

Figura 6. Trayectos recorridos para la identificación de la flora y fauna.

Los cuadrados representan los trayectos recorridos en el área A, cerca del río Grande de Loíza y a lo largo de la quebrada. Los círculos representan los trayectos del área B, en la planicie donde ubica el potrero y plataformas de las cabañas que existieron como parte de la pasada actividad recreativa. Las líneas entrecortadas con cuadrados representan los trayectos recorridos por las partes más altas de la propiedad (las colinas), del área C.



Figura 7. La zarza *Mimosa ceratonia*, bejuco que domina en gran parte de la propiedad sobre otras herbáceas y arbustos

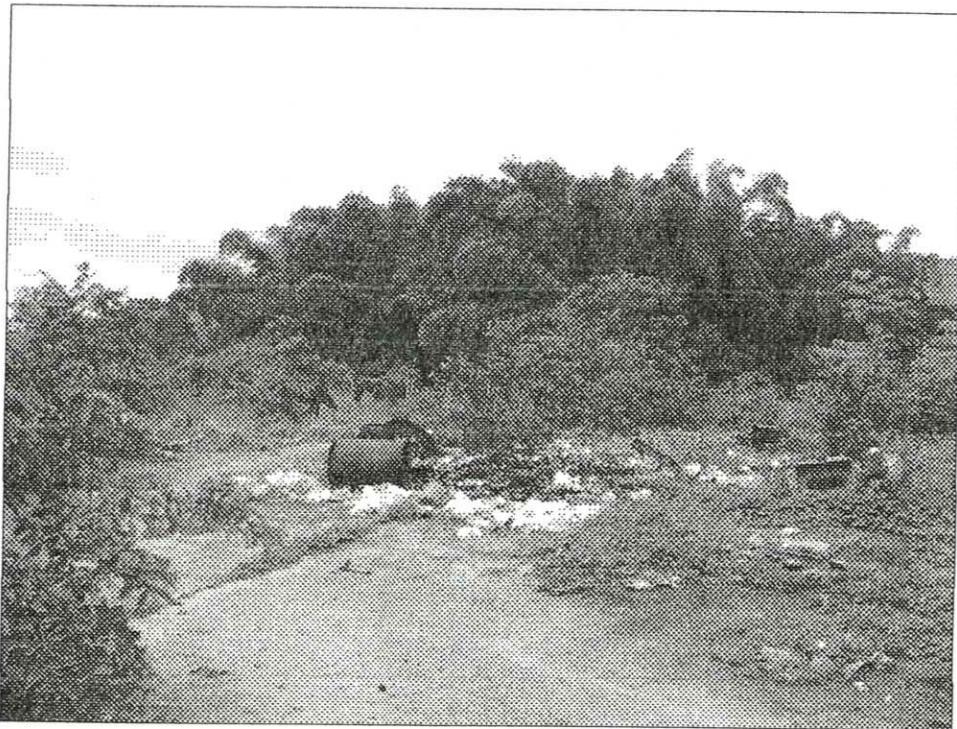


Figura 8. Vista parcial de la planicie con remanentes de cemento del área recreativa. Al fondo se observa la colindancia con la quebrada cubierta por bambú, y algunos caballos pastando

CERTIFICACION

Yo, María Luisa Rivera-Vázquez bióloga, certifico que he preparado el Estudio de Flora y Fauna para el proyecto residencial Alborada del Río localizado en el municipio de Gurabo, y que la información que el mismo contiene es cierta, correcta y completa, a mi mayor saber y entender. Afirmo y reconozco las consecuencias de incluir y someter información incompleta, inconclusa o falsa en dicho documento.

