overland sheet flow features that do not possess contiguous OHWMs, do not have wetland characteristics, and do not carry relatively permanent flows of water are not considered jurisdictional (USACE 2007). Seven non-jurisdictional drainage swales occur within the Project Area and Downstream Study Area. Each Drainage Swale (DS) is presented below from south to north progressing up the watershed on site. The location of each DS is shown in Appendix A,



Figure 6, and photographs of the typical areas along each drainage swale are included in Appendix B.

#### **5.4.1 Drainage Swale 2 (DS-2): Proposed Non-Jurisdictional**

DS-2 connects to E-1 near the southern extent of the Downstream Study Area. Although DS-2 is shown as an intermittent blue-line on the USGS topographic quadrangle map, no field expression of an OHWM or wetland characteristics were apparent in the field.

#### **5.4.2 Drainage Swale 4 (DS-4): Proposed Non-Jurisdictional**

DS-4 connects to E-1 upstream of the point where E-3 connects to E-1 within the southern extent of the Downstream Study Area. DS-4 is shown as an intermittent blue-line on the USGS topographic quadrangle map; however, no field expression of an OHWM or wetland characteristics were observed during field investigations.

#### **5.4.3 Drainage Swale 5 (DS-5): Proposed Non-Jurisdictional**

DS-5 connects to E-1 upstream of the point where E-3 connects to E-1 within the southern extent of the Downstream Study Area. DS-5 is shown as an intermittent blue-line on the USGS topographic quadrangle map; however, no field expression of an OHWM or wetland characteristics were observed during field investigations.

#### **5.4.4 Drainage Swale 11 (DS-11): Proposed Non-Jurisdictional**

DS-11 connects to POND-2 within the Project Area. DS-11 is shown as an intermittent blue-line on the USGS topographic quadrangle map; however, no consistent field expression of an OHWM or wetland characteristics were observed during field investigations.

#### **5.4.5 Drainage Swale 12 (DS-12): Proposed Non-Jurisdictional**

DS-12 connects to POND-2 within the Project Area. DS-12 is shown as an intermittent blue-line on the USGS topographic quadrangle map; however, no consistent field expression of an OHWM or wetland characteristics were observed during field investigations.

#### **5.4.6 Drainage Swale 13 (DS-13): Proposed Non-Jurisdictional**

DS-13 connects to POND-2 within the Project Area. DS-13 is shown as an intermittent blue-line on the USGS topographic quadrangle map; however, no consistent field expression of an OHWM or wetland characteristics were observed during field investigations.

#### **5.4.7 Drainage Swale 14 (DS-14): Proposed Non-Jurisdictional**

DS-14 is a drainage swale that leads approximately 3,500 linear feet north from POND-1 to POND-2 (Burrito Tank). The USGS 7.5-minute topographic quadrangle shows an

intermittent blue-line directed nearly due north upgradient from POND-1 into the retaining wall below POND-2 (Burrito Tank). However, detailed field-recorded topographic surveys show the drainage swale topographic low point from east of Burrito Tank wandering south toward POND-1. As shown in Photo 2 below, the flow line on three or four occasions flows uphill while progressing south (downstream) toward POND-1 and over the course of 3,500 linear feet drops approximately 9.15 feet (from 541 MSL to 533 MSL), most of which is lost in the northernmost 1,000 feet. The southern approximately 2,500 linear feet remain nearly flat at 535 feet above MSL.

The topographic bottom of DS-14 between POND-1 and POND-2 does not contain a contiguous OHWM for the approximate 3,500 linear feet between the open water features. There are locations within the northernmost 1,000 feet where low-lying areas collect water, but no evidence of flow is apparent. Three parallel linear features do not appear to be in line or topographically connected.

No evidence of stormwater exiting POND-2 (Burrito Tank) downgradient to a flow line and further downgradient to POND-1 was observed. This is particularly significant for field investigations immediately following the seven-inch rain event on July 27, 2012. No evidence of surface flow was observed from the lowest elevation at Burrito Tank, the apparent spillway bypass on the eastern terminus of the impoundment berm. As such, DS-14 and POND-2 do not appear to have a surface hydrologic connection downstream to POND-1, E-1, and, ultimately, the Rio Grande, a TNW of the United States.



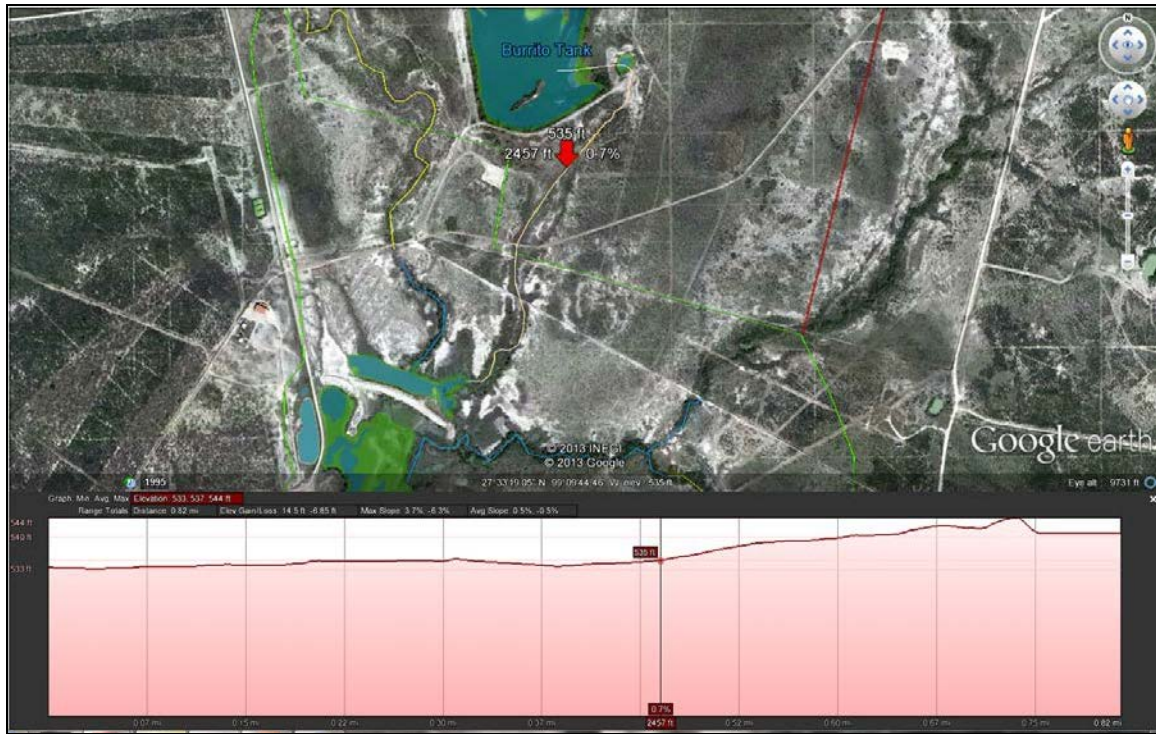
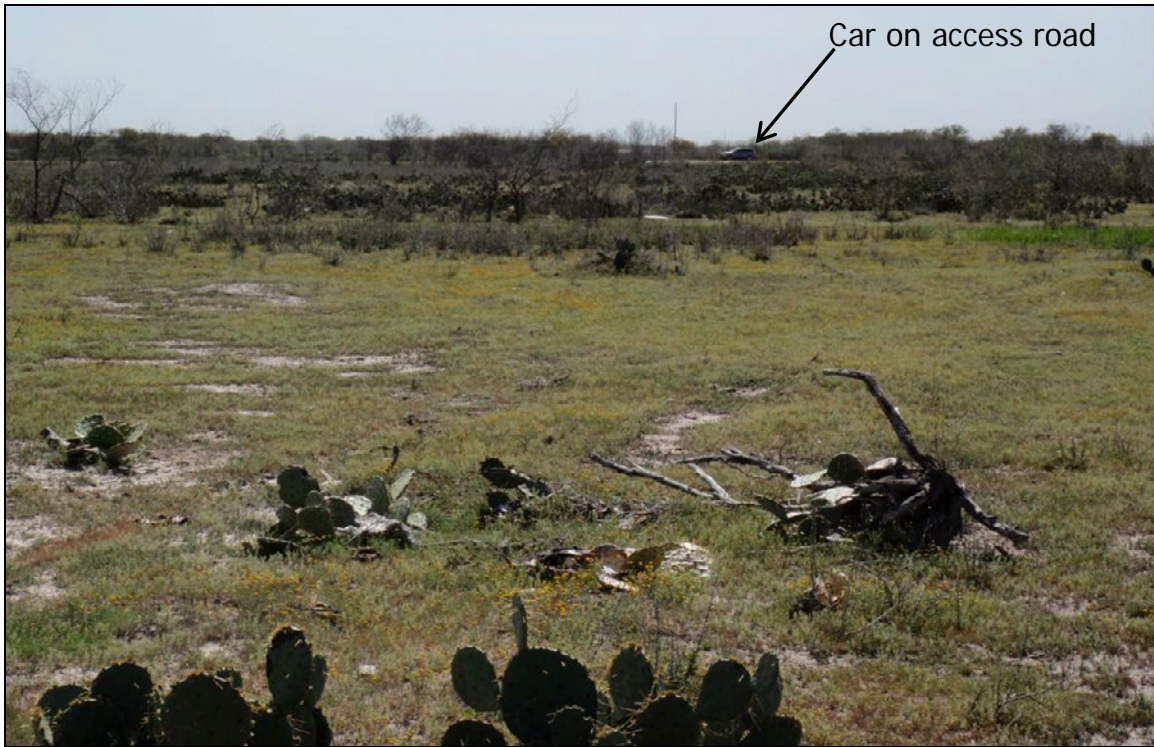


Photo 2: The flow line of DS-14 between POND-1 and POND-2 based on detailed topographic survey.



