

Soil Survey Resource Report for Rio Grande Canalization Project River Restoration Implementation Plan

Soil Survey Resource Report for Rio Grande Canalization Implementation Plan August 2010

Prepared for:

U.S. International Boundary and Water Commission
4171 N. Mesa
El Paso, Texas 79902

Prepared by:

TRC
Austin, Texas

EXECUTIVE SUMMARY

Soil surveys were conducted at Restoration Sites 1-10 and 17-30 (25 sites, totaling 458.1 acres). In the study area, the most common soil type is the Agua variant, comprising approximately 50% of the soils. Agua variant is somewhat poorly drained with a loamy surface and sandy subsoil, and the depth to a water table ranges from 12 to 42 inches. Major limitations are salinity, wetness, and poor drainage. The next most common is Brazito, comprising approximately 40% of the area. Brazito is well drained, with a sandy surface and sandy subsoil and does not have a water table within 60 inches. The major limitations are rapid permeability, very low water holding capacity and unfavorable rooting zone below a depth of 10-15 inches. The last major soil type is the Belen variant, comprising approximately 10% of the area. Belen variant is poorly drained with a clayey surface and subsoil. It is the only soil mapped that is largely clay. Belen soils are intermixed with Agua soils in this area. The major limitations are salinity, wetness, and poor drainage. Anapra clay loam was also identified on one site, but comprises a small area. Anapra is a deep, well drained soil. The major limitation is moderate available water holding capacity.

Agua soils dominate in the southern part of the project area. Agua variant soils, moderately wet, are mapped on sites 7, 18, 20 to 26, and 28 to 30. Brazito soils occur mostly in the northern part of the project area. Brazito loamy fine sand is mapped on sites 3, 4, 5, 6, 8, 17, and 19. Agua variant and Belen variant soils are mapped on sites 9 and 27. Site 10 is Brazito very fine sand, thick surface. Site 2 is Anapra clay loam.

None of the restoration sites were dominated by salt tolerant vegetation that indicated severe salinity issues. All sites except Site 27 had a variety of plant types. Sites with water tables less than 36 inches below the surface normally had 50 to 80 percent or greater cover of grasses, forbs, and woody species. Vegetative cover was usually less than 50 percent when the depth to the water table was greater than 42 inches. Sites without a water table within 60 inches were mostly bare ground with scattered woody species and grass and forb cover of 5 to 35 percent. Where vegetation was sparse the main limitation is the lack of water. Analysis of the vegetation present and the salt prediction test data indicates salinity issues will not be a severe problem for vegetative establishment on most of the restoration sites. Sites 9, 17, 27, and 30 have both soil and vegetative indicators indicating salinity levels need additional investigation.

The primary vegetation types proposed to be planted as part of the restoration plan are trees (willows and cottonwoods), longstem riparian shrubs, and grasses. The Agua variant, Brazito, and Anapra clay loam soils would all be suitable for those plantings. However, the Belen variant soils are clayey and are less likely to be suitable for the trees and shrubs. The Brazito soils tend to have a deeper water table and may require more supplemental irrigation.

PREFACE

Soil surveys contain information that assists land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. Soil information is a valuable tool and sometimes indispensable tool for planning and implementation of conservation and land use decisions. It does have certain limitations that should be noted. For example, the soil map units may have inclusions of up to five acres that do not fit within the use and limitations for the map unit that is labeled. This is due to the scale and detail of mapping at which the maps were created. Onsite soil examination and testing are therefore necessary to determine soil suitability for intensive use of small areas. Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. A high water table makes a soil poorly suited for many uses, but well suited for vegetation that thrives over a shallow water table. Despite these issues, the limitations of a soil survey are more than offset by the benefits of using the right soil for the right purpose or understanding the possible soil limitations prior to site planning, development, and construction.

TABLE OF CONTENTS

		Page
	EXECUTIVE SUMMARY	ii
	PREFACE	iii
1.0	How This Soil Survey Was Made.....	1
2.0	Soil Maps	5
2.1	MAP INFORMATION.....	5
2.2	Map Unit Legend	5
2.3	Map Unit Descriptions	5
2.3.1	AJ—Agua variant soils, moderately wet	7
2.3.2	AK—Agua variant and Belen variant soils	8
2.3.3	Ao—Anapra clay loam	11
2.3.4	Br—Brazito loamy fine sand	13
2.3.5	Bs—Brazito very fine sandy loam, thick surface	14
3.0	Soil Reports.....	17
4.0	Soil Properties and Qualities.....	18
4.1	Physical Soil Properties	18
4.2	Soil Chemical Properties.....	22
4.2.1	Salinity Tests Made for this Soil Survey	25
4.2.2	Salinity Test Analysis for the Restoration Sites	25
5.0	Soil Water Table Limitations in This Survey	32
6.0	Ecological Site Assessment	40
7.0	Soils Suitability for Vegetation.....	42

APPENDIX 1 – Soil Maps

APPENDIX 2 – Soil Descriptions

APPENDIX 3 – The 1:2 Extraction Salt Prediction Method:

APPENDIX 4 – Salinity Test Values Sorted by Hazard

APPENDIX 5 – Salinity Hazard

APPENDIX 6 – Official Soil Series Descriptions

LIST OF TABLES

	Page
Table 1 - Physical Soil Properties – Dona Ana County Area, New Mexico	20
Table 2 - Soil Chemical Properties – Dona Ana County Area, New Mexico	23
Table 3 - Salt Prediction Test Results.....	27
Table 4 - Water Table and GPS Coordinates.....	33
Table 5 – Ecological Sites by Map Unit Component	41

1.0 HOW THIS SOIL SURVEY WAS MADE


This soil survey was made to provide information about the soils for the United States Section, International Boundary and Water Commission (USIBWC) Rio Grande Canalization Project River Restoration Implementation Plan. The Scope of Work for this project states: “The contractor will conduct soil surveys (Order 1 or 2) to determine site viability for each of the sites identified in the Conceptual Restoration Plan.” The survey includes a description of the soils and their location on the landscape and tables that show soil physical and chemical properties. Soil surveys were conducted at Restoration Sites 1-10 and 17-30 (25 sites, totaling 458.1 acres) as indicated in the USIBWC Scope of Work, Attachment A, Solicitation Amendment A003. These sites are shown to be under USIBWC ownership/management in the Conceptual Restoration Plan. For this project U.S. Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS) National Cooperative Soil Survey processes and procedures were used for all field and laboratory investigations. Field work and laboratory work was completed in the period of June 9 to July 10, 2010. Unless otherwise indicated, the statements and conditions refer to the conditions present during this period. All work was performed under the supervision of W. Michael Risinger, Professional Geoscientist, Professional Agronomist, and Professional Soil Scientist.


The contract specifications for the survey included an Order 2 Soil Survey with a minimum delineation size of five acres and a map scale of 1:15,840 (four inches/mile). Surveys at this scale are considered to be moderately intense by the National Cooperative Soil Survey agencies. Order 2 soil surveys are made for intensive land uses that require detailed information about soil resources for making predictions of suitability for use and of treatment needs. While very useful for general purposes, Order 2 surveys necessarily generalize the often highly variable nature of soils at farm field scale. In order to efficiently depict the distribution of soils of entire counties and to make data collection practical, Order 2 surveys map geographic units of soil that are not pure. Delineations are variable in size with a minimum of 5 to 10 acres. Base map scale is generally 1:12,000 to 1:31,680, depending on the complexity of the soil pattern within the area. During Order 2 surveys, soil scientists generally rely greatly on soil patterns observed on air photographs, and complement photo interpretation with soil observations on the ground at an average intensity of about one boring for each 10 to 50 acres. To make good Order 1 maps, a trained soil scientist needs to identify soil boundaries on the ground in the field, and the soil profile needs to be observed on average at an intensity of at least one observation every 2 acres.

After the initial field visit, the soil scientist determined it more desirable to use a base map scale of 1:5000 and to map the soils in greater detail higher than required by the contract. As a result of this decision, this soil survey was conducted as a hybrid “Order 1.5” soil survey with scale of 1:5000 (12.7 inches/mile). All soil boundaries were made based on on-site observations that averaged one observation for each 3 acres.

A soil survey was completed for each of the 25 restoration sites, with a minimum delineation design size of five acres. Some restoration sites are less than five acres in size, however all soil map units identified on the sites were delineated even if delineation within a site was less than five acres. Multiple on-site observations of the soils were made at 24 of the 25 restoration sites. Examination was made with shovel/soil auger to a depth of 60 inches or an excavation-limiting layer. Site 5 was not sampled and soils were not described within the boundaries of the site due to a map reading error during the sampling work. Soil map data from sites 3 and 4, directly across the river from Site 5, and data from the Soil Survey of Dona Ana County, New Mexico were used to confirm the soil map for Site 5. Soil physical and chemical properties were observed and recorded at each observation site. The number of soil observation sites was determined by the complexity of the restoration site being investigated. The soil mapping legend and soil map unit descriptions were generated from the USDA-NRCS certified data of the Soil Survey of Dona Ana County, New Mexico Survey Area; Data: Version 10, Sep 24, 2009.

For this project the soil scientist observed and described 117 soil profiles (Appendix 2).

 Numerous other on-site observations were made during the mapping process. Only those that were fully described are included in the soil description report.

 Soil profile is the sequence of natural layers, or horizons, in a soil. The soil profile was described from the surface down to a depth of 60 inches, or to a layer which prevented deeper excavation. Commonly, “quicksand” conditions occurred at or just below the water table depth and caused the auger hole to collapse and prevented deeper excavation. In a few cases, dry gravelly horizons similarly collapsed before reaching a depth of 60 inches and prevented deeper excavation. Additional auger holes were attempted at these sites with the same result. These issues were documented when they occurred.

Five soil map units were identified on the 25 restoration sites. These five soil map units occurred in areas large enough to delineate on the soil maps. The dominant map units were Agua variant soils, moderately wet, comprising approximately 50% of the area, and Brazito loamy fine sand, comprising approximately 40% of the area.

Agua soils dominate in the southern part of the project area. Agua variant soils, moderately wet, are mapped on sites 7, 18, 20 to 26, and 28 to 30.

Brazito soils occur mostly in the northern part of the project area. Brazito loamy fine sand is mapped on sites 3, 4, 5, 6, 8, 17, and 19.

Agua variant and Belen variant soils are mapped on sites 9 and 27. Belen variant is poorly drained and is the only soil mapped that is largely clay. This soil comprised approximately 10% of the area.

Site 10 is Brazito very fine sand, thick surface. Site 2 is Anapra clay loam.

Global Positioning System (GPS) location data was collected for most observation sample sites. The GPS data are included in Table 1. Photographs of soil landscapes/vegetation from most sites and one soil profile were collected and are provided in a separate file.

Soil water table information was collected from sample observation sites for all 25 restoration sites and is reported in Table 1. Auger holes were excavated to 62 inches or to a depth where the hole collapsed. When present, the standing water level was measured after the depth to water stabilized, normally 5 to 10 minutes after excavation ceased. Water table information will be critical to the rooting and establishment of the species desired to be planted. The depth to water table varies with season of the year and other environmental variables.

An important aspect of this soil survey is a salinity survey. Salinity is a key soil factor for native habitat restoration in this region in addition to the typical soil survey information concerning soil texture, water table depth, and rooting medium considerations. Salinity problems are common in this reach of the Rio Grande and saline soils could significantly affect the viability of plant species desired for site-specific restoration planning.