Y para que así conste, firmo la presente certificación en Bayamón, Puerto Rico, hoy **miércoles, 16 de octubre de 2002.**



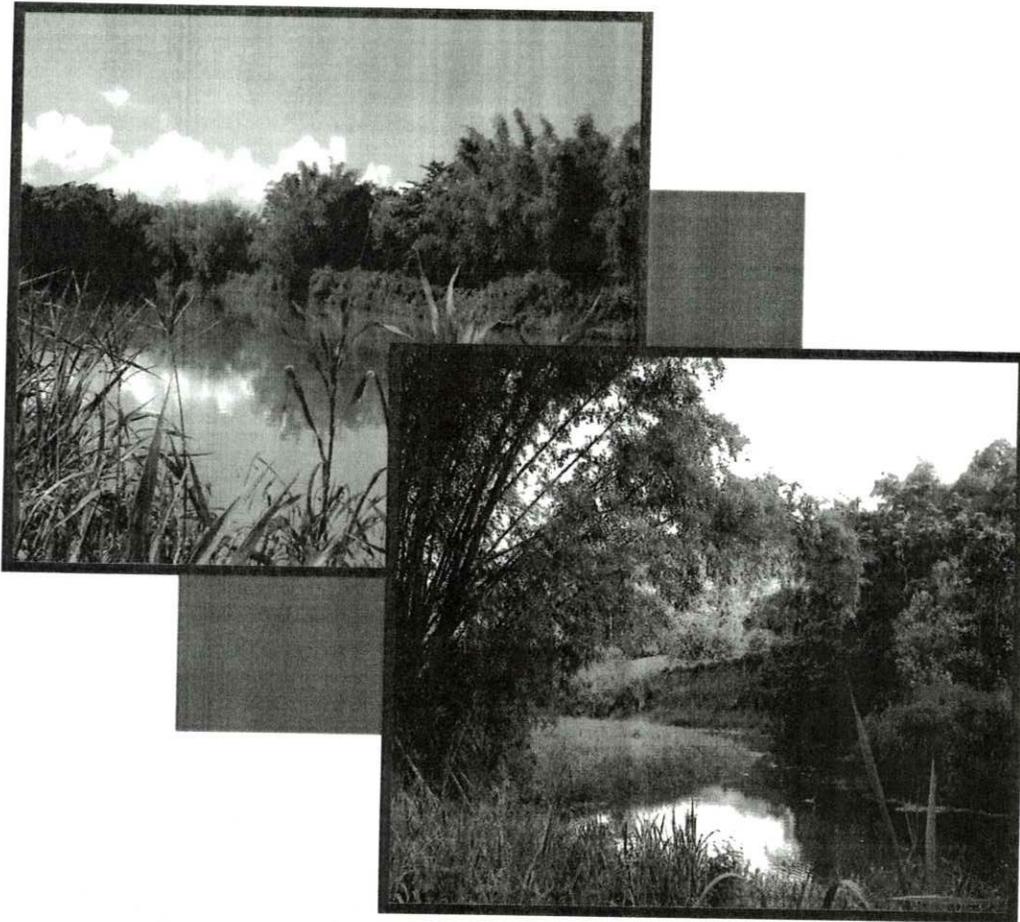
María Luisa Rivera-Vázquez, MS

ANEJO 2
Resultado de la Prueba de Bombeo

ANEJO 3
Determinación Jurisdiccional de Humedal

Wetland Jurisdictional Determination

Alborada del Río Project
Road PR-941 Km. 2.7, Celada Ward, Gurabo, Puerto Rico



Prepared for:

Mr. José Martínez
PO Box 1689
Trujillo Alto, PR 00977

Prepared by:

Servicios Científicos y Técnicos, Inc.
RR-9 Box 1722
San Juan, PR 00926-9736

December 2004

Table of Contents

	Page
1.0 Introduction	1
2.0 Location and Topography	3
3.0 Methods	3
3.1 Transects and Sampling Points	4
4.0 Results	4
4.1 Vegetation	4
4.2 Hydrology	5
4.3 Soils	6
4.4 Atypical Situations or Problem Areas	7
5.0 Conclusion	7
6.0 Literature Cited	8
Appendices	9
1. Figures	
2. Data Forms	
3. Photographic Record	
4. Permission for USACE Personnel to enter the property	

List of Figures

Figure 1. Site Location on the Topographic Map

Figure 2. Site Location on the 2002 Satellite Image

Figure 3. Site Location on the Flood Map

Figure 4. Site Location on the Soils Map

Figure 5. Transects and Sampling Points Location

Figure 6. Preliminary Wetland Delineation and Sampling Points

Figure 7. Preliminary Wetland Delineation

1.0 Introduction

The purpose of this study was to identify the waters of the United States of America (USA) present within the property proposed for the Alborada del Río project at Celada Ward in the Municipality of Gurabo. In order to identify the waters of the USA, the proponent, Mr. José Martínez, hired Servicios Científicos y Técnicos to perform a Jurisdictional Determination (JD) for the site.