Photo 3: DS-14-looking north toward Burrito Tank from approximate point of uphill flow line.



*Photo 4: DS-14-looking south from approximate point of most significant uphill flow line. Vehicle visible on road near southern extent of Project Area.*

#### **5.4.8 POND-2: Burrito Tank Open Water / Wetland Complex**

Approximately 38 wetlands investigations were performed within the POND-2 (Burrito Tank) complex. Open water was present in Burrito Tank at the time of the field investigations. The POND-2 complex contains emergent wetland fringe and open water. Field investigations identified 32.7 acres of open water and as many as 10.7 acres of wetland fringe (Appendix A, Figure 6). These acreages may be larger than typical conditions due to the seven-inch rain event immediately prior to investigations. Photographs of typical areas within POND-2 are included in Appendix B and wetland datasheets for POND-2 are included as Appendix E.

#### **DS-14 and POND-2: Significant Nexus Analysis**

##### ***DS-14: Relevant Reach within Project Area***

Drainage Swale 14 (DS-14) within the Project Area (including POND-2) is proposed as non-jurisdictional under Section 404 of the CWA because it has no OHWM within the relative reach and because the tributary is unable to carry pollutants and floodwater downstream to the Rio Grande (approximately 28 aerial miles south and 48 river miles downstream).



Each of the four criteria listed earlier in this report for significant nexus determination is presented below for the relevant reach of DS-14 based on field observations of the functional chemical, physical, and biological integrity of a downstream TNW. A completed jurisdictional form detailing the significant nexus analysis is included in Appendix C for the relevant reach of DS-14 and POND-2.

1. The ability for a tributary/wetland to carry pollutants and floodwater to a TNW:
  - a. The relevant reach of DS-14 does not contain an OHWM and showed no evidence of conveyance of stormwater (pollutants or floodwater) downstream to POND-1. Following the 105-year storm event, there was no evidence of stormwater exiting POND-2 and traveling down DS-14 to POND-1 and
  - b. no flowing water was present along DS-14 during field investigations that included a visit immediately following a seven-inch rain event (which equates to more than 1/3 of the annual rainfall for the area).
2. The ability for a tributary to provide habitat for aquatic species that also live in the TNW:
  - a. DS-14 does not provide aquatic habitat;
  - b. no standing water or dense stands of wetland vegetation were observed within the areas associated with DS-14;
  - c. DS-14 is not likely to support habitat for federally listed species, fish spawn areas, or other environmentally sensitive species; and
  - d. POND-2 may provide some aquatic habitat seasonally, but it has no hydrologic connection downstream to TNW.
3. The ability for a wetland to trap and filter pollutants, and store flood water before reaching TNW:
  - a. DS-14 does not contain wetland features that may trap, filter, or store floodwater and
  - b. POND-2 contains wetland fringe that may provide some ability to trap, filter and store floodwater. However, the likelihood of this floodwater reaching TNW is highly unlikely based on the field investigations following the seven-inch rain event.
4. The ability for a tributary/wetland to maintain water quality of the TNW:
  - a. DS-14 shows no evidence of having any more than an insubstantial or speculative influence on water quality of the respective TNW, the Rio Grande. DS-14 is located in the uppermost headwaters of the Rio Grande Basin (28 miles from the Rio Grande and 1.45 miles from the Nueces River basin).



## 5.5 Isolated Open Water Features

Two isolated, man-made stock tanks within the Downstream Study Area (POND-A, POND-B) and four similarly isolated stock tanks existing within the Project Area (POND-C, POND-D, POND-E and POND-3) appear to have no surface hydrologic connection to or adjacency to a water of the United States. Extensive wetlands investigations were performed within POND-3. POND-3 is an open water pond (5.8 acres) surrounded by potential fringe wetlands (4.4 acres) (Appendix A, Figure 6). Additional wetland datasheets for POND-3 and other areas within the study area are included in Appendix F.

## 6.0 CONCLUSION

Site investigations were completed on the 1,100-acre Project Area and a 1,377-acre Downstream Study Area to provide hydrologic context for the Project Area. Coincidentally, a 105-year-magnitude storm event occurred immediately prior to field investigations. This significant, seven-inch storm event equated to a 105-year magnitude storm and provided one third of the annual rainfall in approximately four hours. This storm event provided extraordinary opportunity to observe how a significant volume of stormwater would behave within the watershed.

Based on desktop review and field investigations, **aci consulting** located six, non-RPW ephemeral tributaries (E-1, E-3, E-6, E-7, E-8, and E-10) and one potentially jurisdictional wetland/open water feature (POND-1). A significant nexus review confirmed the relative reach of E-1 and POND-1 within the Downstream Study Area as potentially contributing to the chemical, physical, and biological integrity of downstream traditionally navigable waters (TNW). Therefore, this relative reach and connecting tributaries with OHWM were determined to likely fall under the jurisdiction of Section 404 of the Clean Water Act.

Numerous non-jurisdictional drainage swales (DS-2, DS-4, DS-5, DS-11, DS-12, DS-13 and DS-14) were observed onsite. These drainage swales expressed no evidence of OHWM or collection of flow. A significant nexus determination was completed for the relative reach of DS-14 between POND-1 and POND-2. The determination found no significant nexus for DS-14 contributing to the chemical, physical, and biological integrity of downstream TNW. This included the POND-2 complex.

Additional isolated, man-made stock tanks were observed that appear to have no surface hydrologic connection to or adjacency with waters of the U.S. These included POND-A, POND-B, POND-C, POND-D, POND-E, POND-2, and POND-3.

Final determination of jurisdiction under Section 404 of the CWA will be coordinated with the USACE Fort Worth office.

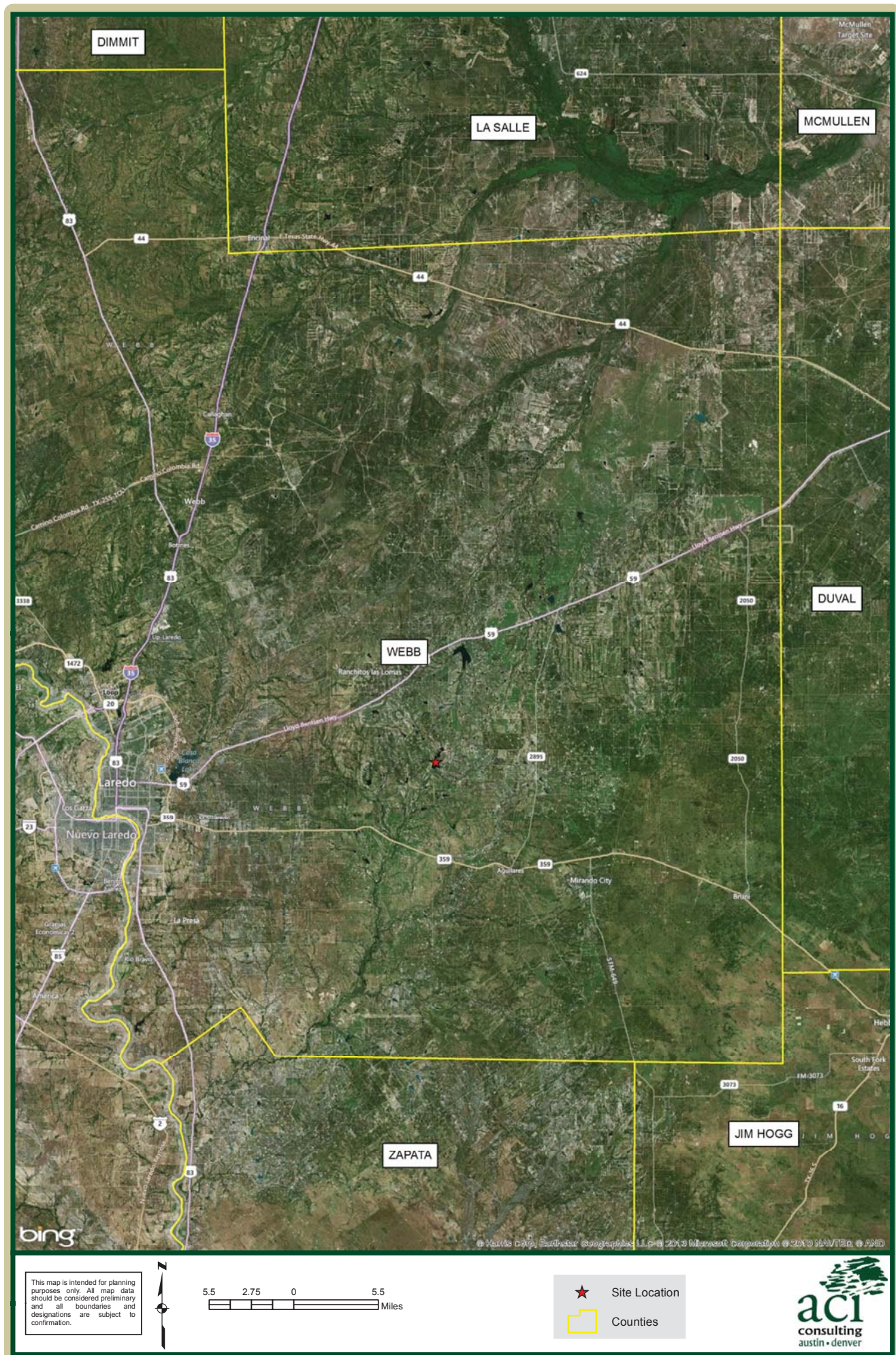
## 7.0 REFERENCES

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## **Appendix A: Site Figures**