Salinity samples were tested from 54 sample sites taken from all but three of the 25 restoration sites (sites 5, 6, and 28). The number of observation sites sampled ranged from 1 (sites with simple soil maps) to 7 (the most complex). A total of 151 salinity test samples were collected from 51 sample sites. Sample depths were 0-6 inches, 24 inches and 60 inches or the depth of the water table if less than 60 inches. In three cases, the depth to the water table was less than 24 inches and only two samples were collected from those sample sites. The samples were tested using the USDA-NRCS National Soil Survey Laboratory 1:2 Extraction Salt Prediction Method. The method is described in Appendix 3 and results are reported in Table 3.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists record the characteristics of the soil profiles that they study. They note soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientist assigns the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a

set of soil characteristics with precisely defined limits. Five soil map units were mapped on the 25 restoration sites

Properties of each soil typically vary from one point to another across the landscape. Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. The soil chemical and physical properties tables of this survey were generated from the USDA-NRCS certified data of the Soil Survey of Dona Ana County, New Mexico Survey Area; Data: Version 10, Sep 24, 2009.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After the significant natural bodies of soil in the survey area were located and identified, boundaries of these bodies were drawn on aerial photographs identifying each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

2.0 SOIL MAPS

The soil map section includes the soil maps for the restoration project area, a list of soil map units on the maps and a description of each soil map unit. Restoration site boundaries are delineated in red. Soil boundaries and symbols are black.

In the study area, the most common soil type is the Agua variant, comprising approximately 50% of the soils. Agua variant is somewhat poorly drained with a loamy surface and sandy subsoil, and the depth to a water table ranges from 12 to 42 inches. The next most common is Brazito, comprising approximately 40% of the area. Brazito is well drained, with a sandy surface and sandy subsoil and does not have a water table within 60 inches. The last major soil type is the Belen variant, comprising approximately 10% of the area. Belen variant is poorly drained with a clayey surface and subsoil. Belen soils are intermixed with Agua soils in this area. Anapra clay loam was also identified on one site, but comprises a small area. Anapra is a deep, well drained soil.

2.1 MAP INFORMATION

Map Scale: 1:5000 if printed on A size (8.5" × 11") sheet.

Source of Map: Natural Resources Conservation Service 2006 NAIP

Date aerial images were photographed: 2006.

2.2 Map Unit Legend

Map Unit Symbol—Map Unit Name

AJ—Agua variant soils, moderately wet

AK—Agua variant and Belen variant soils

Ao—Anapra Clay Loam

Br—Brazito loamy fine sand

Bs—Brazito very fine sandy loam, thick surface

2.3 Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit. A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils.

On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils for which it is named and some minor components that belong to taxonomic classes other than those of the major soils. Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called non-contrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils. An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a soil series. The USDA-NRCS Official Soil Series Descriptions for the soils mapped in the study area are listed in Appendix 6. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into soil phases. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Agua loam is a phase of the Agua series.

Some map units are made up of two or more major soils. These map units are complexes, associations, or undifferentiated groups. An undifferentiated group is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major

soils, or it can be made up of all of them. Agua variant and Belen variant soils, is an example.

2.3.1 AJ—Agua variant soils, moderately wet

The soils in this undifferentiated group are nearly level and are on the flood plain of the Rio Grande at an elevation of 3,700 to 4,100 feet. Areas are 25 to 30 acres in size and are irregularly shaped.

This map unit is made up of areas of Agua Variant fine sandy loam, 0 to 1 percent slopes, and similar soils that have a water table at a depth of 24 to 36 inches. These soils are moderately saline affected.

Included in mapping and making up 10 percent of the map unit are areas of soils that are coarse textured. In areas of soils that are not protected by levees and are susceptible to flooding soils are used only for grazing, recreation and wildlife habitat.

The Agua Variant soil is deep and somewhat poorly drained. It formed in mixed alluvium. Typically the surface layer is pale brown fine sandy loam 11 inches thick. The underlying material, to a depth of 28 inches is very pale brown very fine sandy loam. Below that to a depth of 60 inches, it is very pale brown fine sand.

Permeability of the Agua Variant is moderate. The root zone is 25 to 35 inches deep. The available water capacity is very low. Surface runoff is slow, and the water erosion hazard is slight. The soil blowing hazard is high. The water table is at a depth of 12 to 42 inches. The potential plant community includes alkali sacaton, giant sacaton, inland saltgrass, vine-mesquite, tobosa, and seep willow.

These soils are susceptible to encroachment by salt cedar and other invaders, which are detrimental to grazing. Mechanical control of invaders may be limited by wetness, and chemical control may be limited if wildlife and desirable riparian vegetation are to be considered. Major limitations are salinity, wetness, and poor drainage. Irrigation water must be applied carefully to prevent the rise of the water table and the build-up of salt.

Technical data are presented below.

Map Unit Setting

Elevation: 3,700 to 4,100 feet

Mean annual precipitation: 8 to 10 inches

Mean annual air temperature: 62 to 66 degrees F

Frost-free period: 200 to 240 days

Map Unit Composition

Agua variant and similar soils: 90 percent

Description of Agua Variant

Setting

Landform: Flood plains

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Mixed stratified coarse-loamy alluvium over mixed sandy and gravelly alluvium

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: About 12 to 42 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 10 percent

Maximum salinity: Very slightly saline to moderately saline (4.0 to 16.0 mmhos/cm)

Sodium adsorption ratio, maximum: 13.0

Available water capacity: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability (nonirrigated): 6w

Ecological site: Salt Meadow (R042XC028NM)

Typical profile

0 to 11 inches: Fine sandy loam

11 to 28 inches: Very fine sandy loam

28 to 60 inches: Fine sand

2.3.2 AK—Agua variant and Belen variant soils

These soils are nearly level and are on the floodplain of the Rio Grande at an elevation of 3,700 to 4,100 feet.

Areas of this map unit are made up of Agua Variant fine sandy loam, 0 to 1 percent slopes, or Belen Variant silty clay, 0 to 1 percent slopes, or both.

Included in mapping and making up 10 percent of the map unit are areas of similar soils that are coarse textured. In areas not protected by levees and susceptible to flooding, the soils are used only for grazing and recreation and as wildlife habitat.

The Agua Variant soil is deep and somewhat poorly drained. It formed in mixed alluvium. Typically, the surface is pale brown fine sandy loam 13 inches thick. The underlying material, to a depth of 23 inches is light gray and brownish gray very fine sandy loam. Below that, to a depth of 60 inches, it is very pale brown fine sand. Permeability of the Agua Variant soil is moderate. The root zone is 25 to 35 inches deep. Surface runoff is slow, and the water erosion hazard is slight. The soil blowing hazard is high. The water table is at a depth of 12 to 42 inches. Salinity is high.

The Belen Variant soil is deep and somewhat poorly drained. It formed in clayey and loamy alluvium. Typically, the surface layer is brown silty clay and clay 14 inches thick. The underlying material is light brownish gray silty clay to a depth of 21 inches and pale brown very fine sandy loam to a depth of 38 inches. Below that, to a depth of 50 inches it is very pale brown very fine sand.

Permeability of the Belen Variant soil is very slow. The root zone is 25 to 35 inches deep. Surface runoff is slow, and the water erosion hazard is slight. The soil blowing hazard is high. The water table is at a depth of 12 to 36 inches. Salinity is high. The potential plant community includes alkali sacaton, giant sacaton, inland saltgrass, vine-mesquite, tobosa, and seepwillow. These soils are susceptible to encroachment by salt-cedar and other invaders. Mechanical control may be limited by wetness, and chemical control may be limited if wildlife and desirable riparian vegetation are to be considered. The major limitations are salinity, wetness, and poor drainage. Irrigation water must be applied carefully to prevent the rise of the water table and the build-up of salt.

Technical data are presented below.

Map Unit Setting

Elevation: 3,700 to 4,100 feet

Mean annual precipitation: 8 to 10 inches

Mean annual air temperature: 62 to 66 degrees F

Frost-free period: 200 to 240 days

Map Unit Composition

Agua variant and similar soils: 45 percent

Belen variant and similar soils: 45 percent

Description of Agua Variant

Setting

Landform: Flood plains

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Mixed stratified coarse-loamy alluvium over mixed sandy and gravelly alluvium

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: About 12 to 42 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 10 percent

Maximum salinity: Very slightly saline to moderately saline (4.0 to 16.0 mmhos/cm)

Sodium adsorption ratio, maximum: 13.0

Available water capacity: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): 4s

Land capability (nonirrigated): 6w

Ecological site: Salt Meadow (R042XC028NM)

Typical profile

0 to 13 inches: Fine sandy loam

13 to 23 inches: Very fine sandy loam

23 to 60 inches: Fine sand

Description of Belen Variant

Setting

Landform: Flood plains

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Mixed stratified coarse-loamy alluvium over mixed sandy and gravelly alluvium

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: About 12 to 36 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 10 percent

Maximum salinity: Very slightly saline to moderately saline (4.0 to 16.0 mmhos/cm)

Sodium adsorption ratio, maximum: 13.0

Available water capacity: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): 4s

Land capability (nonirrigated): 4s

Ecological site: Salt Meadow (R042XC028NM)

Typical profile

0 to 14 inches: Silty clay

14 to 21 inches: Silty clay

21 to 38 inches: Very fine sandy loam

38 to 60 inches: Very fine sand

2.3.3 Ao—Anapra clay loam

This is a deep, well drained nearly level soil that formed in mixed alluvium on the flood plain of the Rio Grande at an elevation of 3,700 to 4,100 feet.

Included in mapping are small areas of Anapra loam and silt loam and Glendale, Vinton, Harkey, Brazito, and Agua soils. Included soils make up as much as 15 percent of the map unit. The area of each inclusion is generally less than 1 acre. In areas of soils that are not protected by levees and are susceptible to flooding soils are used only for grazing, recreation and wildlife habitat.

Typically, the surface layer is pale brown clay loam about 12 inches thick. The underlying material, to a depth of 28 inches, is pale brown clay loam. Below that, to a depth of 60 inches, it is very pale brown fine sand. Permeability is moderately slow. The root zone is 60 inches deep and the available water capacity is moderate. Surface runoff is slow, and the water erosion hazard is slight. The soil blowing hazard is moderate. The major limitation is moderate available water holding capacity.

Technical data are presented below.

Map Unit Setting

Elevation: 3,700 to 4,120 feet

Mean annual precipitation: 8 to 10 inches

Mean annual air temperature: 60 to 64 degrees F

Frost-free period: 180 to 220 days

Map Unit Composition

Anapra and similar soils: 85 percent

Description of Anapra

Setting

Landform: Flood plains

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Mixed stratified fine-silty alluvium over mixed sandy alluvium

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 10 percent

Maximum salinity: Nonsaline to slightly saline (2.0 to 8.0 mmhos/cm)

Sodium adsorption ratio, maximum: 1.0

Available water capacity: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability (nonirrigated): 7s

Ecological site: Loamy (R042XB014NM)

Typical profile

0 to 16 inches: Clay loam

16 to 28 inches: Clay loam

28 to 60 inches: Fine sand

2.3.4 Br—Brazito loamy fine sand

This is a deep, well drained, nearly level soil that formed in mixed alluvium on the flood plain of the Rio Grande commonly near old or existent river channels.

Included in mapping are areas of similar soils that are moderately coarse textured in the upper part of the profile, areas of Brazito very fine sandy loams, thick surface and areas of Vinton, Anthony and Agua soils. In areas of soils that are not protected by levees and are susceptible to flooding soils are used only for grazing, recreation and wildlife habitat.

Typically, the surface layer is brown loamy fine sand about 5 inches thick. The underlying material is pale brown sand to a depth of 60 inches.

Permeability is rapid. The depth of the root zone is 10 to 24 inches, but is limited for most plants by the very low available water capacity of the sandy underlying material. Surface runoff is very slow. The water erosion hazard is slight, and the soil blowing hazard is very high. The major limitations are rapid permeability, very low water holding capacity and unfavorable rooting zone below a depth of 10 inches.

Technical data are presented below.

Map Unit Setting

Elevation: 3,700 to 4,120 feet

Mean annual precipitation: 8 to 10 inches

Mean annual air temperature: 58 to 62 degrees F

Frost-free period: 180 to 220 days

Map Unit Composition

Brazito and similar soils: 80 percent

Description of Brazito

Setting

Landform: Flood plains

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Mixed sandy alluvium

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 5 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)

Sodium adsorption ratio, maximum: 1.0

Available water capacity: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): 4s

Land capability (nonirrigated): 7s

Ecological site: Deep Sand (R042XB011NM)

Typical profile

0 to 5 inches: Loamy fine sand

5 to 60 inches: Fine sand

2.3.5 Bs—Brazito very fine sandy loam, thick surface

This is a deep, well drained, nearly level soil that formed in a mixed alluvium on the flood plain of the Rio Grande, commonly near old or existent river channels.