The term “waters of the United States of América” is defined in 33 CFR 328.3 and includes a variety of water bodies such as lakes, rivers, streams (including intermittent streams), mudflats, wetlands, prairies, potholes, wet meadows, beach lakes, natural and, in some cases, artificial ponds.

Wetlands are a subset of the waters of the United States of America. Section 404 of the Clean Water Act defines a wetland as an area that is inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

The identification of wetlands, regulated by the U.S. Army Corps of Engineers (Corps) under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, is physically performed through a process known as a JD. The JD process establishes a line (delineation) which separates and identifies the Corps regulated wetland areas from non-wetland (upland) areas, which are not regulated by the Corps.

This report includes all the issues required by the Public Notice of the Antilles Regulatory Section, published in October 12, 2001. According to the Public Notice, all requests for verification of JDs performed by landowners and private consultants in Puerto Rico and the U.S. Virgin Islands must be made in writing and, as a minimum, must include the following information:

- ❖ **Name, address and phone numbers of current property owner(s) and authorized agent (if applicable):** This information is included in the portrait of the report.
- ❖ **A description of the parcel:** This information is included in Section 2.0 of the report (Location and Topography).
- ❖ **Permission for the Corps personnel to enter the property:** A permission letter is included as Appendix 4 of the report.
- ❖ **An accurate location map and concise directions on how to get to the property:** The physical address of the site is included in the portrait of the report. Various figures included in Appendix 1 illustrate the location.
- ❖ **Plan, aerial photo, map or sketch showing the jurisdictional boundary line:** Appendix 1 includes a 2002 Satellite Image illustrating the jurisdictional boundary as well as the property boundaries.
- ❖ **Area of review if different from property boundary:** The area of review is within the property boundaries.
- ❖ **Name of waterways:** Grande de Loíza River (Lake Carraízo) lies at the west limit and an unnamed stream runs through the north portion.
- ❖ **Latitude and longitude (Center of the property):** The Latitude and Longitude of the center of this property are X: 66.01 and Y: 18.27.
- ❖ **Aerial photographs (should be the latest available and must be as clear as possible):** The report includes a 2002 Satellite Image, which is used in several figures presented in Appendix 1.
- ❖ **Reference Information:** Available official references were used for the study. The resources used for the figures (like maps) are presented in Section 6.0 of the report (Literature Cited).
- ❖ **Approximate total acreage of the site:** The site has an approximate area of 44.16 acres.
- ❖ **Data forms for uplands and wetlands of various points in the property:** Nine data forms are included in Appendix 2 of the report.
- ❖ **General climatological condition at the time of the evaluation:** All visits presented a sunny to cloudy weather.

2.0 Location and Topography

The study area is located at road PR-941 km 2.7, Celada Ward, Municipality of Gurabo, Puerto Rico. The site is limited to the north by Tairona Cattle Ranch, to the east and south by a terrain property of Mr. Urrutia, and with Grande de Loíza River (Lake Carraízo) to the west. An unnamed stream, tributary to the Grande de Loíza River runs through the north portion of the property. This JD covers all the property, which have an approximate area of 44.16 acres.

The study area is located at the Gurabo-Juncos Valley. The topography of the area presents hills, plains and depressions, with higher elevations observed at the south and east portions. The higher elevation at the site is about 109 meters, while the lowest is about 44 meters above the mean sea level (MSL).

Figure 1 presents the property boundaries in the Topographic Map of the Gurabo Quadrangle. Figure 2 presents the site location on a 2002 Satellite Image. Both figures are part of Appendix 1.