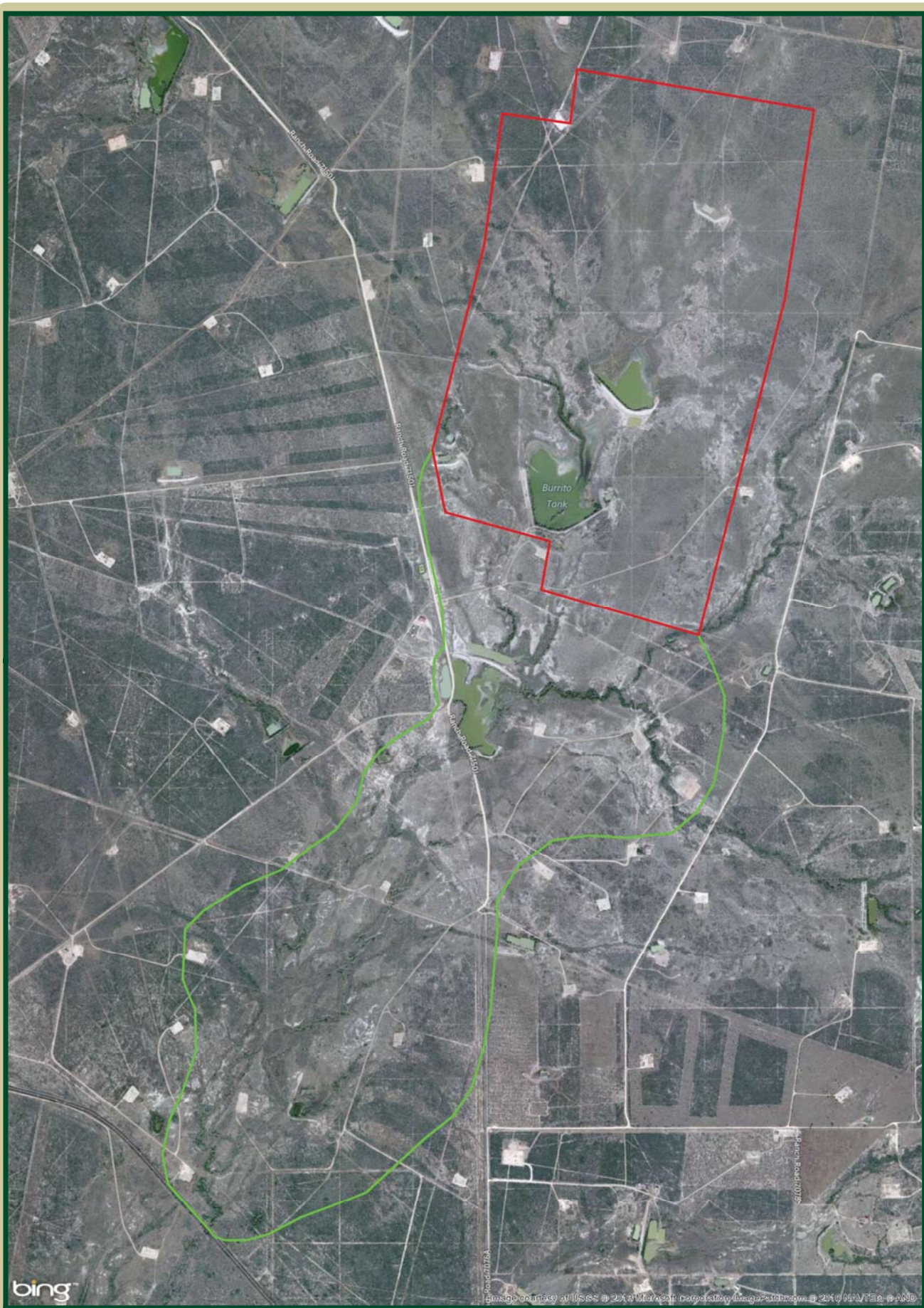
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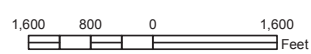
Rancho Viejo Proposed Jurisdictional Waters Report  
 Figure 1: Project Location



March 2013





This map is intended for planning purposes only. All map data should be considered preliminary and all boundaries and designations are subject to confirmation.

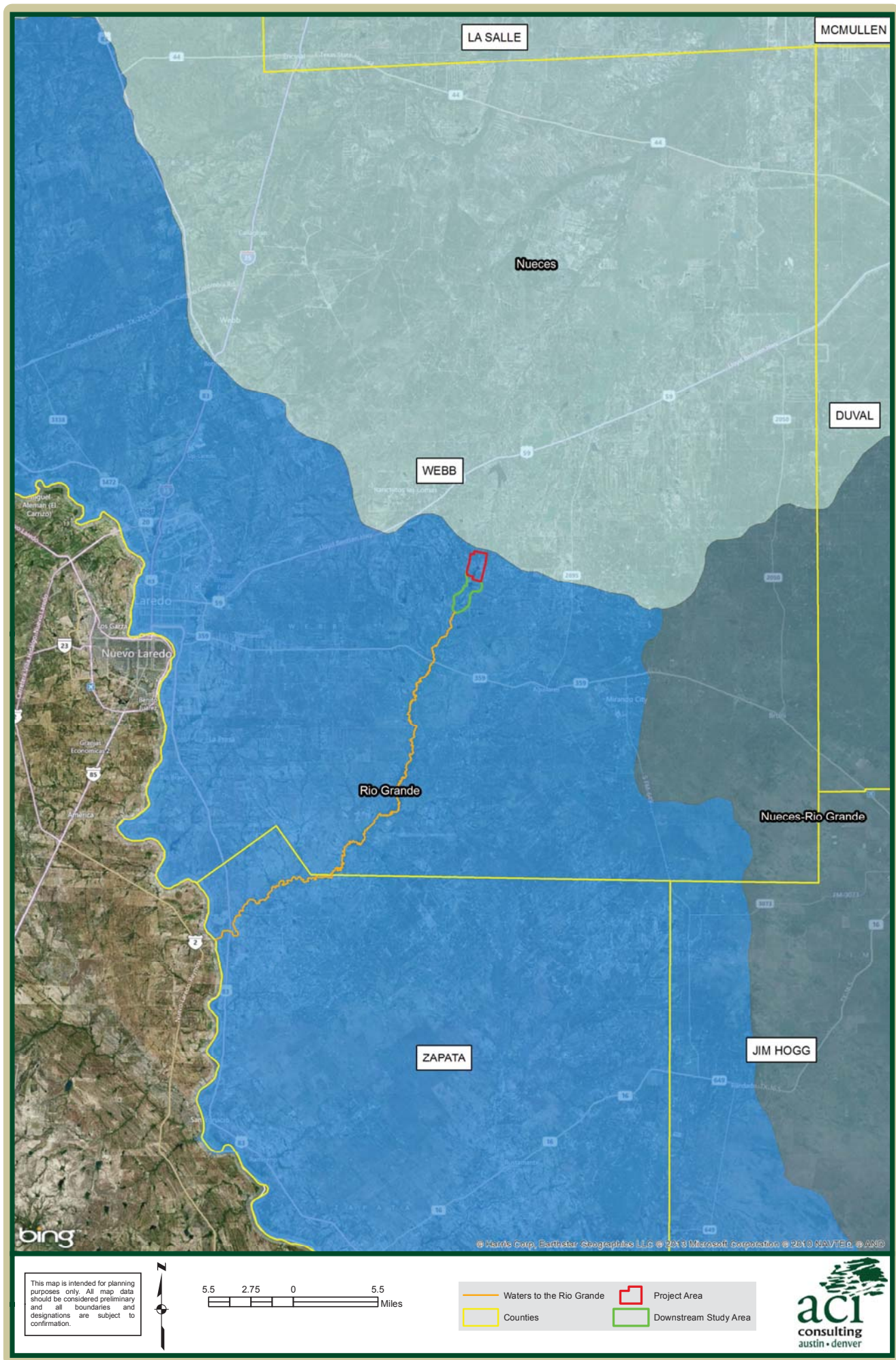


-  Project Area
-  Downstream Study Area



Rancho Viejo Proposed Jurisdictional Waters Report  
 Figure 2: Project Area and Downstream Study Area