Included in mapping are areas of similar soils that are moderately coarse textured in the upper part of the underlying material and areas of Brazito loamy fine sands and Vinton, Anthony, and Agua soils. The included soils make up 20 percent of the map unit, the area of each inclusion is generally less than 1 acre. In areas of soils that are not protected by levees and are susceptible to flooding soils are used only for grazing, recreation, and wildlife habitat.

Typically, the surface layer is brown very fine sandy loam about 15 inches thick. The underlying material is very pale brown fine sand to a depth of 60 inches. Permeability is rapid. The depth of the root zone is 10 to 24 inches, but is limited for most plants by the very low available water capacity of the sandy underlying material. Surface runoff is slow. The water erosion hazard is slight, and the soil blowing hazard is high. The major limitations are rapid permeability and the very low available water capacity of the underlying material, which limits the root zone mainly to a depth of less than 15 inches.

Technical data are presented below.

Map Unit Setting

Elevation: 3,700 to 4,120 feet

Mean annual precipitation: 8 to 10 inches

Mean annual air temperature: 58 to 62 degrees F

Frost-free period: 180 to 220 days

Map Unit Composition

Brazito and similar soils: 80 percent

Description of Brazito

Setting

Landform: Flood plains

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Mixed sandy alluvium

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 5 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)

Sodium adsorption ratio, maximum: 1.0

Available water capacity: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability (nonirrigated): 7s

Ecological site: Sandy (R042XB012NM)

Typical profile

0 to 15 inches: Very fine sandy loam

15 to 60 inches: Fine sand

3.0 SOIL REPORTS

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities section. The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included. These soil reports were generated from the USDA-NRCS certified data of the Soil Survey of Dona Ana County, New Mexico Survey Area; Data: Version 10, Sep 24, 2009. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture Web Soil Survey.

4.0 SOIL PROPERTIES AND QUALITIES

The Soil Properties and Qualities section includes various soil properties and qualities displayed in a summary table for the soil map units. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

4.1 Physical Soil Properties

Table 1 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification. The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (K_{sat}), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space,

and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Table 1 - Physical Soil Properties – Dona Ana County Area, New Mexico

Map symbol and Soil Name	Depth, inches	Sand, %	Silt, %	Clay, %	Moist bulk density, g/cc	Saturated hydraulic conductivity, $\mu\text{m}/\text{sec}$	Available water capacity, inches/inch	Organic matter, %
Agua loam								
Agua loam	0-12	42	42	15-20-25	1.40-1.50	4-14	0.18-0.20	0.5-1.0
	12-23	45	45	8-13-18	1.40-1.50	4-14	0.17-0.20	0.3-0.5
	23-60	95	1	0-4-8	1.50-1.60	42-141	0.03-0.06	0.3-0.5
AJ-Agua variant moderately wet								
Agua variant	0-13	71	17	8-13-18	1.40-1.50	4-14	0.07-0.09	0.7-1.0
	13-23	64	24	8-3-18	1.45-1.55	4-14	0.15-0.17	0.7-1.0
	23-60	94	1	0-5-10	1.40-1.50	42-141	0.02-0.04	0.7-1.0
AK-Agua variant and Belen variant soils								
Agua variant	0-13	71	17	8-13-18	1.40-1.50	4-14	0.07-0.09	0.7-1.0
	13-23	64	24	8-3-18	1.45-1.55	4-14	0.15-0.17	0.7-1.0
	23-60	94	1	0-5-10	1.40-1.50	42-141	0.02-0.04	0.7-1.0
Belen variant	0-14	7	48	40-45-50	1.40-1.50	0.42-1.41	0.08-0.10	0.7-1.0
	14-21	7	48	40-45-50	1.30-1.40	0.00-0.42	0.08-0.10	0.7-1.0
	21-38	64	24	8-13-18	1.45-1.55	4.23-14.11	0.08-0.10	0.7-1.0
	38-60	87	10	0-3-5	1.40-1.50	42-141	0.07-0.09	0.7-1.0

Map symbol and Soil Name	Depth, inches	Sand, %	Silt, %	Clay, %	Moist bulk density, g/cc	Saturated hydraulic conductivity, $\mu\text{m}/\text{sec}$	Available water capacity, inches/inch	Organic matter, %
Ao—Anapra clay loam								
Anapra	0-16	27	42	27-31-35	1.30-1.50	1.41-4.23	0.25-0.18	0.7-1.0
	16-28	27	42	27-31-35	1.30-1.60	1.41-4.23	0.15-0.22	0.7-1.0
	28-60	92	1	3-7-10	1.40-1.60	42-141	0.03-0.08	0.7-1.0
Br—Brazito loamy fine sand								
Brazito	0-5	82	9	5-9-12	1.55-1.65	42-141	0.07-0.10	0.4-0.6
	5-60	93	1	2-6-10	1.40-1.50	42-141	0.05-0.07	0.2-0.3
Bs—Brazito very fine sandy loam, thick surface								
Brazito	0-5	59	23	15-18-20	1.20-1.30	4.23-14.11	0.25-0.17	0.04-0.06
	5-60	93	1	2-6-10	1.40-1.50	42-141	0.05-0.07	0.2-0.3

4.2 Soil Chemical Properties

Soil Chemical Properties are measured or inferred from direct observations in the field or laboratory. Examples of soil chemical properties include pH, cation exchange capacity, calcium carbonate, gypsum, and electrical conductivity.

Table 2 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Soil reaction is a measure of acidity or alkalinity. It is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in deciSiemens per meter (dS/m) at 25 degrees C, which is the numerical equivalent to the old measure of millimhos per centimeter. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete. Yields of most crops are not significantly affected where salt levels are 0 to 2 dS/m. Generally, a level of 2 to 4 dS/m affects some crops. Levels of 4 to 5 dS/m affect many crops and above 8 dS/m affect all but the very tolerant crops. Salinity problems are caused from the accumulation of soluble salts in the root zone. These excess salts reduce plant growth and vigor by altering water uptake and causing ion-specific toxicities or imbalances. Establishing good drainage is generally the cure for these problems, but salinity problems are often more complex. Proper management procedures, combined with periodic soil tests, are needed to prolong the productivity of salt-affected soils.

Table 2 - Soil Chemical Properties – Dona Ana County Area, New Mexico

Map symbol and soil name	Depth	Cation-exchange	Soil reaction	Calcium Carbonate	Salinity
	inches	Capacity Meq/L	pH	%	(dS/m)
Ag—Agua loam					
Agua	0-12	7.0-15	7.4-8.4	5-10	0.0-4.0
	12-23	4.0-10	7.9-8.4	5-10	0.0-4.0
	12-23	0.0-1.0	7.9-8.4	1-10	0.0-2.0
AJ—Agua variant soils, moderately wet					
Agua variant	0-11	5.0-15	7.9-9.0	5-10	4.0-16.0
	11-28	3.0-10	7.9-9.0	5-10	4.0-16.0
	28-60	0.0-1.0	7.9-9.0	1-5	4.0-16.0
AK—Agua variant and Belen variant soils					
Agua variant	0-13	5.0-15	7.9-9.0	5-10	4.0-16.0
	13-23	3.0-10	7.9-9.0	5-10	4.0-16.0
	23-60	0.0-1.0	7.9-9.0	1-5	4.0-16.0
Belen variant	0-14	15-30	7.9-9.0	5-10	4.0-16.0
	14-21	15-30	7.9-9.0	5-10	4.0-16.0
	21-38	3.0-10	7.9-9.0	5-10	4.0-16.0
	38-60	0.0-1.0	7.9-9.0	5-10	4.0-16.0

Map symbol and soil name	Depth	Cation-exchange	Soil reaction	Calcium Carbonate	Salinity
	inches	Capacity Meq/L	pH	%	mmhos/cm (dS/m)
Ao—Anapra clay loam					
Anapra	0-16	8.0-20	7.9-8.4	5-10	2.0-4.0
	16-28	7.0-20	7.9-8.4	5-10	2.0-4.0
	28-60	1.0-1.0	7.9-8.4	1-5	2.0-8.0
Br—Brazito loamy fine sand					
Brazito	0-5	3.0-8.0	7.4-8.4	0-5	0.0-4.0
	5-60	1.0-1.0	7.4-8.4	0	0.0-4.0
Bs—Brazito very fine sandy loam, thick surface					
Brazito	0-15	7.0-15	7.4-8.4	0-5	0.0-4.0
	15-60	1.0-1.0	7.4-8.4	0	0.0-4.0

4.2.1 Salinity Tests Made for this Soil Survey

Salt prediction analysis is used to predict which soils have measurable amounts of soluble salts and to predict the quantity and the appropriate dilutions for any additional salt analyses of those soils. The salt prediction method utilizes a more dilute soil water solution than the standard soil saturated paste method that is normally used to measure soil salinity conditions and the values from the salt prediction test cannot be substituted for the standard saturated past test values. If salt prediction or conductivity is less than 0.25 mmhos/cm (dS/m) soils are considered non-salty, and generally, no other salt analyses are needed on these soils. Conductivity of 0.25 dS/m (mmhos/cm) or more indicates further testing of the salinity levels of the soils may be needed for some land uses/plant communities.

Salt prediction test values can be used to indicate the relative severity of salinity for different depths and sample sites where test conductivity exceeds 0.25 dS/m. They allow comparison of salinity levels between sites and show which soil layers have significant salinity levels that may impact the growth of plants. Test values also provide a “scale” to rank the sites from lowest salinity to highest salinity.

Salt prediction samples were tested from 54 sample sites taken from all but three of the 25 restoration sites (sites 5, 6 and 28). Results are shown in Table 3. Restoration plans for site 5 include lowering the site elevation by 4 feet and samples were not taken. Samples from site 6 and 28 were contaminated and not tested. Soil observations, grass and forb cover percentage and the presence of scattered young and mature cottonwood trees at Site 6 and 80 to 100 percent Bermuda grass cover on site 28 indicate salinity is not an issue for establishing the vegetation listed in the restoration plan.

4.2.2 Salinity Test Analysis for the Restoration Sites

All of the restoration sites tested had one or more sample sites with salt prediction test values greater than 0.25 dS/m. Therefore, none of the restoration sites would be considered “non-salty.” Under USDA-NRCS guidelines all 25 restoration sites would qualify for further salinity testing. Appendices 4 and 5 show salt test results sorted by hazard and by site, respectively.

Only three of the 54 sample sites have salt prediction test values less than of 0.25 dS/m for all three sampled depths and would be considered “non-salty.” An additional 13 sample sites have test values less than 0.25 dS/m for all subsurface test depths. Forty two sample sites have test values less than 1.0 dS/m in all subsurface test depths. These sample sites should not have significant salinity issues with establishing the vegetation in the restoration plan.

Conflicting test values within a soil pedon (the smallest unit or volume of soil that contains all the soil horizons of a particular soil type) and from adjacent sample sites within a single restoration site confirm the highly variable nature of soil salinity in the project area.

Thirty one sites had the highest salt test values in the surface layer, fifteen sites in the middle layer, and eight in the bottom layer. None of the sites had test values greater than 1dS/m in all three test layers and only six sites, 2-1, 10-3, 17-2, 20-4, 30-1 and 30-2, had conductivity test values greater than 2dS/m in two test layers.

Nine restoration sites (twenty of the sample sites) had 0-6-inch test values greater than 2 dS/m and 12 of the sample sites had test values that exceeded 2 dS/m in one or more subsurface test depths. Six sample sites exceeded 6 dS/m at one or more subsurface test depths. The highest test values measured were surface layers of sites 17-2 (16.88 dS/m) and site 30-2 (13.18 dS/m). The bottom layer (water table) at both sites tested less than 1.0 dS/M. Site 17-1 had values less than 0.25 in the surface and 24-inch samples and 1.51dS/m for the 42-in water table depth sample. The other three sample sites from site 30 had surface layer test values of 2.32, 3.47, and 7.92 dS/m with 24-inch values of 2.76, 0.61 and 1.00 dS/m. All water table/60-inch samples for site 30 ranged from 0.02 to 0.89 dS/m. Further salinity tests may be needed on these on these sites.