3.0 Methods

This JD was conducted following the guidelines and procedures recommended in the Corps of Engineers Wetlands Delineation Manual (Technical Report Y-87-1, 1987). The On-site Inspection of the Routine Determination Method was the selected approach to perform it. The field work was conducted on October and November 2004.

Official publications were consulted to observe the physiographic conditions of the site. For example, the study area was located at the Topographic Map of the Gurabo Quadrangle, the 2002 Satellite Image and Sheet 27 of the Soil Survey of San Juan Area of Puerto Rico.

3.1 Transects and Sampling Points

Nine sampling points within five transects were assessed for vegetation, hydrology and soils. The selected location for each sampling point was based on the characteristics of the site, in such way that the information collected represents the different plants, hydrologic conditions and soils at the study site. Flags were staked in the field to mark sampling points. Additional observations were made to determine wetland boundaries.

Figure 5 presents the location of transects and sampling points within the property boundaries. Appendices 2 and 3, respectively, include the field data forms and a photographic record of the soil pits and surrounding areas at most sampling points.

4.0 Results

4.1 Vegetation

Hydrophytic vegetation is defined as the sum of the total macrophyte plant life growing in water, soil or on substrate that is at least periodically deficient in oxygen as a result of excessive water content. Vegetation in wetlands consists of one or more plant associations. Therefore, it is mandatory to consider plant species dominance, among other things, to determine if a particular area is dominated by hydrophytic vegetation.

The property presents various strata within different plant communities. However, selected sampling sites were mostly dominated by herbaceous strata. Sampling points near the unnamed creek presented trees and saplings strata. Dominant plant species were selected independently from each plant community. The relative dominance was measured by the greatest percentage of aerial cover.

For this wetland determination, vegetation samples were inspected visually. Some species and photos were taken to the Department of Natural and Environmental Resources herbarium and the International Institute of Tropical Forestry, for expert identification.

The 1988 and 1996 National Lists of Plants Species that Occur in Wetlands for the Caribbean Region were used to identify the indicators of wetland vegetation. Indicators for wetland vegetation were represented by 3 OBL (*Mimosa casta*, *Myrsia splendens* and *Dieffenbachia seguine*), 7 FACW (*Brachiaria arrecta*, *Brachiaria purpurascens*, *Impomoea alba*, *Impomoea setifera*, *Panicum laxum*, *Eriochloa polystachya* and *Paspalum virgatum*) and 6 FAC (*Adiantum latifolium*, *Commelina diffusa*, *Casearia guianensis*, *Guarea guidonea*, *Roystonea borinquena* and *Inga laurina*). Only 3 FACU plants (*Urochloa maxima*, *Faramea occidentalis* and *Guapira fragrans*) represented the upland categories. Specific vegetation observed at each sampling point is included on the field data forms (Appendix 2).

4.2 Hydrology

Wetland hydrology refers to the presence of water either above the soil or within the soil for a prolonged period of time during the year. Plants development and soils formation are directly influenced by wetland hydrology.

Grande de Loíza River (Lake Carraízo) and the unnamed creek are the water bodies leading the hydrology at the site. The general drainage of the area is from south to north. The river basin and flood prone areas within the site are shown in Figure 3. Most of the site comprises topographic contours higher than the river and creek water levels and flood beds, as well as steep topography. No hydrology indicators were found on sampling points near the water bodies.

Because sampling points 4.1, 4.2 and 5.1 are within depressions between higher elevations, saturated soils were found on them. Free water was also found on the soil pits of these sampling points.

Sampling point 2.1, an atypical situation, presented free water on soil pit as well. This sampling point is subject to manure and used water deposits from a small cattle ranch operating within the site.

4.3 Soils

According to the Soil Survey of the San Juan Area of Puerto Rico (Sheet 27), there are two different soils mapped in the study area (AaC- Aceitunas clay 5 to 12% slopes and CaE- Caguabo clay loam 20 to 40% slopes). Both soils are well drained and have moderate permeability.

In order to determine locations for the soil samplings, a visual assessment of the area was performed with the guidance of the soil map (Figure 4). Soil pits were made on both soils. The soils around the two water bodies surrounding the site (Grande de Loíza River (Lake Carraízo) at west and the unnamed creek at north) were sampled for wetland indicators. Other points were traced to sample soils on depressions formed between higher elevations (northern portion) or hills (southeastern portion).