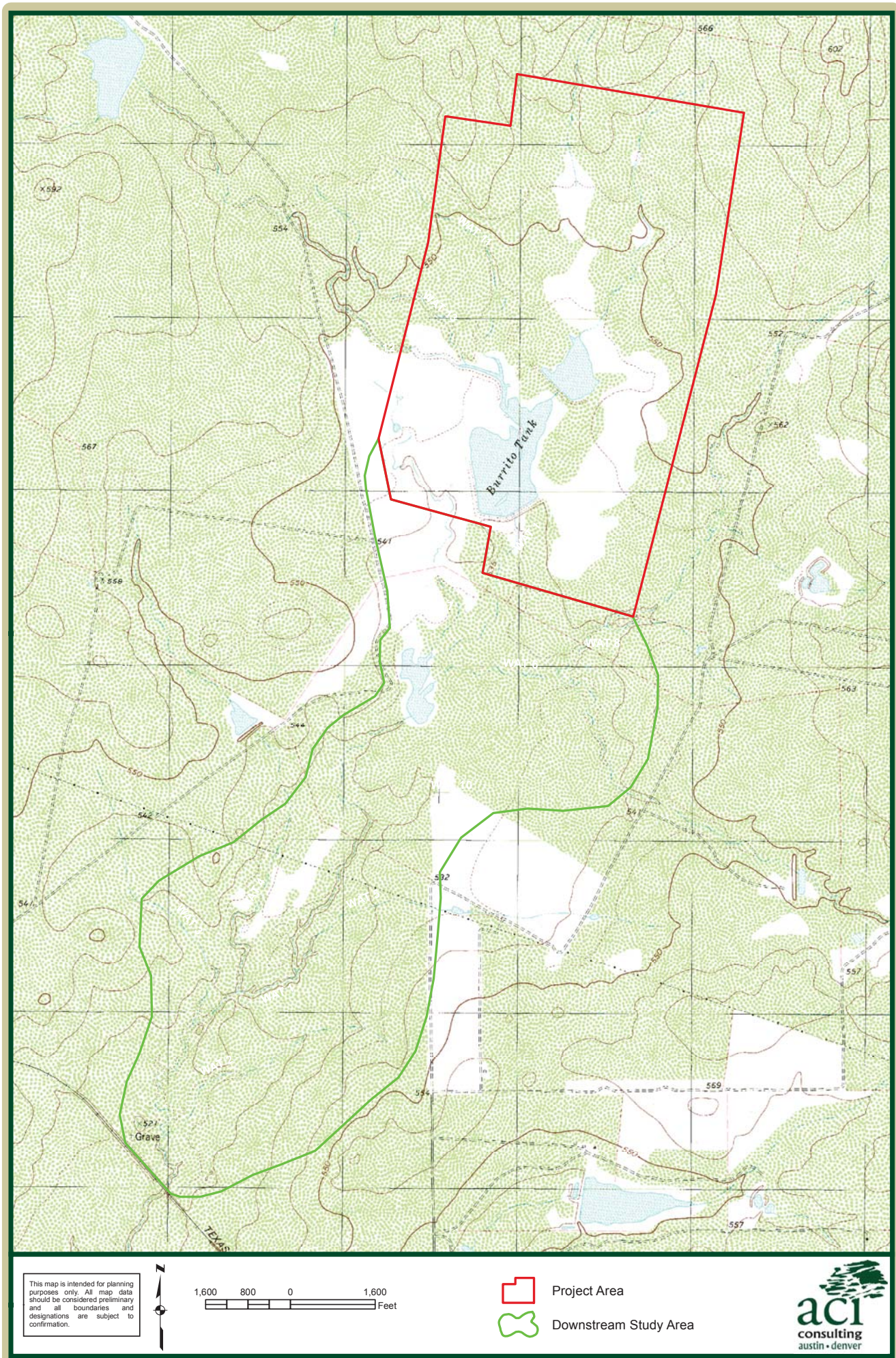




Rancho Viejo Proposed Jurisdictional Waters Report  
 Figure 3: River Basins

March 2013

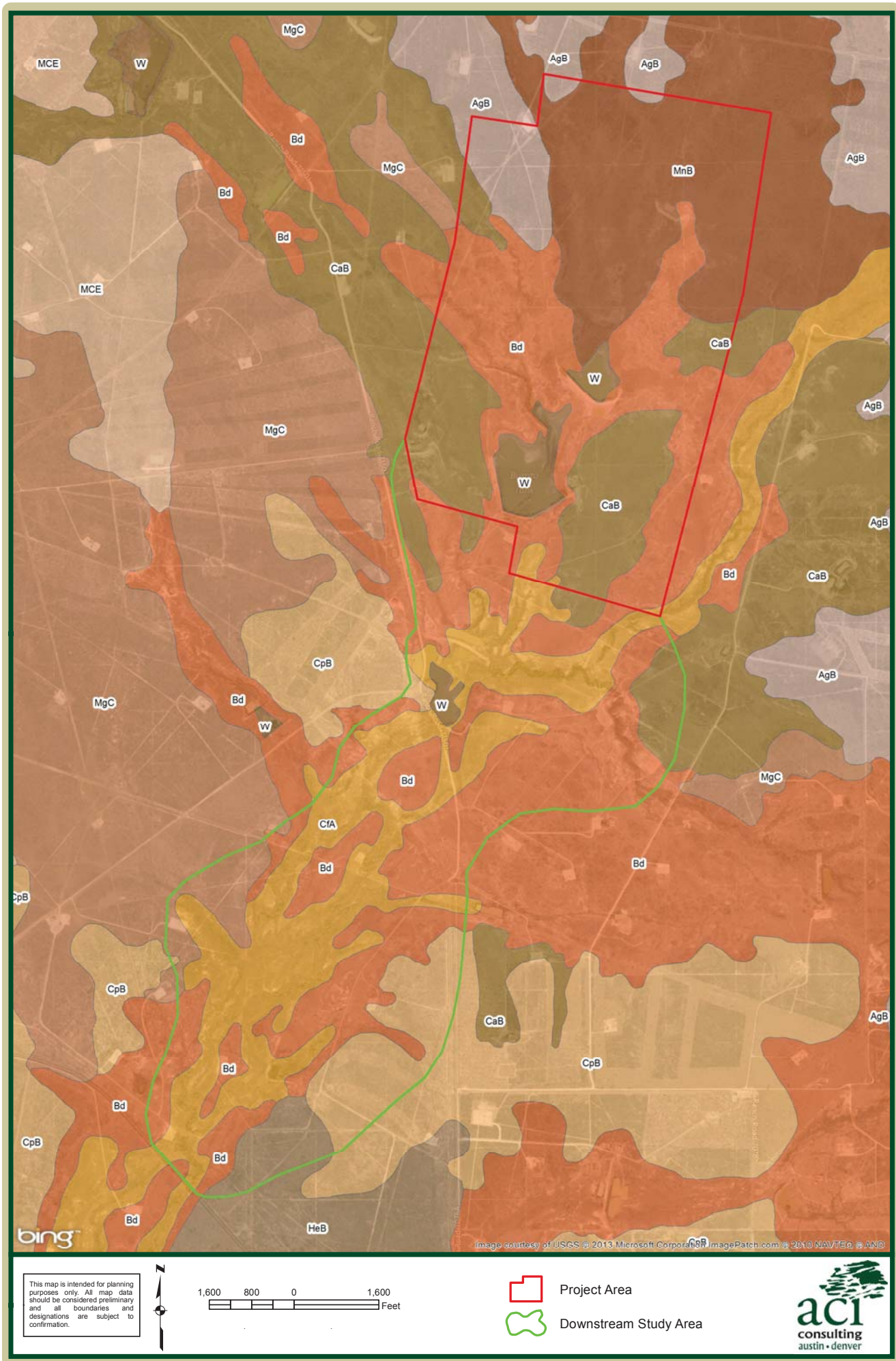




Rancho Viejo Proposed Jurisdictional Waters Report  
Figure 4: Project Area and Downstream Study Area Topographic Map

March 2013

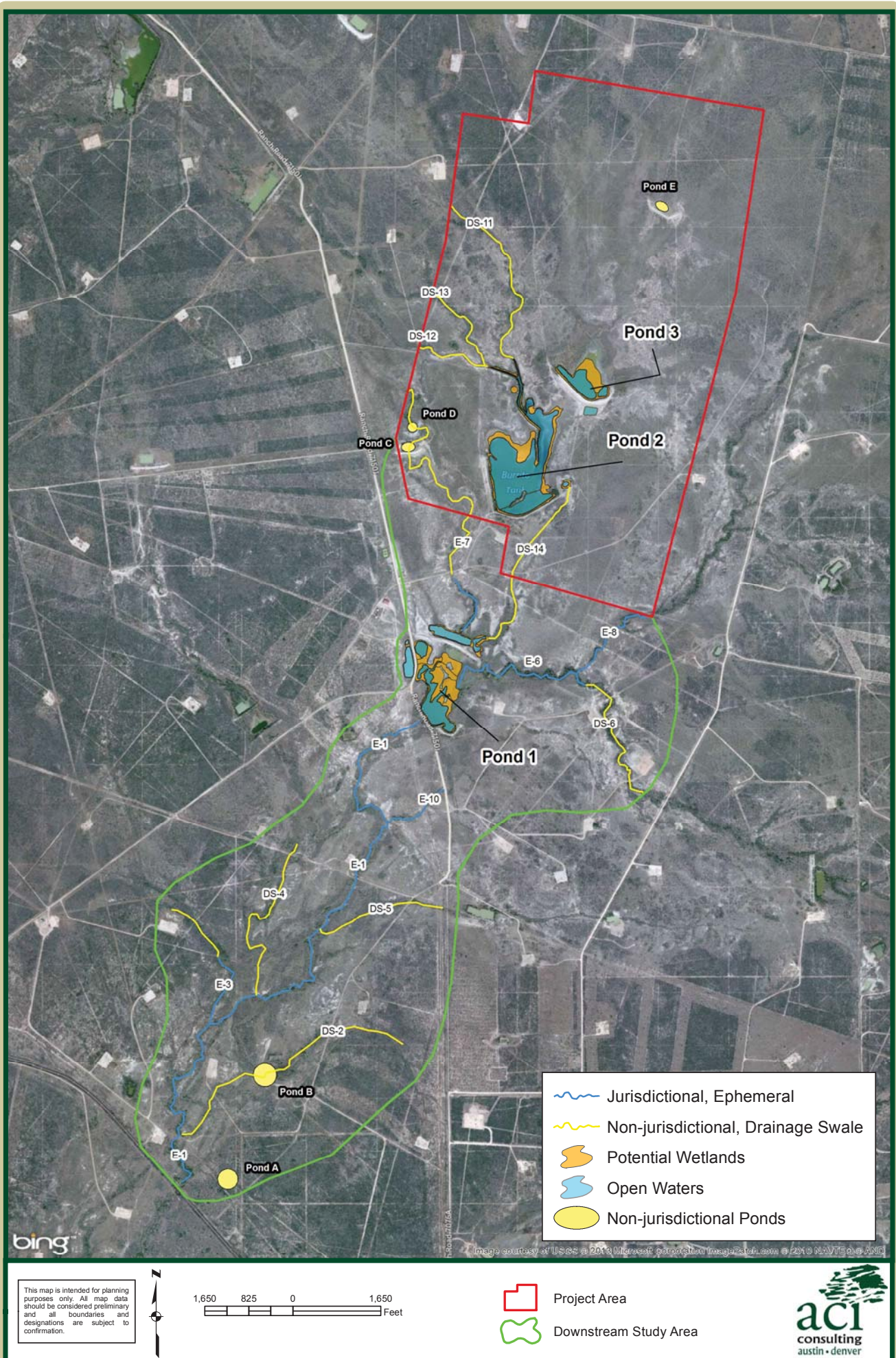




Rancho Viejo Proposed Jurisdictional Waters Report  
Figure 5: Project Area and Downstream Study Area Soils Map