None of the Restoration Sites were dominated by salt tolerant vegetation that indicated severe salinity issues. All sites except Site 27 had a variety of plant types. Sites with water tables less than 36 inches below the surface normally had 50 to 80 percent or greater cover of grasses, forbs and woody species. Vegetative cover was usually less than 50 percent when the depth to the water table was greater than 42 inches. Sites without a water table within 60 inches were mostly bare ground with scattered woody species and grass and forb cover of 5 to 35 percent. Where vegetation was sparse the main limitation is the lack of water. Analysis of the vegetation present and the salt prediction test data indicates salinity issues will not be a significant problem for vegetative establishment on most of the restoration sites. Sites 9, 17, 27 and 30 have both soil and vegetative indicators indicating salinity levels need additional investigation.

Table 3 - Salt Prediction Test Results

Site No.	Depth (inches)	Rating (dS/m)
1-1	0-6	0.43
	24	1.06
	36	1.96
2-1	0-6	4.70
	24	5.06
	42	0.23
2-2	0-6	2.23
	24	0.02
	42	0.11
3-1	0-6	0.02
	24	0.05
	60	0.11
4-3	0-6	0.39
	24	0.66
	39	2.56
7-2	0-6	1.47
	24	0.09
	39	0.11
8-1	0-6	0.69
	24	0.43
	60	0.94
8-2	0-6	0.00
	24	0.00
	60	0.46
9-1	0-6	0.46
	24	5.24
	52	0.12
9-2	0-6	0.89
	24	0.03
	52	0.03
9-4	0-6	0.06
	24	0.55
	60	0.03
9-5	0-6	4.35
	24	0.16
9-6	0-6	6.16
	24	0.39

Site No.	Depth (inches)	Rating (dS/m)
	48	0.05
9-9	0-6	2.17
	24	1.03
	48	0.18
9-11	0-6	4.45
	24	0.36
9-12	0-6	2.95
	24	1.11
	36	0.87
10-1	0-6	0.02
	24	1.34
	60	0.35
10-3	0-6	0.61
	24	6.80
	48	2.28
10-4	0-6	0.19
	24	2.41
	48	0.13
10-5	0-6	0.00
	24	1.07
	36	0.00
17-1	0-6	0.06
	24	0.14
	42	1.51
17-2	0-6	16.88
	24	7.04
	56	0.78
18-1	0-6	2.67
	24	0.23
	48	0.07
19-1	0-6	0.01
	24	0.30
	60	0.04
19-2	0-6	0.31
	24	0.53
	60	0.93
19-3	0-6	0.00
	24	0.00
	60	0.62

Site No.	Depth (inches)	Rating (dS/m)
20-1	0-6	1.68
	24	0.21
	48	0.05
20-2	0-6	1.17
	24	2.16
	36	0.37
20-3	0-6	3.21
	24	0.83
	48	0.35
20-4	0-6	4.08
	24	5.84
	42	0.26
20-5	0-6	0.85
	24	0.10
	42	0.11
20-6	0-6	0.04
	24	2.86
	60	0.48
	24	3.62
	52	0.14
21-1	0-6	0.34
	24	1.12
	48	0.29
21-2	0-6	0.25
	24	0.15
	48	0.11
21-3	0-6	0.04
	24	0.02
	48	0.05
22-1	0-6	1.87
	24	5.75
	48	0.38
22-3	0-6	3.61
	24	0.07
	36	0.26
22-4	0-6	2.55
	24	0.75
	48	0.28
	24	0.75

Site No.	Depth (inches)	Rating (dS/m)
	48	0.22
23-3	0-6	0.65
	24	0.14
	48	0.23
24-1	0-6	6.82
	24	0.26
	36	0.14
24-2	0-6	1.07
	24	0.22
25-2	0-6	0.94
	24	0.22
	36	0.17
25-3	0-6	1.13
	24	0.16
	36	0.03
26-1	0-6	3.91
	24	0.08
	42	0.30
	24	0.03
	36	0.08
27-2	0-6	0.78
	24	0.65
	48	0.21
29-1	0-6	0.73
	24	0.29
	60	0.06
29-2	0-6	0.28
	24	1.75
	60	0.43
30-1	0-6	7.92
	24	2.76
	48	0.67
30-2	0-6	13.18
	24	7.94
	60	0.89
30-3	0-6	2.32
	24	0.61
	36	0.26
	24	1.00

Site No.	Depth (inches)	Rating (dS/m)
	36	0.02
27-7	seep	5.87
20-6a	crust	>19.99

5.0 SOIL WATER TABLE LIMITATIONS IN THIS SURVEY

Soil water table measurements (112 observations) were made at 24 of the 25 restoration sites. Results are shown in Table 4. Site 5 was not sampled for depth to water table due to a map reading error. Water table depths measured on a proxy site slightly down river and on Sites 3 and 4 directly across the river from Site 5 show the depth to water table to be greater than 60 inches on the soil, Brazito Loamy Fine Sand, mapped on site 5. Depth to the water table ranged from plus six inches to greater than 62 inches. Seventeen sample sites had a water table within 24 inches, 25 within 24 to 36 inches, 37 within 36 to 48 inches, 10 within 48 to 60 inches, and 25 were greater than 60 inches.

By using redoximorphic features (features formed by the reduction, translocation, and oxidation of iron and manganese oxides), soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date. Table 4 represents the depth to water table during the field studies of June 9 to June 20, 2010. During this period, sites 1, 7, 9, 18, 20, 22, 24, 26, 27, 28 and 30 had one or more sample sites with the water table within 36 inches. Most sample sites with water tables contained soil redoximorphic features indicating the water table is commonly above the depths recorded during the study period.

USDA-NRCS military interpretations for Type 5 vehicles rate sandy soils severely limited when the water table is within 20 inches of the soil surface. This interpretation represents the limitation of use of heavy equipment such as tractors and bulldozers. Soils with sandy subsoils are mapped on all but one of the restoration sites. Sandy soils with high water tables may turn to “quicksand” resulting in heavy equipment becoming mired and disabled. It is recommended that brush control work utilizing heavy equipment be completed during seasons when the water table is more than 20 inches below the soil surface. Conversely, when high water table levels positively benefit work, such as tree planting, the work should be planned when the water table is nearer the soil surface.

Table 4 - Water Table and GPS Coordinates

Site No.	Map Unit Symbol	Map Unit Name assigned	Water Table Depth (in)	GPS Coordinates NAD83/WGS84	Published Soil Survey Symbol
1-1	AJ	Agua variant soils, moderately wet	14	N32 50.340 W107 17.862	Br
1-2	AJ	Agua variant soils, moderately wet	30	N32 50.445 W107 17.866	Br
1-3	Br	Brazito loamy fine sand	*	N32 50.564 W107 17.878	Br
2-1	Ao	Anapra clay loam	38	N32 44.862 W107 16.999	Ao
2-2	Ao	Anapra clay loam	45	N32 44.829 W107 17.014	Ao
2-3	Ao	Anapra clay loam	43	no GPS data	Ao
2-4	Ao	Anapra clay loam	40	no GPS data	Ao
3-1	Br	Brazito loamy fine sand	>60	no GPS data	Br
3-2	Br	Brazito loamy fine sand	>60	N32 44.256 W107 16.909	Br
3-3	Br	Brazito loamy fine sand	>60	N32 44.272 W107 16.970	Br
4-1	Br	Brazito loamy fine sand	50	N32 44.219 W107 16.645	Br
4-2	Br	Brazito loamy fine sand	42	N32 44.175 W107 16.463	Br
4-3	Br	Brazito loamy fine sand	43	N32 44.072 W107 16.453	Br
5-1	Br	Brazito loamy fine sand	>60**	N32 42.327 W107 15.366	Br
5-2	Br	Brazito loamy fine sand	>60**	N32 42.352 W107 15.379	Br
5-3	Br	Brazito loamy fine sand	>60**	N32 42.398 W107 15.398	Br
6-1	Br	Brazito loamy fine sand	>60	N32 42.815 W107 15.233	AJ
6-2	Bs	Brazito very fine sandy loam, thick surface	>60	N32 42.858 W107 15.171	AJ

Site No.	Map Unit Symbol	Map Unit Name assigned	Water Table Depth (in)	GPS Coordinates NAD83/WGS84	Published Soil Survey Symbol
6-3	Br	Brazito loamy fine sand	54	N32 42.897 W107 15.130	AJ
6-4	Br	Brazito loamy fine sand	>60	N32 43.010 W107 15.166	AJ
6-5	Br	Brazito loamy fine sand	43	N32 43.161 W107 15.086	AJ
6-6	Br	Brazito loamy fine sand	42	N32 43.296 W107 15.206	AJ
6-7	Br	Brazito loamy fine sand	44	N32 43.345 W107 15.343	AJ
6-8	Br	Brazito loamy fine sand	48	N32 43.341 W107 15.509	AJ
6-9	Br	Brazito loamy fine sand	46	N32 43.303 W107 15.629	AJ
7-1	AJ	Agua variant soils, moderately wet	6 plus	N32 42.190 W107 14.995	AJ
7-2	AJ	Agua variant soils, moderately wet	19	N32 42.248 W107 15.202	AJ
7-3	AJ	Agua variant soils, moderately wet	24	N32 42.408 W107 15.330	AJ
7-4	Br	Brazito loamy fine sand	>60	no data	Bs
8-1	Bs	Brazito very fine sandy loam, thick surface	>60	N32 40.748 W107 09.572	Bs
8-2	Br	Brazito loamy fine sand	>60	N32 40.758 W107 09.846	Bs
8-3	Br	Brazito loamy fine sand	>60	N32 40.690 W107 09.731	Bs
8-4	Bs	Brazito very fine sandy loam, thick surface	>60	N32 40.675 W107 09.602	Bs
8-5	Br	Brazito loamy fine sand	>60	N32 40.763 W107 09.475	Bs
9-1	AK	Agua variant and Belen variant soils	47	N32 40.234 W107 07.324	Br
9-2	AK	Agua variant and Belen variant soils	47	N32 40.248 W107 07.365	Br
9-3	AK	Agua variant and Belen variant soils	9	N32 40.272 W107 07.394	An

Site No.	Map Unit Symbol	Map Unit Name assigned	Water Table Depth (in)	GPS Coordinates NAD83/WGS84	Published Soil Survey Symbol
9-4	AK	Agua variant and Belen variant soils	42	N32 40.352 W107 07.446	Br
9-5	AK	Agua variant and Belen variant soils	23	N32 40.341 W107 07.470	Br
9-6	AK	Agua variant and Belen variant soils	20	N32 40.395 W107 07.584	Br
9-7	AK	Agua variant and Belen variant soils	20	N32 40.432 W107 07.645	Br
9-8	AK	Agua variant and Belen variant soils	21	N32 40.448 W107 07.668	Br
9-9	AK	Agua variant and Belen variant soils	37	N32 40.487 W107 07.702	An
9-10	AK	Agua variant and Belen variant soils	21	N32 40.533 W107 07.808	Bs
9-11	AK	Agua variant and Belen variant soils	20	N32 40.496 W107 07.647	Bs
9-12	AK	Agua variant and Belen variant soils	22	no GPS data	Bs
10-1	Bs	Brazito very fine sandy loam, thick surface	>60	N32 39.400 W107 05.869	Br
10-2	Bs	Brazito very fine sandy loam, thick surface	>60	N32 39.428 W107 05.793	Bs
10-3	Bs	Brazito very fine sandy loam, thick surface	>60	N32 39.445 W107 05.641	Bs
10-4	Br	Brazito loamy fine sand	>60	N32 39.410 W107 05.884	Ag
10-5	Ao	Anapra clay loam	>60	N32 39.467 W107 05.770	Ag
17-1	Br	Brazito loamy fine sand	47	N32 22.502 W106 50.362	Br
17-2	Bs	Brazito very fine sandy loam, thick surface	48	no data	Br
17-3	Br	Brazito loamy fine sand	>60	no data	Br
18-1	AJ	Agua variant soils, moderately wet	42	N32 20.273 W106 50.058	Ao
18-2	AJ	Agua variant soils, moderately wet	42	N32 20.215 W106 50.061	Br