Moist soils occur on sampling points located near Grande de Loíza River (Lake Carraízo) and the unnamed creek. Hydric soils indicators (sulfidic odor, aquic moisture regime, reducing conditions and gleyed colors) were found on sampling points 4.1, 4.2 and 5.1.

None of the soils were included on the Hydric Soils List for the San Juan Area. Therefore, no data was found about hydric inclusions or saturation criteria within the soils.

4.4 Atypical Situations or Problem Areas

An atypical situation was found on sampling point 2.1. Free water on the soil pit and saturated soils, as well as hydrophytic vegetation, were positive indicators at the sampling point. However, hydric conditions are created because the area is subject to manure and used water deposits from a small cattle ranch operating within the site. No other atypical situations or problem areas were found.

5.0 Conclusion

As a result of the study, three sampling points were positive for wetland indicators. Reduced soils and saturation, as well as free water on soil pits, were found on sampling points 4.1, 4.2 and 5.1 due to topographic depressions located between higher elevations. According to these findings, Figure 7 presents the preliminary wetland delineation for the study area over a 2002 Satellite Image.

At sampling point 2.1, free water on the soil pit and saturated soils, as well as hydrophytic vegetation, were positive indicators. However, the area in which the sampling point lies is subject to manure and used water deposits from a small cattle ranch operating within the site. The situation creates hydric conditions on soils and vegetation. The closest water association (Grande de Loíza River (Lake Carraízo)) is about 300 feet to the west of this sampling point.

Although moist soils occur at sampling points near the water bodies, no hydric soils or hydrology indicators were found. As Grande de Loíza River is one of Puerto Rico's biggest water bodies, the areas near the river tend to be dynamic and could be subject to flooding. Flooding events could change actual conditions on those areas. However, no construction activities are proposed within those areas; 25 meters adjacent to the river and 20 meters adjacent to the creek were proposed as buffer zones.

6.0 Literature Cited

- Boccheciamp, R. A. (1978). Soil Survey of San Juan Area of Puerto Rico. U.S. Department of Agriculture. Soil Conservation Service. (Sheet Number 27).
- Más, E. G. and C. García. (1990). Guía Ilustrada de Yervas Comunes en Puerto Rico. Servicio de Extensión Agrícola. Universidad de Puerto Rico, Recinto Universitario de Mayagüez.
- Munsell Soil Color Charts. (2000). Revised Washable Edition. GretagMacbeth. New York.
- Reed, P. B., Jr. (1988). National List of Plants Species that Occur in Wetlands: Caribbean (Region C). U.S. Fish and Wildlife Service.
- Reed, P. B., Jr. (1996). Revision to the National List of Plants Species that Occur in Wetlands: Caribbean (Region C). Supplement to Biological Report 88 (26.12). U.S. Fish and Wildlife Service.
- Soil Conservation Service. (1993). Hydric Soils of the Caribbean Area: In Cooperation with the National Technical Committee for Hydric Soils. Revised Edition of the List of Hydric Soils.
- U.S. Army Corps of Engineers. (1987). Corps of Engineers Wetland Delineation Manual. Technical Report Y-87-1. Environmental Laboratory, Department of the Army, Waterways Experimental Station. Washington, D.C.

Appendices

DATA FORM
 ROUTINE WETLAND DETERMINATION
 (1987 COE Wetlands Delineation Manual)