March 2013

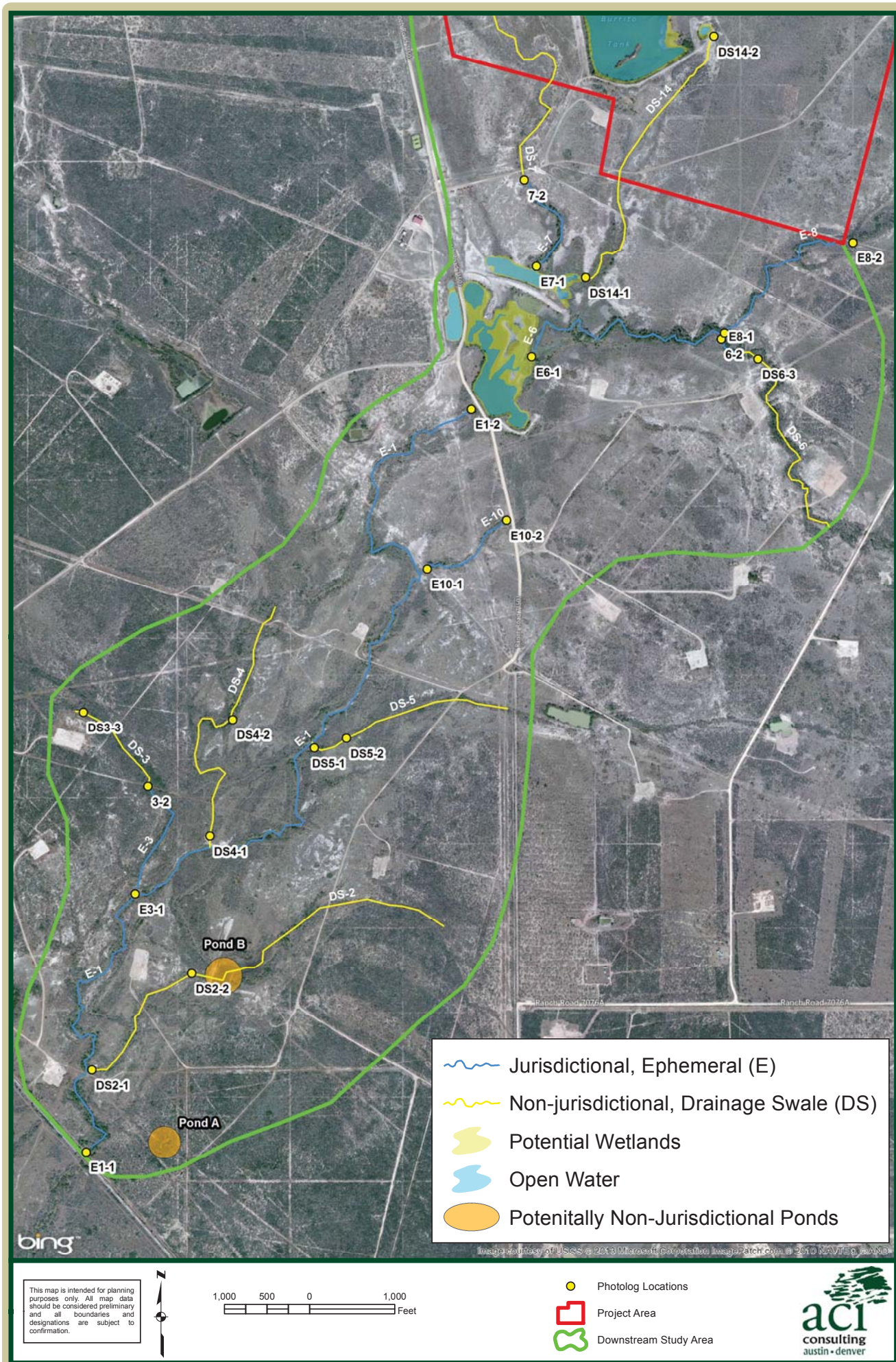




Rancho Viejo Proposed Jurisdictional Waters Report  
 Figure 6: Project Area and Downstream Study Area Waters

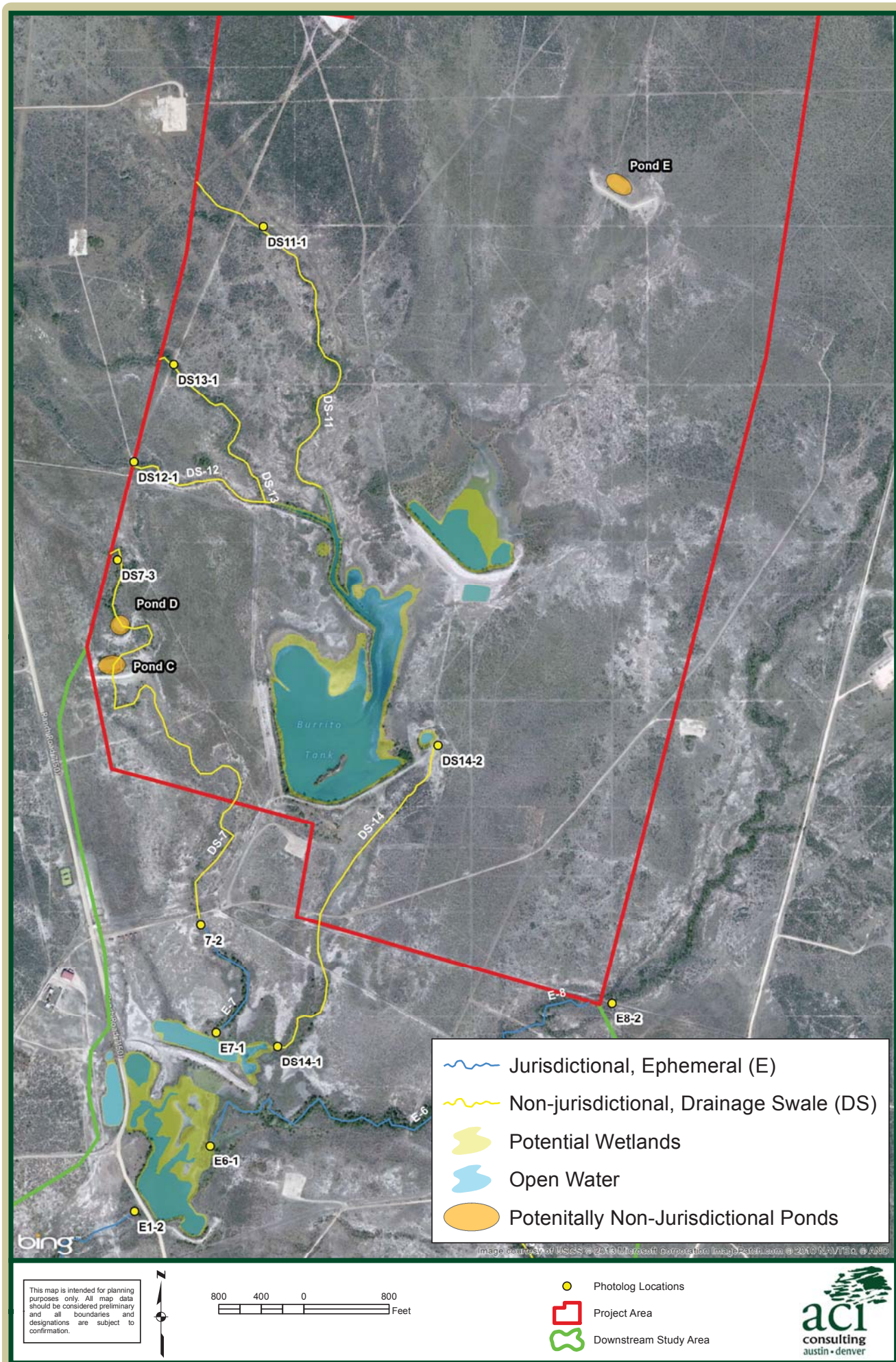
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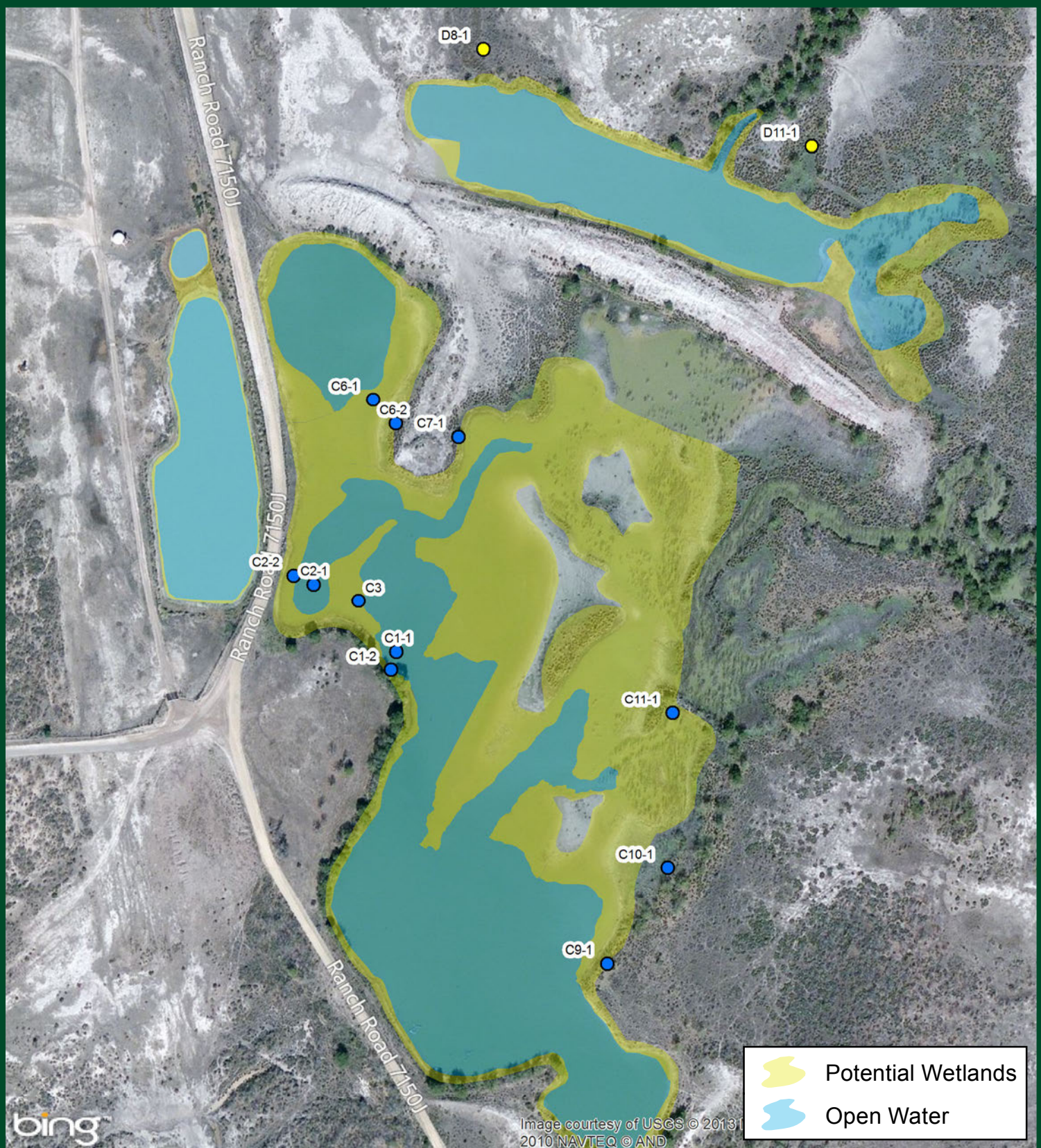
Rancho Viejo  
Figure 7-1: Photolog for the Downstream Study Area