Site No.	Map Unit Symbol	Map Unit Name assigned	Water Table Depth (in)	GPS Coordinates NAD83/WGS84	Published Soil Survey Symbol
18-3	AJ	Agua variant soils, moderately wet	27	N32 20.217 W106 50.062	Ao
18-4	AJ	Agua variant soils, moderately wet	27	no GPS data	Br
18-5	AJ	Agua variant soils, moderately wet	27	no GPS data	Br
18-6	AJ	Agua variant soils, moderately wet	27	no GPS data	Br
19-1	Br	Brazito loamy fine sand	49	N32 16.615 W106 49.577	Br
19-2	Br	Brazito loamy fine sand	>60	N32 16.579 W106 49.543	Br
19-3	Br	Brazito loamy fine sand	52	N32 16.506 W106 49.573	Br
19-4	Br	Brazito loamy fine sand	***	N32 16.550 W106 49.600	Br
20-1	AJ	Agua variant soils, moderately wet	33	N32 15.517 W106 49.246	Br
20-2	AJ	Agua variant soils, moderately wet	42	N32 15.240 W106 49.168	Ao
20-3	AJ	Agua variant soils, moderately wet	30	N32 15.454 W106 49.209	Br
20-4	AJ	Agua variant soils, moderately wet	25	N32 15.319 W106 49.150	Ao
20-5	AJ	Agua variant soils, moderately wet	20	N32 15.053 W106 49.110	Bs
20-6	AJ	Agua variant soils, moderately wet	46	N32 14.854 W106 49.124	Bg
20-7	AJ	Agua variant soils, moderately wet	37	N32 14.597 W106 48.968	Br
20-8	AJ	Agua variant soils, moderately wet	32	N32 14.801 W106 49.066	Bg
21-1	Br	Brazito loamy fine sand	42	N32 14.996 W106 49.023	Bs
21-2	Br	Brazito loamy fine sand	42	N32 14.802 W106 48.899	Br

Site No.	Map Unit Symbol	Map Unit Name assigned	Water Table Depth (in)	GPS Coordinates NAD83/WGS84	Published Soil Survey Symbol
21-3	Br	Brazito loamy fine sand	42	N32 14.564 W106 48.818	Bs
22-1	AJ	Agua variant soils, moderately wet	47	N32 05.359 W106 39.674	Ar
22-2	AJ	Agua variant soils, moderately wet	45	N32 05.267 W106 39.756	Ap
22-3	AJ	Agua variant soils, moderately wet	23	N32 05.170 W106 39.832	Bs
22-4	AJ	Agua variant soils, moderately wet	50	N32 05.022 W106 39.896	Bs
23-1	AJ	Agua variant soils, moderately wet	42	N32 04.526 W106 39.653	Ap
23-2	AJ	Agua variant soils, moderately wet	42	N32 04.713 W106 39.688	Ag
23-3	AJ	Agua variant soils, moderately wet	44	N32 04.315 W106 39.688	Ap
24-1	AJ	Agua variant soils, moderately wet	24	N31 58.532 W106 36.931	Mg
24-2	AJ	Agua variant soils, moderately wet	17	N31 58.574 W106 36.973	Mg
24-3	AJ	Agua variant soils, moderately wet	17	N31 58.640 W106 37.009	Mg
24-4	AJ	Agua variant soils, moderately wet	20	N31 58.675 W106 37.044	Mg
24-5	AJ	Agua variant soils, moderately wet	24	N31 58.635 W106 37.066	Mg
24-6	AJ	Agua variant soils, moderately wet	24	N31 58.478 W106 36.871	Mg
25-1	AJ	Agua variant soils, moderately wet	28	N31 58.148 W106 36.504	Mg
25-2	AJ	Agua variant soils, moderately wet	32	N31 58.026 W106 36.413	Mg
25-3	AJ	Agua variant soils, moderately wet	29	N31 57.856 W106 36.320	Mg
26-1	AJ	Agua variant soils, moderately wet	30	N31 51.436 W106 36.350	Mg

Site No.	Map Unit Symbol	Map Unit Name assigned	Water Table Depth (in)	GPS Coordinates NAD83/WGS84	Published Soil Survey Symbol
26-2	AJ	Agua variant soils, moderately wet	30	N31 51.745 W106 36.280	Mg
26-3	AJ	Agua variant soils, moderately wet	40	N31 51.745 W106 36.275	Mg
27-1	AK	Agua variant and Belen variant soils	31	N31 50.273 W106 36.369	AK
27-2	AK	Agua variant and Belen variant soils	28	N31 50.273 W106 36.369	AK
27-3	AK	Agua variant and Belen variant soils	28	N31 50.108 W106 36.531	AK
27-4	AK	Agua variant and Belen variant soils	42	N31 50.092 W106 36.595	AK
27-5	AK	Agua variant and Belen variant soils	30	N31 50.093 W106 36.597	AK
27-6	AK	Agua variant and Belen variant soils	>60	N31.50.972 W106.36.526	AK
27-7	AK	Agua variant and Belen variant soils	19	N31 49.923 W106 36.505	AK
27-8	AK	Agua variant and Belen variant soils	30	N31 50.026 W106 36.544	AK
28-1	AJ	Agua variant soils, moderately wet	54	N31 49.537 W106 36.147	Sa
28-2	AJ	Agua variant soils, moderately wet	60	N31 49.525 W106 36.167	Ag
28-3	AJ	Agua variant soils, moderately wet	32	N31 49.951 W106 36.448	Ag
28-4	AJ	Agua variant soils, moderately wet	42	N31 49.958 W106 36.382	Ge
28-5	AJ	Agua variant soils, moderately wet	36	N31 49.607 W106 36.236	Ag
29-1	AJ	Agua variant soils, moderately wet	40	N31 48.382 W106 34.922	Ap
29-2	AJ	Agua variant soils, moderately wet	>60	N31 48.245 W106 34.757	AK
29-3	AJ	Agua variant soils, moderately wet	50	N31 48.139 W106 34.594	AK
29-4	AJ	Agua variant soils, moderately wet	40	N31 48.198 W106 34.746	AK

Site No.	Map Unit Symbol	Map Unit Name assigned	Water Table Depth (in)	GPS Coordinates NAD83/WGS84	Published Soil Survey Symbol
29-5	AJ	Agua variant soils, moderately wet	39	N31 48.248 W106 34.811	Ap
30-1	AJ	Agua variant soils, moderately wet	47	N31 47.965 W106 33.534	AK
30-2	AJ	Agua variant soils, moderately wet	61	N31 47.970 W106 33.684	AK
30-3	AJ	Agua variant soils, moderately wet	34	N31 47.990 W106 33.946	AK
30-4	AJ	Agua variant soils, moderately wet	46	N31 48.006 W106 34.079	AK

* Site 1-3 Expect water table within 60 inches, hole collapsed <60 inches.

** Due to a map reading error, data for Site 5 was interpolated from data collected at Sites 3 and 4 and from a proxy site slightly downriver.

*** Site 19-4 Expect water table within 60 inches, hole collapsed <60 inches.

6.0 ECOLOGICAL SITE ASSESSMENT

Individual soil map unit components can be correlated to a particular ecological site. The Ecological Site Assessment section includes ecological site descriptions, plant growth curves, state and transition models, and selected National Plants Database information.

An "ecological site" is the product of all the environmental factors responsible for its development. It has characteristic soils that have developed over time; a characteristic hydrology, particularly infiltration and runoff that has developed over time; and a characteristic plant community (kind and amount of vegetation). The vegetation, soils, and hydrology are all interrelated. Each is influenced by the others and influences the development of the others. For example, the hydrology of the site is influenced by development of the soil and plant community. The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production. An ecological site name provides a general description of a particular ecological site. For example, "Loamy Upland" is the name of a rangeland ecological site. An "ecological site ID" is the symbol assigned to a particular ecological site.

The map identifies the dominant ecological site for each map unit, aggregated by dominant condition. Other ecological sites may occur within each map unit. Each map unit typically consists of one or more components (soils and/or miscellaneous areas). Each soil component is associated with an ecological site. Miscellaneous areas, such as rock outcrop, sand dunes, and badlands, have little or no soil material and support little or no vegetation and therefore are not linked to an ecological site. Table 5 lists all of the ecological sites for each map unit component in the area of interest.

Table 5 – Ecological Sites by Map Unit Component

Map Unit Symbol	Component name	Component Percent	Ecological site
Ag	Agua loam	(85%)	R042XB018NM — Bottomland
AJ	Agua, wet variant	(90%)	R042XC028NM — Salt Meadow
AK	Agua variant and Belen variant soils	(85%)	R042XC028NM — Salt Meadow
Ao	Anapra clay loam	(80%)	R042XB014NM — Loamy
Ap	Anthony-Vinton fine sandy loams	(85%)	R042XB014NM — Loamy
Br	Brazito loamy find sand	(80%)	R042XB011NM — Deep Sand
Bs	Brazito very fine sandy loam, thick surface	(80%)	R042XB012NM — Sandy

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

Soil Survey Area: Dona Ana County Area, New Mexico Survey Area Data: Version 10, Sep 24, 2009

7.0 SOILS SUITABILITY FOR VEGETATION

The primary vegetation types proposed to be planted as part of the restoration plan are trees (willows and cottonwoods), longstem riparian shrubs, and grasses. The Agua variant, Brazito, and Anapra clay loam soils would all be suitable for those plantings. However, the Belen variant soils are clayey and are less likely to be suitable for the trees and shrubs. The Brazito soils tend to have a deeper water table and may require more supplement^③ irrigation.

Therefore, most sites should be able to support the vegetation as planned, with the possible exception of sites 9, 17, 27, and 30. These sites, or portions of them, may be best suited to planting grasses. Sites 9 and especially 27 contain Agua variant and Belen variant soils. Since those soils are intermixed, if it were possible to select locations with Agua variant, plantings of trees and shrubs would be more likely to succeed. The presence of scattered large cottonwoods at Site 27 among the dense cover of salt cedars is an indication of that. Selection of precise locations may not be practicable in the field, because of the limited level of detail inherent in the soils survey. Sites 9, 17, 27, and 30 also have potential salinity problems that could affect vegetation survival, particularly for trees. There was no confirmed evidence of consistent high salinity at any sites, however.

References

Field Book for Describing and Sampling Soils v 2.0, by Schoeneberger, Wysocki, Benham, and Broderson, 2002, United States Department of Agriculture, Natural Resources Conservation Service. <http://soils.usda.gov/technical/fieldbook/>

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National range and pasture handbook. <http://www.glti.nrcs.usda.gov/> United States Department of Agriculture, Natural Resources Conservation Service.