Project/Site: <u>Alborada del Rio / Celada Ward</u> Applicant/Owner: <u>José Martínez</u> Investigator: <u>Elbys Rios / Eduardo Cabrera</u>	Date: <u>4/nov/2004</u> County: <u>Gurabo</u> State: <u>Puerto Rico</u>
Do Normal Circumstances exist on the site? <input checked="" type="radio"/> Yes <input type="radio"/> No Is the site significantly disturbed (Atypical Situation)? Yes <input type="radio"/> No <input type="radio"/> Is the area a potential Problem Area? Yes <input type="radio"/> No <input type="radio"/> (If needed, explain on reverse.)	Community ID: _____ Transect ID: <u>1</u> Plot ID: <u>1</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Mimosa casta</u>	<u>H</u>	<u>OBL</u>	9. _____		
2. <u>Ipomoea setifera</u>	<u>H</u>	<u>FACW</u>	10. _____		
3. <u>Eriochloa polystachya</u>	<u>H</u>	<u>FACwt</u>	11. _____		
4. <u>Panicum laxum</u>	<u>H</u>	<u>FACW</u>	12. _____		
5. <u>Urochloa maxima</u>	<u>H</u>	<u>FACU-</u>	13. _____		
6. _____			14. _____		
7. _____			15. _____		
8. _____			16. _____		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 4/5 = 80%

Remarks: _____

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>N/A</u> (in.) Depth to Free Water in Pit: <u>N/A</u> (in.) Depth to Saturated Soil: <u>N/A</u> (in.)	Remarks: _____

SOILS

Map Unit Name
(Series and Phase): Caguabo clay loam (CaE) Drainage Class: WD

Taxonomy (Subgroup): _____ Field Observations
Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	10YR-5/3			loamy sand

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks: moist soil

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes <input checked="" type="radio"/> No <input type="radio"/> (Circle)	(Circle)
Wetland Hydrology Present?	Yes <input type="radio"/> No <input checked="" type="radio"/>	
Hydric Soils Present?	Yes <input type="radio"/> No <input checked="" type="radio"/>	
		Is this Sampling Point Within a Wetland? Yes <input type="radio"/> No <input checked="" type="radio"/>
Remarks:		

Approved by H&USACE 3/92

DATA FORM
 ROUTINE WETLAND DETERMINATION
 (1987 COE Wetlands Delineation Manual)

Project/Site: <u>Alborada del Río/Celada Ward</u> Applicant/Owner: <u>José Martínez</u> Investigator: <u>Ellys Ríos/Eduardo Cabrera</u>	Date: <u>4/Nov/2004</u> County: <u>Gurabo</u> State: <u>Puerto Rico</u>
Do Normal Circumstances exist on the site? <input checked="" type="radio"/> Yes <input type="radio"/> No Is the site significantly disturbed (Atypical Situation)? <input type="radio"/> Yes <input type="radio"/> No Is the area a potential Problem Area? <input type="radio"/> Yes <input type="radio"/> No (If needed, explain on reverse.)	Community ID: _____ Transect ID: <u>1</u> Plot ID: <u>2</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Mimosa casta</u>	<u>H</u>	<u>OBL</u>	9. _____	_____	_____
2. <u>Ipemoea alba</u>	<u>H</u>	<u>FACW</u>	10. _____	_____	_____
3. <u>Gouania polygama</u>	<u>H</u>	<u>NI</u>	11. _____	_____	_____
4. <u>Paspalum virgatum</u>	<u>H</u>	<u>FACW-</u>	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-1): 3/3 = 100%

Remarks: _____

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>N/A</u> (in.) Depth to Free Water in Pit: <u>N/A</u> (in.) Depth to Saturated Soil: <u>N/A</u> (in.)	Remarks: <u>Grande de Loíza River (Lake Carraízo) was about 10 ft to the west of the sampling point. However, no hydrology indicators were found.</u>

SOILS

Map Unit Name
(Series and Phase): Aceitunas clay (AAC) Drainage Class: WD

Taxonomy (Subgroup): _____ Field Observations
Confirm Mapped Type? Yes No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	10YR-5/4			clay loam

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks: moist soils occur on the sampling point.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	<input checked="" type="radio"/> Yes <input type="radio"/> No (Circle)	Is this Sampling Point Within a Wetland? Yes <input checked="" type="radio"/> No
Wetland Hydrology Present?	Yes <input type="radio"/> No <input checked="" type="radio"/> (Circle)	
Hydric Soils Present?	Yes <input type="radio"/> No <input checked="" type="radio"/> (Circle)	

Remarks: Grande de Loiza River (Lake Carraizo) was about 10 ft to the west of the sampling point. However, no soil or hydrology indicators were found.