Rancho Viejo  
Figure 7-2: Photolog for the Project Area

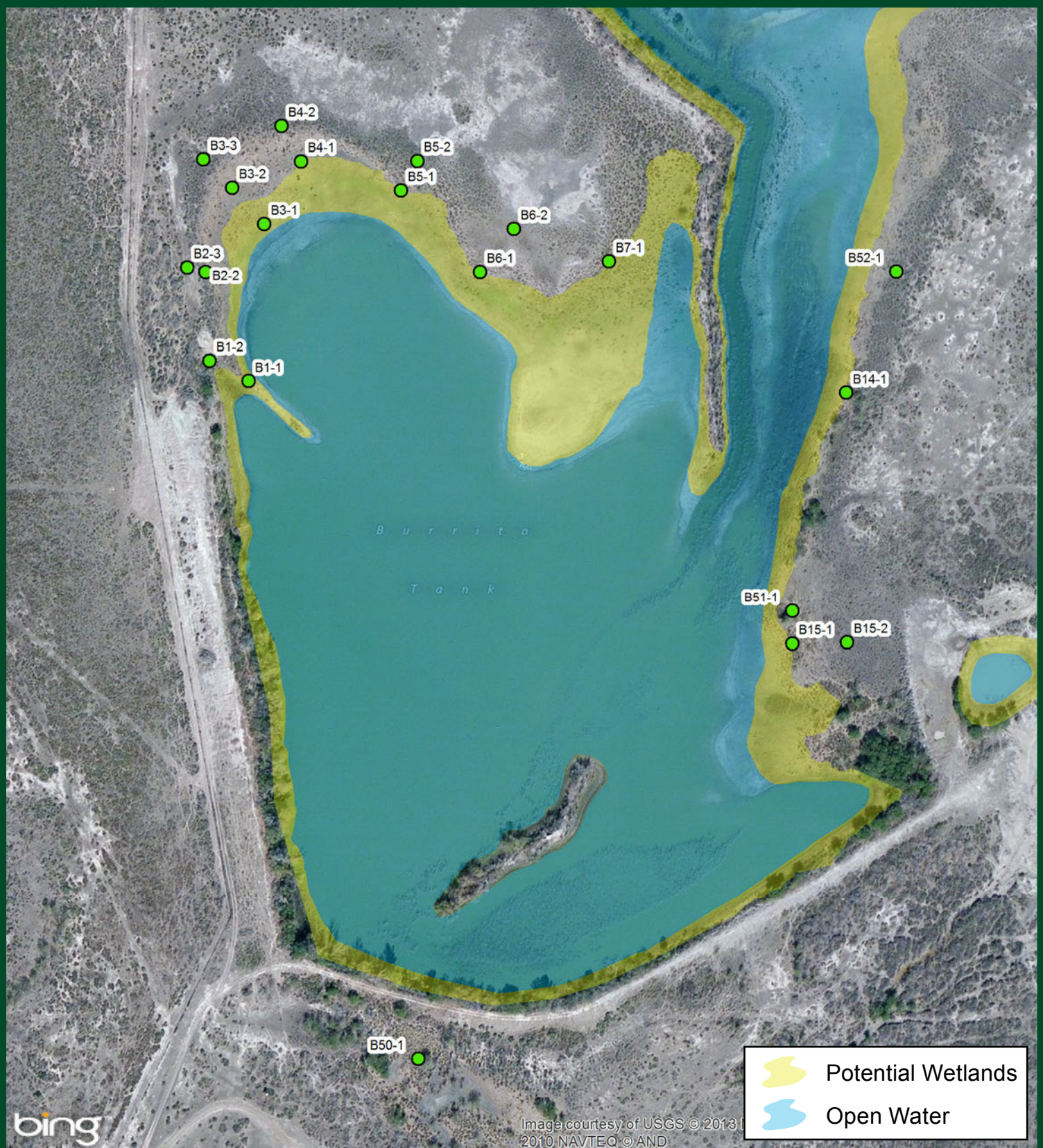




Rancho Viejo  
Figure 7-3: Photolog for Pond-1

March 2013





This map is intended for planning purposes only. All map data should be considered preliminary. All boundaries and designations are subject to confirmation.