National soil survey handbook, title 430-VI. <http://soils.usda.gov/>

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. <http://soils.usda.gov/>

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. <http://soils.usda.gov/>

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U. S. Department of Agriculture.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>

U.S. Department of Agriculture Handbook 436. <http://soils.usda.gov/>

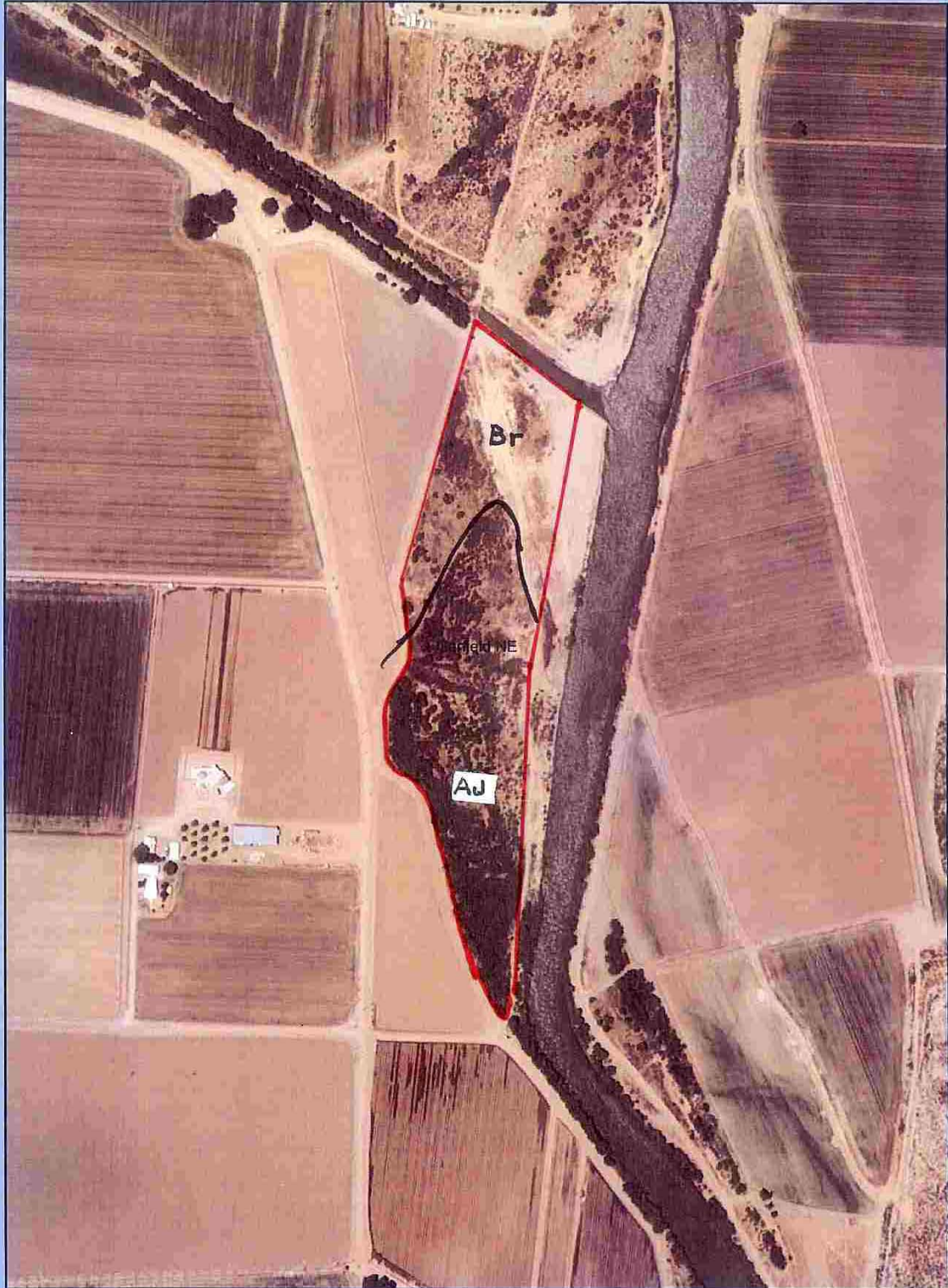
APPENDIX 1 – SOIL MAPS

Soil map field sheets were derived from the 2006 United States Department of Agriculture-Natural Resources Conservation Service National Agricultural Imagery Program (NAIP). This imagery is available for free download through the USDA Geospatial Data Gateway, <http://datagateway.nrcs.usda.gov/>. They can also be purchased through the APFO Customer Service Section; 801-844-2922, or apfo.sales@slc.usda.gov.

Restoration site boundaries are delineated in red. Soil boundaries and symbols are in black.

SITE # 1

Garfield NW



150 75 0 150 Meters

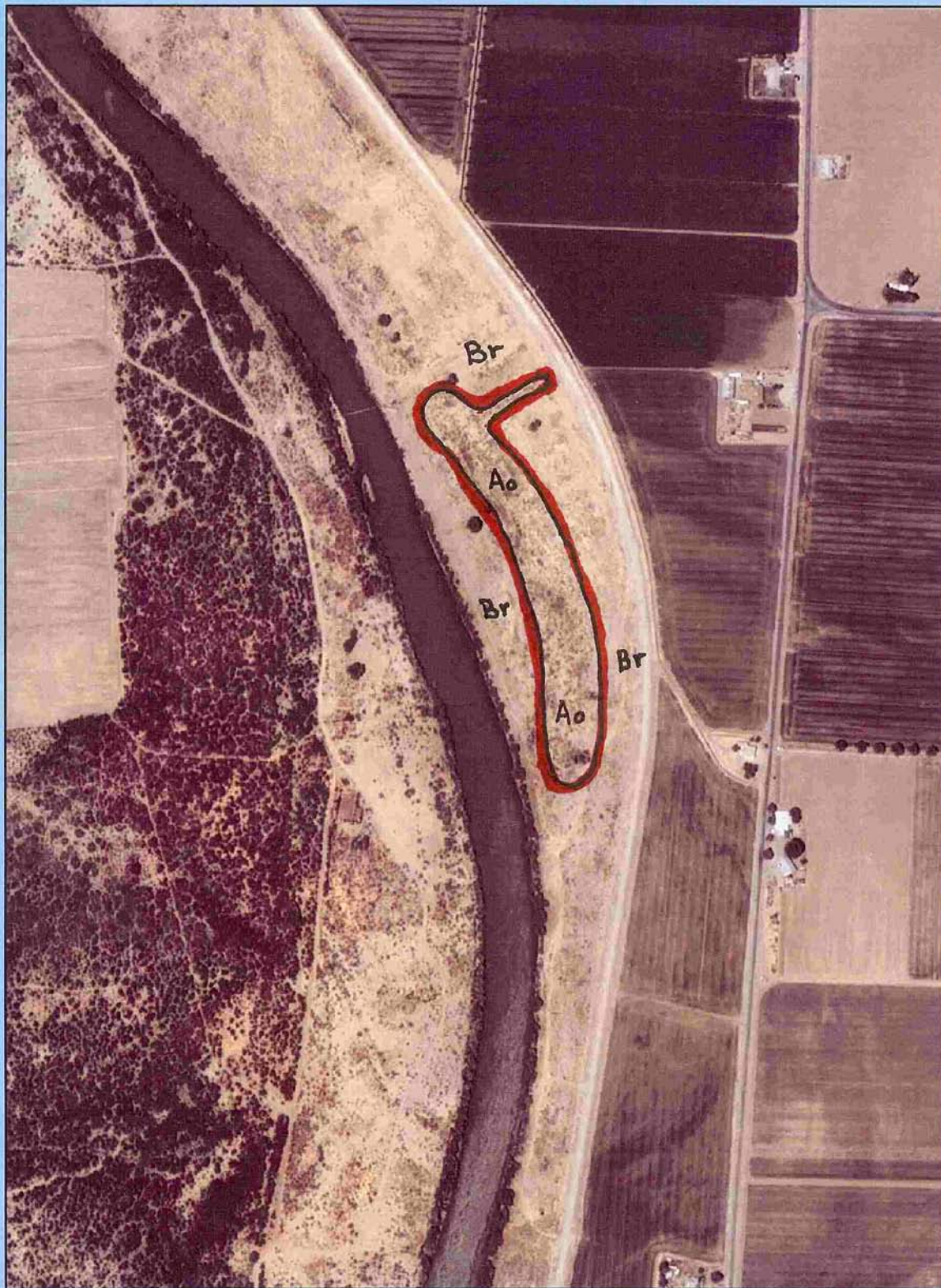


1:5,000



SITE # 2

Arroyo Cuervo NE



150 75 0 150 Meters



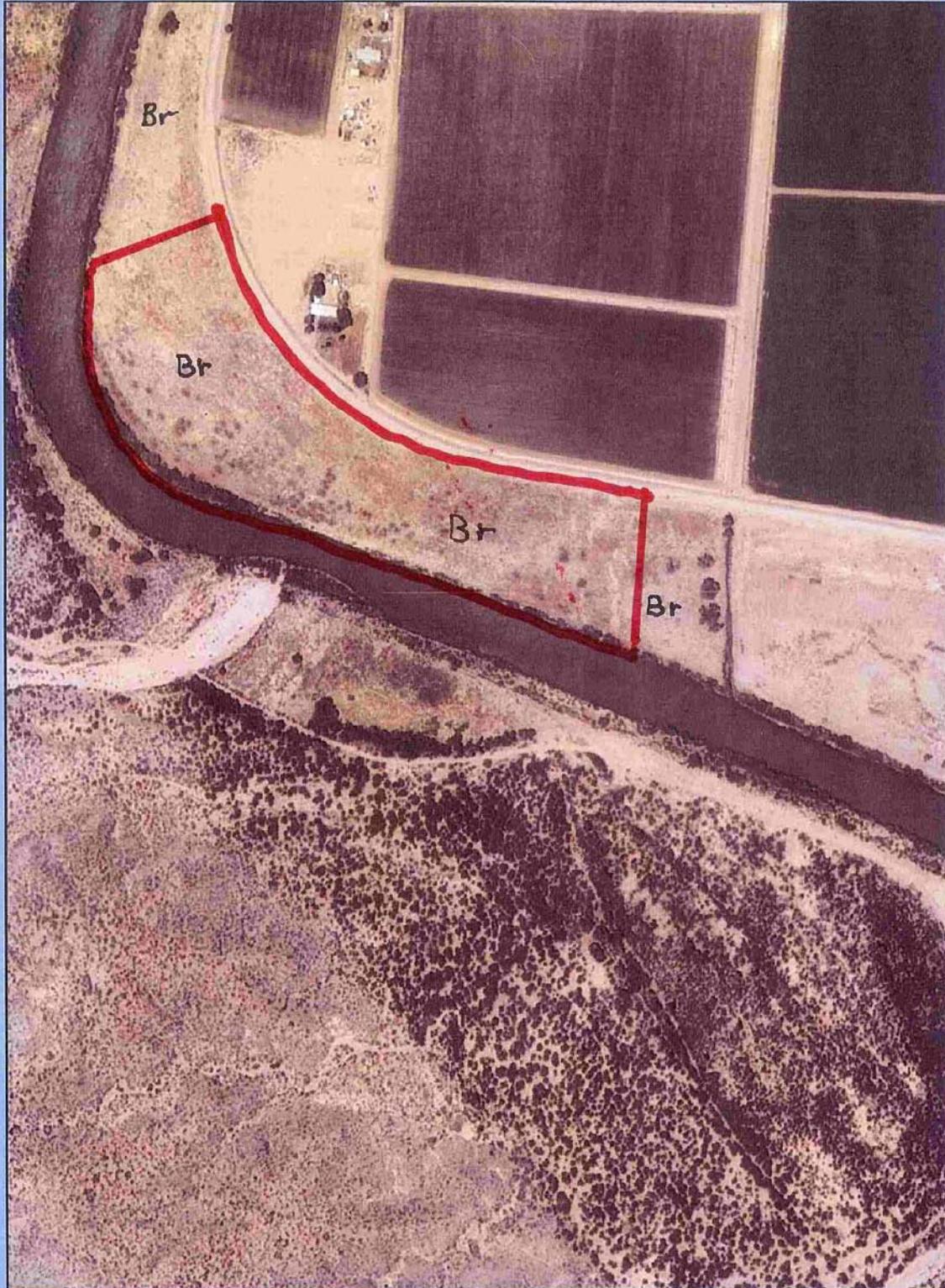
1:5,000

N



SITE # 3

Arroyo Cuervo NE



150 75 0 150 Meters

1:5,000

N



SITES # 4 & 5



0 40 80 160 240 320 Meters

1:5,000

SITE # 6-1

Arroyo Cuervo NE extended

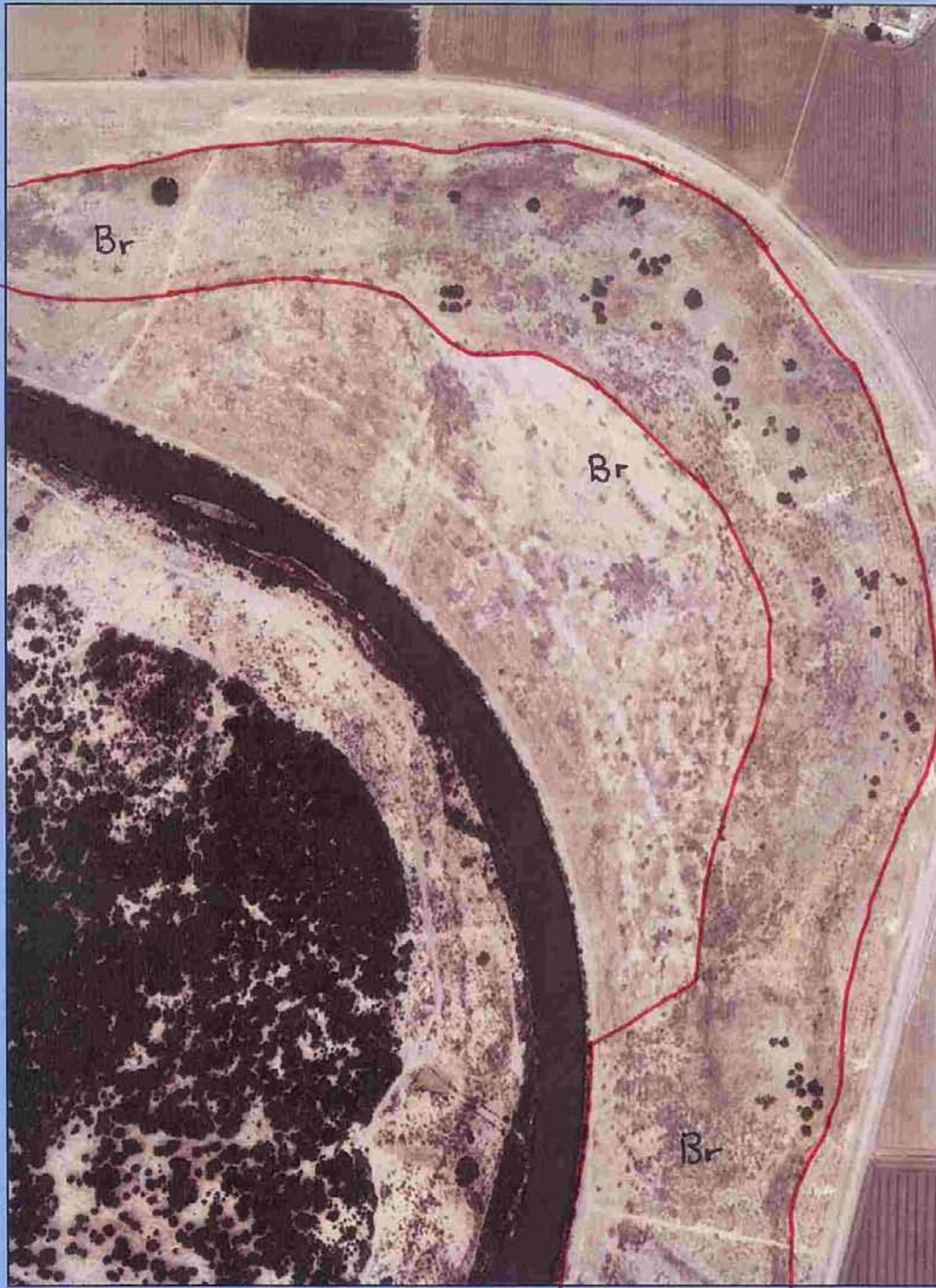


1:5,000

0 40 80 160 240 320 Meters

SITE # 6-2

Arroyo Cuervo NE



150 75 0 150 Meters

1:5,000



SITE # 6-3

Arroyo Cuervo NE



Arroyo Cuervo NE

Br

Br

Bs

Bs

Br

Bs

AJ

150 75 0 150 Meters

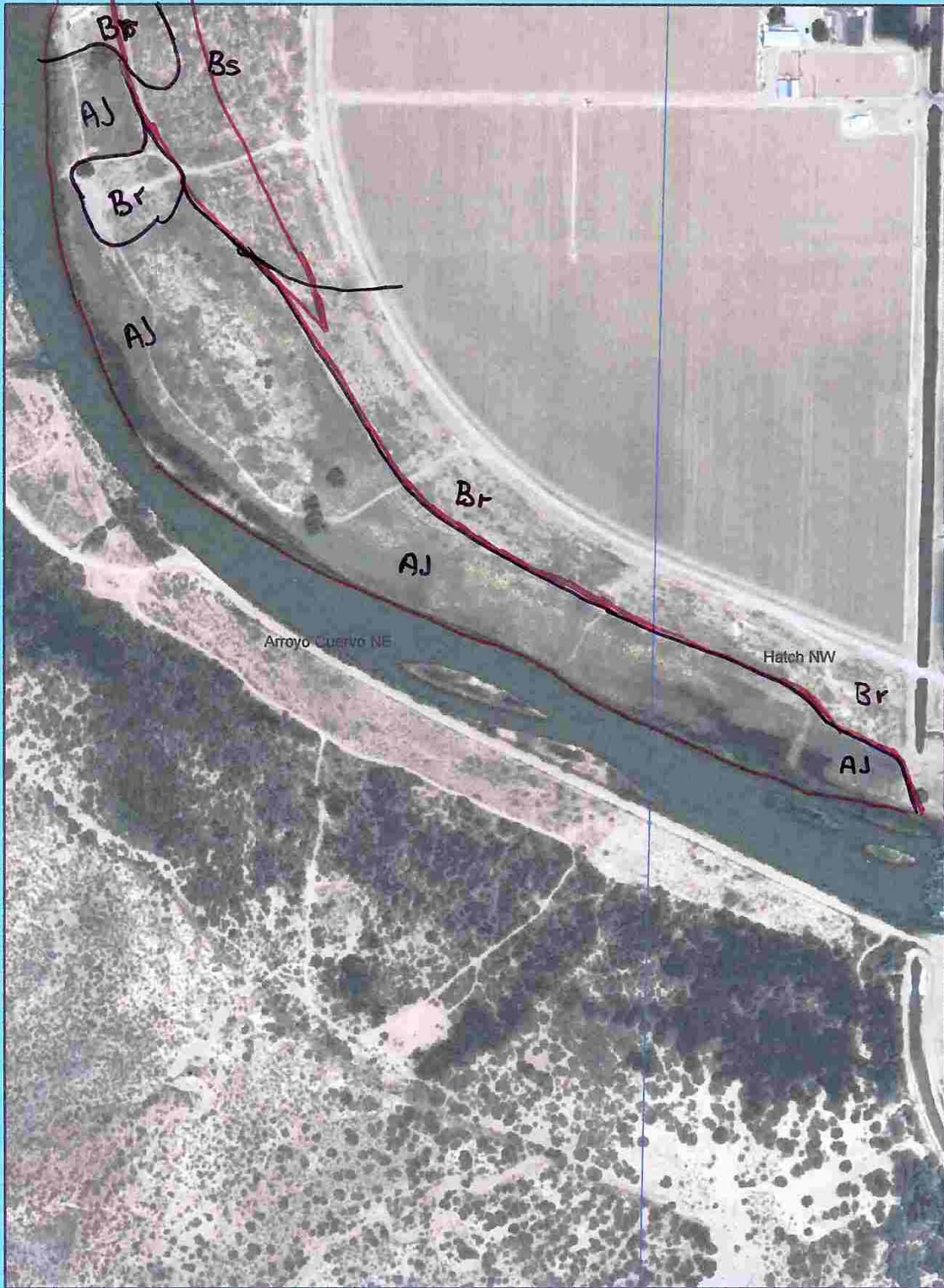
1:5,000

N



SITE # 7

Arroyo Cuervo NE

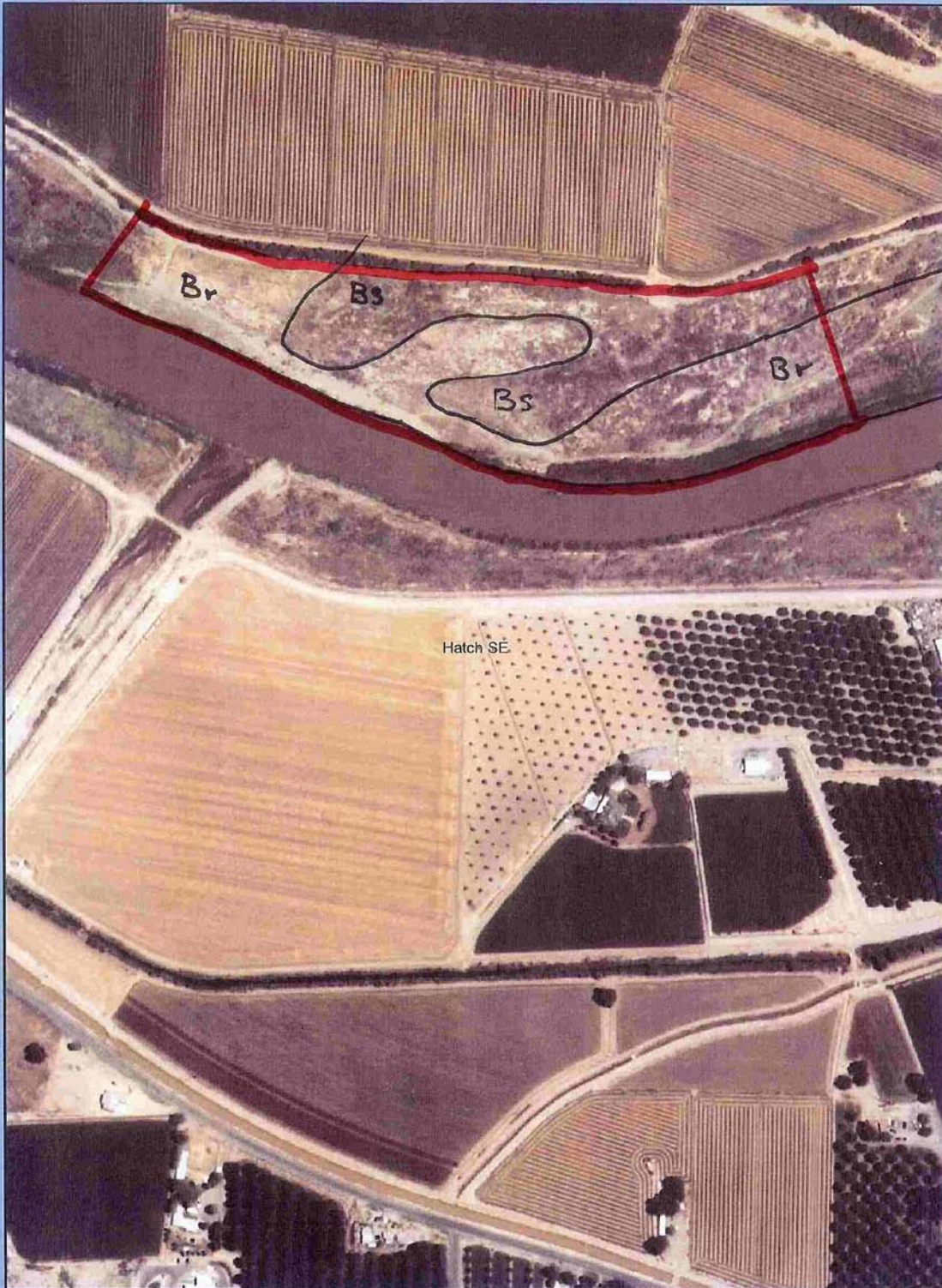


150 75 0 150 Meters

1:5,000

SITE # 8

Hatch SE



150 75 0 150 Meters