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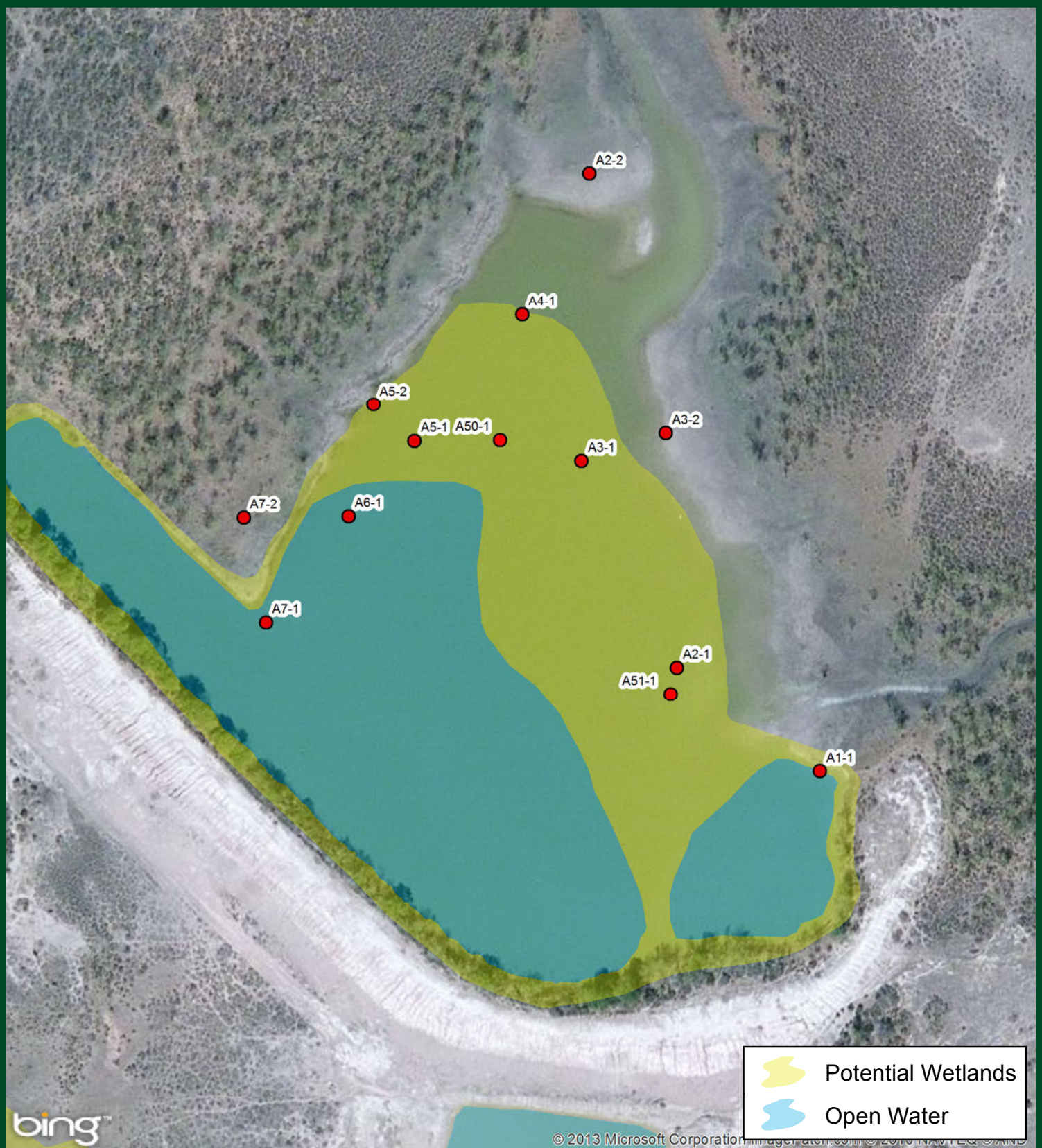
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Rancho Viejo  
Figure 7-4: Photolog for Pond-2





Rancho Viejo  
Figure 7-5: Photolog for Pond-3

March 2013

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**Appendix B:**  
**Photographic Log**

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<i>Rancho Viejo</i>  Date: 8/6/2012	<b>Feature</b>	E-1 Downstream Extent	Photo #: 1
	<b>Description</b>	Ephemeral Stream - Upstream	<b>Direction:</b> Northeast
	<b>Location</b>	E1-1	



<i>Rancho Viejo</i>  Date: 8/6/2012	<b>Feature</b>	E-1 Downstream Extent (1-1)	Photo #: 2
	<b>Description</b>	Ephemeral Stream -Downstream	<b>Direction:</b> Southwest
	<b>Location</b>	E1-1	



<i>Rancho Viejo</i>  Date: 8/7/2012	<b>Feature</b>	E-1 Upstream Extent	Photo #: 3
	<b>Description</b>	Pond-1, berm showing	<b>Direction:</b> Northeast
	<b>Location</b>	E1-2	



<i>Rancho Viejo</i>  Date: 8/7/2012	<b>Feature</b>	E-1 Upstream Extent	Photo #: 4
	<b>Description</b>	Ephemeral Stream -Downstream	<b>Direction:</b> Southwest
	<b>Location</b>	E1-2	





<i>Rancho Viejo</i> <b>Date:</b> 8/6/2012	<b>Feature</b>	DS-2 – Downstream Extent	Photo #: 5
	<b>Description</b>	Confluence with E-1	<b>Direction:</b> Northeast
	<b>Location</b>	DS2-1	



<i>Rancho Viejo</i> <b>Date:</b> 8/6/2012	<b>Feature</b>	DS-2 – Downstream Extent	Photo #: 6
	<b>Description</b>	Confluence with E-1	<b>Direction:</b> West
	<b>Location</b>	DS2-1	





<i>Rancho Viejo</i> <b>Date:</b> 8/6/2012	<b>Feature</b>	DS-2 – along undefined drainage	Photo #: 7
	<b>Description</b>	Drainage Swale, Upstream	<b>Direction:</b> Northeast
	<b>Location</b>	DS2-2	



<i>Rancho Viejo</i> <b>Date:</b> 8/6/2012	<b>Feature</b>	DS-2 – along undefined drainage	Photo #: 8
	<b>Description</b>	Drainage Swale, Downstream	<b>Direction:</b> Southwest
	<b>Location</b>	DS2-2	





<i>Rancho Viejo</i>	<b>Feature</b>	E-3 Downstream Extent	Photo #: 9
	<b>Description</b>	Ephemeral Stream, Upstream	<b>Direction:</b> North
	<b>Location</b>	E3-1	
<b>Date:</b> 8/6/2012			



<i>Rancho Viejo</i>	<b>Feature</b>	E-3 Downstream Extent	Photo #: 10
	<b>Description</b>	Ephemeral Stream, Downstream	<b>Direction:</b> South
	<b>Location</b>	E3-1	
<b>Date:</b> 8/6/2012			





<i>Rancho Viejo</i>  <b>Date:</b> 8/9/2012	<b>Feature</b>	Upper Extent E-3, Transition to Drainage Swale (DS-3)	Photo #: 11
	<b>Description</b>	Ephemeral Stream, Downstream	<b>Direction:</b> Southeast
	<b>Location</b>	DS3-2	



<i>Rancho Viejo</i>	<b>Feature</b>	DS-3 Transition of E-3 to Non JD Drainage (DS-3)	Photo #: 12
	<b>Description</b>	Drainage Swale, Upstream	<b>Direction:</b> North
	<b>Location</b>	DS3-2	
<b>Date:</b> 8/9/2012			





<i>Rancho Viejo</i> <b>Date:</b> 8/9/2012	<b>Feature</b>	DS-3 Further Upstream	Photo #: 13
	<b>Description</b>	Drainage Swale, Upstream	<b>Direction:</b> Northwest
	<b>Location</b>	DS3-3	



<i>Rancho Viejo</i> <b>Date:</b> 8/9/2012	<b>Feature</b>	DS-3 Further Upstream	Photo #: 14
	<b>Description</b>	Drainage Swale, Downstream	<b>Direction:</b> Southeast
	<b>Location</b>	DS3-3	





<i>Rancho Viejo</i>  <b>Date:</b> 8/9/2012	<b>Feature</b>	DS-4 Downstream Extent	Photo #: 15
	<b>Description</b>	Drainage Swale, Upstream	<b>Direction:</b> Northwest
	<b>Location</b>	DS4-1	



<i>Rancho Viejo</i>  <b>Date:</b> 8/9/2012	<b>Feature</b>	DS-4 Downstream Extent	Photo #: 16
	<b>Description</b>	Drainage Swale, Downstream	<b>Direction:</b> Southeast
	<b>Location</b>	DS4-1	





<i>Rancho Viejo</i>  <b>Date:</b> 8/9/2012	<b>Feature</b>	DS-4 Further Upstream	Photo #: 17
	<b>Description</b>	Drainage Swale, Upstream	<b>Direction:</b> North
	<b>Location</b>	DS4-2	



<i>Rancho Viejo</i>  <b>Date:</b> 8/9/2012	<b>Feature</b>	DS-4 Further Upstream	Photo #: 18
	<b>Description</b>	Drainage Swale, Downstream	<b>Direction:</b> Southwest
	<b>Location</b>	DS4-2	





<i>Rancho Viejo</i>  <b>Date:</b> 8/9/2012	<b>Feature</b>	DS-5 Downstream Extent	Photo #: 19
	<b>Description</b>	Drainage Swale, Upstream	<b>Direction:</b> Northeast
	<b>Location</b>	DS5-1	



<i>Rancho Viejo</i>  <b>Date:</b> 8/9/2012	<b>Feature</b>	DS-5 Downstream Extent	Photo #: 20
	<b>Description</b>	Drainage Swale, Downstream	<b>Direction:</b> Southwest
	<b>Location</b>	DS5-1	





<i>Rancho Viejo</i>  Date: 8/9/2012	<b>Feature</b>	DS-5 Further Upstream	Photo #: 21
	<b>Description</b>	Drainage Swale, Upstream	<b>Direction:</b> Northeast
	<b>Location</b>	DS5-2	



<i>Rancho Viejo</i>  Date: 8/9/2012	<b>Feature</b>	DS-5 Further Upstream	Photo #: 22
	<b>Description</b>	Drainage Swale, Downstream	<b>Direction:</b> Southwest
	<b>Location</b>	DS5-2	





<i>Rancho Viejo</i>	<b>Feature</b>	E-10 Downstream Extent	Photo #: 23
	<b>Description</b>	Ephemeral Stream, Upstream	<b>Direction:</b> Northeast
	<b>Location</b>	E10-1	
<b>Date:</b> 8/9/2012			



<i>Rancho Viejo</i>	<b>Feature</b>	E-10 Downstream Extent	Photo #: 24
	<b>Description</b>	Ephemeral Stream, Downstream	<b>Direction:</b> Southwest
	<b>Location</b>	E10-1	
<b>Date:</b> 8/9/2012			





<i>Rancho Viejo</i>	<b>Feature</b>	E-10 Upstream Extent	Photo #: 25
	<b>Description</b>	Ephemeral Stream, Upstream	<b>Direction:</b> Northeast
	<b>Location</b>	E10-2	

Date: 8/9/2012



<i>Rancho Viejo</i>	<b>Feature</b>	E-10 Upstream Extent	Photo #: 26
	<b>Description</b>	Ephemeral Stream, Downstream	<b>Direction:</b> Southwest
	<b>Location</b>	E10-2	

Date: 8/9/2012





<i>Rancho Viejo</i>  <b>Date:</b> 8/8/2012	<b>Feature</b>	E-6 Downstream Extent	Photo #: 27
	<b>Description</b>	Ephemeral Stream, Upstream	<b>Direction:</b> Northeast
	<b>Location</b>	E6-1	



<i>Rancho Viejo</i>  <b>Date:</b> 8/8/2012	<b>Feature</b>	E-6 Downstream Extent	Photo #: 28
	<b>Description</b>	Ephemeral Stream, Downstream	<b>Direction:</b> Southwest
	<b>Location</b>	E6-1	





Rancho Viejo Date: 8/8/2012	Feature	Upper Extent of E-6, Transition to Drainage Swale (DS-6)	Photo #: 29
	Description	Ephemeral Stream, Downstream	Direction: Northwest
	Location	DS6-2	



Rancho Viejo Date: 8/8/2012	Feature	Transition of E-6 to Drainage Swale (DS-6)	Photo #: 30
	Description	Drainage Swale, Upstream	Direction: Southeast
	Location	DS6-2	





<i>Rancho Viejo</i>	<b>Feature</b>	DS-6 Further Upstream	Photo #: 31
	<b>Description</b>	Drainage Swale, Upstream	<b>Direction:</b> Southeast
	<b>Location</b>	DS6-3	
<b>Date:</b> 8/8/2012			



<i>Rancho Viejo</i>	<b>Feature</b>	DS-6 Further Upstream	Photo #: 32
	<b>Description</b>	Drainage Swale, Downstream	<b>Direction:</b> Northwest
	<b>Location</b>	DS6-3	
<b>Date:</b> 8/8/2012			





<i>Rancho Viejo</i>  <b>Date:</b> 8/7/2012	<b>Feature</b>	E-7 Downstream Extent	Photo #: 33
	<b>Description</b>	Ponded Water From POND-1 Visible	<b>Direction:</b> Northeast
	<b>Location</b>	E7-1	



<i>Rancho Viejo</i>  <b>Date:</b> 8/7/2012	<b>Feature</b>	E-7 Downstream Extent	Photo #: 34
	<b>Description</b>	Ponded Water From Pond-1 Visible	<b>Direction:</b> South
	<b>Location</b>	E7-1	





<i>Rancho Viejo</i>	<b>Feature</b>	Upper Extent of E-7, Transition to Drainage Swale (DS-7)	Photo #: 35
	<b>Description</b>	Ephemeral Stream, Downstream	<b>Direction:</b> Southeast
	<b>Location</b>	aci consulting	
<b>Date:</b> 8/7/2012			



<i>Rancho Viejo</i>	<b>Feature</b>	Transition of E-7 to Drainage Swale (DS-7)	Photo #: 36
	<b>Description</b>	Drainage Swale, Upstream	<b>Direction:</b> Northwest
	<b>Location</b>	aci consulting	
<b>Date:</b> 8/7/2012			





<i>Rancho Viejo</i>  Date: 8/8/2012	<b>Feature</b>	E-8 Downstream Extent	Photo #: 37
	<b>Description</b>	Ephemeral Stream, Upstream	<b>Direction:</b> Northwest
	<b>Location</b>	E8-1	



<i>Rancho Viejo</i>  Date: 8/8/2012	<b>Feature</b>	E-8 Downstream Extent,	Photo #: 38
	<b>Description</b>	Ephemeral Stream, Downstream	<b>Direction:</b> Southwest
	<b>Location</b>	E8-1	





<i>Rancho Viejo</i>  <b>Date:</b> 8/21/2012	<b>Feature</b>	E-8 Further Upstream	Photo #: 39
	<b>Description</b>	Ephemeral Stream, Upstream	<b>Direction:</b> North
	<b>Location</b>	E8-2	



<i>Rancho Viejo</i>  <b>Date:</b> 8/21/2012	<b>Feature</b>	E-8 Further Upstream	Photo #: 40
	<b>Description</b>	Ephemeral Stream, Downstream	<b>Direction:</b> South
	<b>Location</b>	E8-2	





<i>Rancho Viejo</i>  Date: 8/21/2012	<b>Feature</b>	DS-14 Downstream Extent	Photo #: 41
	<b>Description</b>	Ponded water within Pond-1 Visible	<b>Direction:</b> West
	<b>Location</b>	DS14-1	



<i>Rancho Viejo</i>  Date: 8/21/2012	<b>Feature</b>	DS-14 Upstream Extent	Photo #: 42
	<b>Description</b>	Drainage Swale, Upstream	<b>Direction:</b> North
	<b>Location</b>	DS14-2	



Rancho Viejo Date: 8/21/2012	<b>Feature</b>	DS-12 Farther Upstream	Photo #: 43
	<b>Description</b>	Drainage Swale, Upstream	<b>Direction:</b> West
	<b>Location</b>	DS12-1	



Rancho Viejo Date: 8/21/2012	<b>Feature</b>	DS-12 Farther Upstream	Photo #: 44
	<b>Description</b>	Drainage Swale, Downstream	<b>Direction:</b> East
	<b>Location</b>	DS12-1	





<i>Rancho Viejo</i> Date: 8/21/2012	<b>Feature</b>	DS-13 Farther Upstream	Photo #: 45
	<b>Description</b>	Drainage Swale, Upstream	<b>Direction:</b> Northwest
	<b>Location</b>	DS13-1	



<i>Rancho Viejo</i> Date: 8/21/2012	<b>Feature</b>	DS-13 Farther Upstream	Photo #: 46
	<b>Description</b>	Drainage Swale, Downstream	<b>Direction:</b> Southeast
	<b>Location</b>	DS13-1	





<i>Rancho Viejo</i>  <b>Date:</b> 8/21/2012	<b>Feature</b>	DS-11 Farther Upstream	Photo #: 47
	<b>Description</b>	Drainage Swale, Upstream	<b>Direction:</b> Northwest
	<b>Location</b>	DS11-1	



<i>Rancho Viejo</i>  <b>Date:</b> 8/21/2012	<b>Feature</b>	DS-11 Farther Upstream	Photo #: 48
	<b>Description</b>	Drainage Swale, Downstream	<b>Direction:</b> Southeast
	<b>Location</b>	DS11-1	





<i>Rancho Viejo</i>  <b>Date:</b> 8/21/2012	<b>Feature</b>	Pond-1	Photo #: 49
	<b>Description</b>	Wetland – Tank	<b>Direction:</b> North
	<b>Location</b>	C1-1	



<i>Rancho Viejo</i>  <b>Date:</b> 8/21/2012	<b>Feature</b>	Pond-1	Photo #: 50
	<b>Description</b>	Wetland – Tank	<b>Direction:</b> North
	<b>Location</b>	C1-2	





<i>Rancho Viejo</i> <b>Date:</b> 8/21/2012	<b>Feature</b>	Pond-1	Photo #: 51
	<b>Description</b>	Wetland – Tank	<b>Direction:</b> East
	<b>Location</b>	C2-1	



<i>Rancho Viejo</i> <b>Date:</b> 8/21/2012	<b>Feature</b>	Pond-1	Photo #: 52
	<b>Description</b>	Wetland – Toward Tank	<b>Direction:</b> East
	<b>Location</b>	C2-2	





<i>Rancho Viejo</i>  <b>Date:</b> 8/21/2012	<b>Feature</b>	Pond-1	Photo #: 53
	<b>Description</b>	Wetland – Away from tank	<b>Direction:</b> West
	<b>Location</b>	C2-2	



<i>Rancho Viejo</i>  <b>Date:</b> 8/21/2012	<b>Feature</b>	Pond-1	Photo #: 54
	<b>Description</b>	Soil	<b>Direction:</b> -
	<b>Location</b>	C2-2	



<i>Rancho Viejo</i>  <b>Date:</b> 8/10/2012	<b>Feature</b>	Pond-1	Photo #: 55
	<b>Description</b>	Wetland – Tank	<b>Direction:</b> Northeast
	<b>Location</b>	C3	



<i>Rancho Viejo</i>  <b>Date:</b> 8/21/2012	<b>Feature</b>	Pond-1	Photo #: 56
	<b>Description</b>	Wetland – Tank	<b>Direction:</b> West
	<b>Location</b>	C6-1	





<i>Rancho Viejo</i> <b>Date:</b> 8/21/2012	<b>Feature</b>	Pond-1	Photo #: 57
	<b>Description</b>	Wetland – Tank	<b>Direction:</b> West
	<b>Location</b>	C6-2	



<i>Rancho Viejo</i> <b>Date:</b> 8/21/2012	<b>Feature</b>	Pond-1	Photo #: 58
	<b>Description</b>	Wetland – Tank	<b>Direction:</b> East
	<b>Location</b>	C7-1	



<i>Rancho Viejo</i>  <b>Date:</b> 8/21/2012	<b>Feature</b>	Pond-1	Photo #: 59
	<b>Description</b>	Wetland – Toward tank	<b>Direction:</b> Northwest
	<b>Location</b>	C9-1	



<i>Rancho Viejo</i>  <b>Date:</b> 8/21/2012	<b>Feature</b>	Pond-1	Photo #: 60
	<b>Description</b>	Wetland – Away from tank	<b>Direction:</b> Southeast
	<b>Location</b>	C9-1	