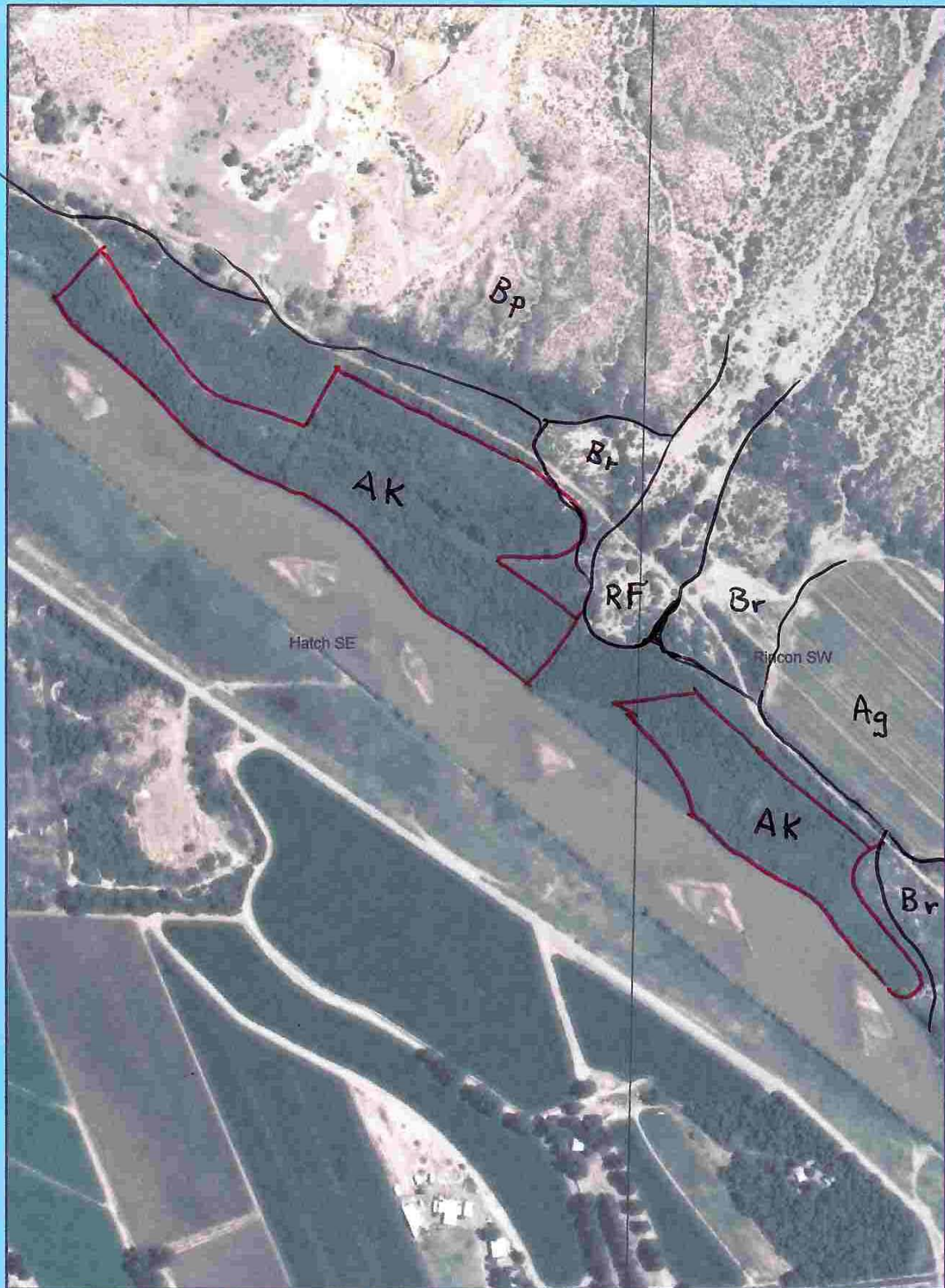


1:5,000



SITE # 9

Hatch SE Rincon SW



0 40 80 160 240 320 Meters

1:5,000

SITE # 10 Hatch SE Rincon SW

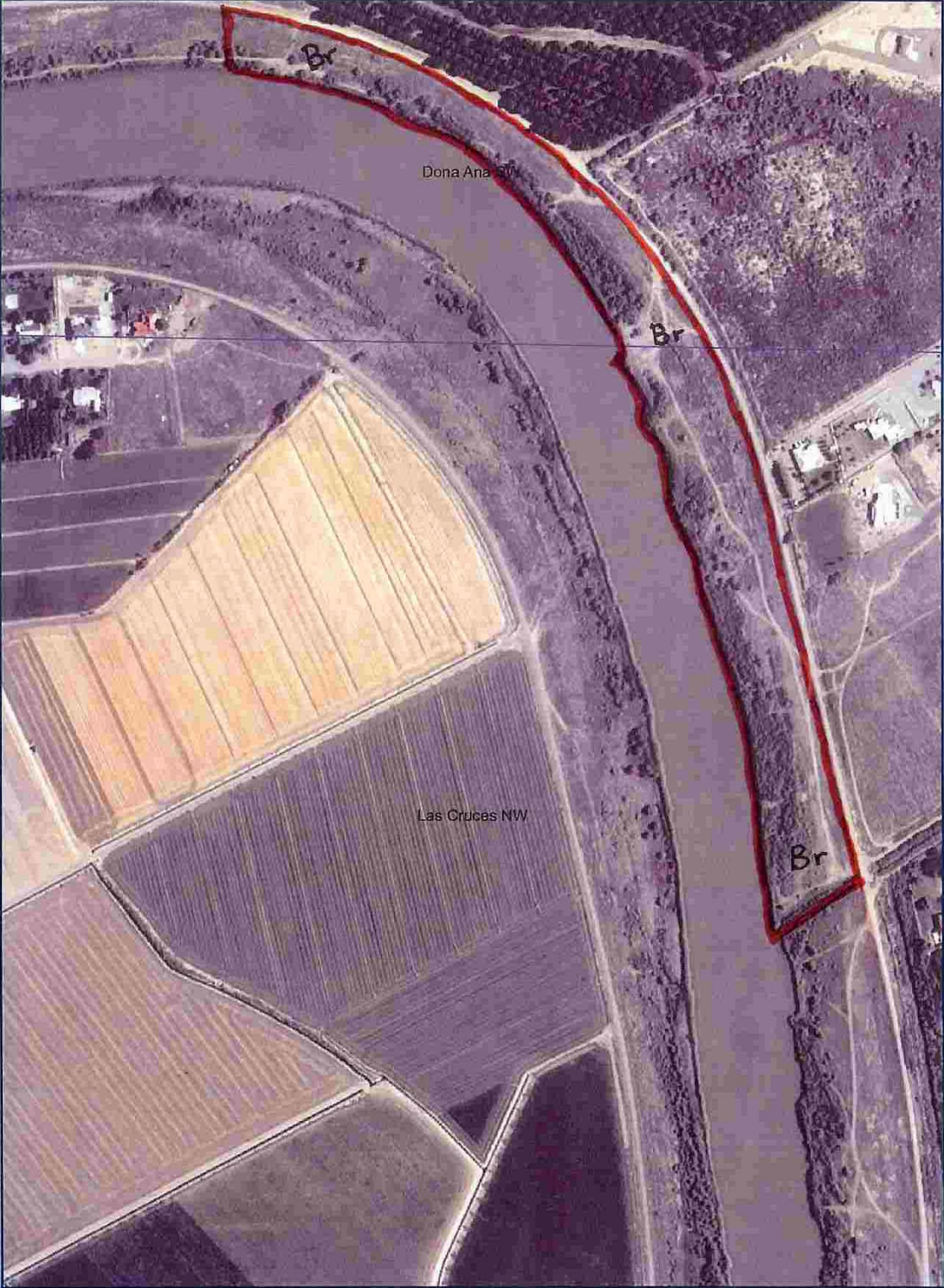


150 75 0 150 Meters

1:5,000



SITE # 17 Dona Ana SW and Las Cruces NW



150 75 0 150 Meters

1:5,000



SITE # 18

Las Cruces NW



150 75 0 150 Meters



1:5,000

N



SITE # 19

Las Cruces SW



150 75 0 150 Meters



1:5,000



SITE # 20 Las Cruces SW Black Meas NW



Las Cruces SW

Las Cruces SW

Black Mesa NW

150 75 0 150 Meters

1:5,000

N



SITE # 20

Las Cruces SW Black Meas NW

SITE # 21



150 75 0 150 Meters

1:5,000



SITE # 22

La Mesa NW



150 75 0 150 Meters



1:5,000

N



SITE # 23

La Mesa NW



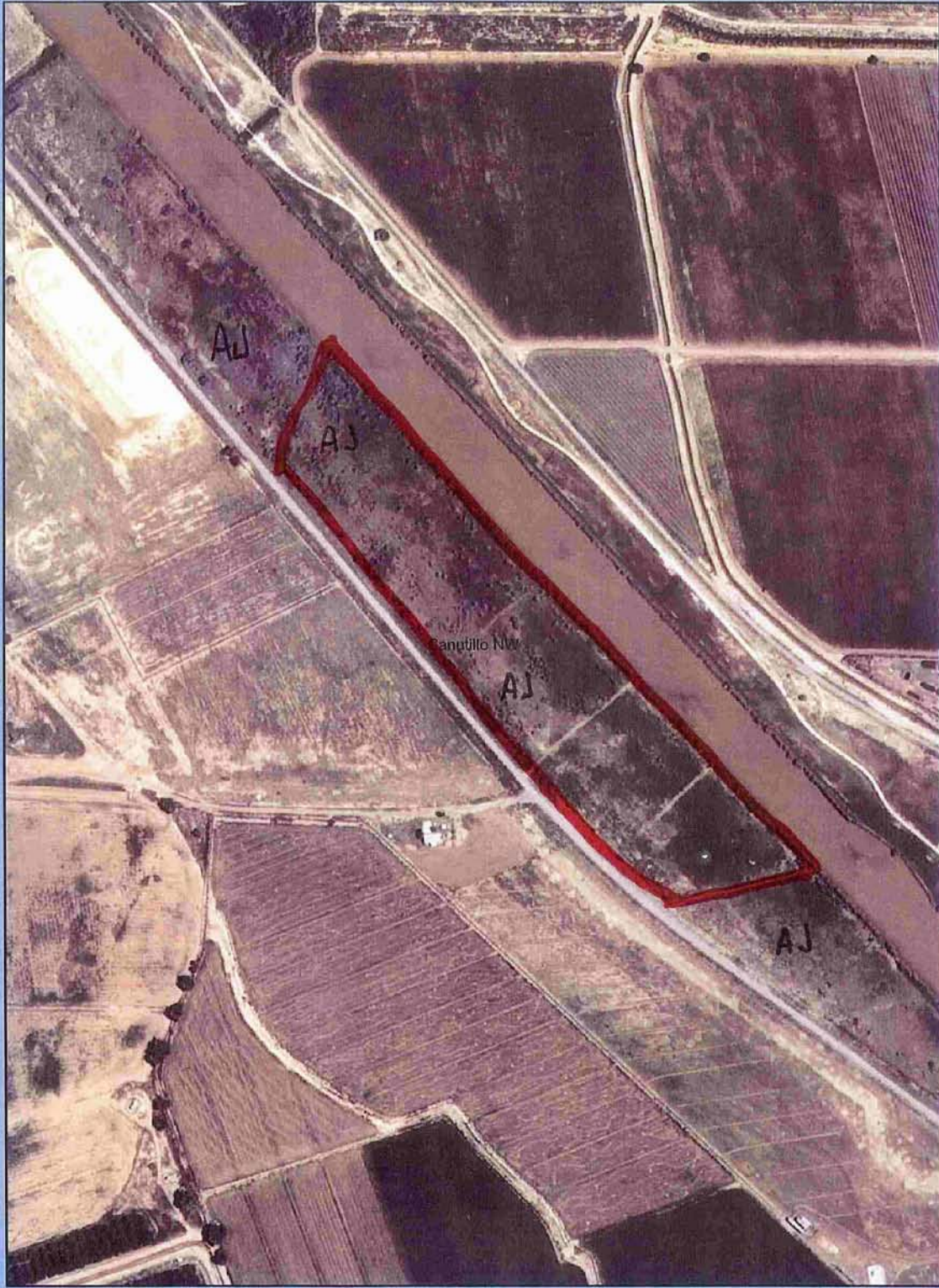
150 75 0 150 Meters

1:5,000



SITE # 24

Canutillo NW



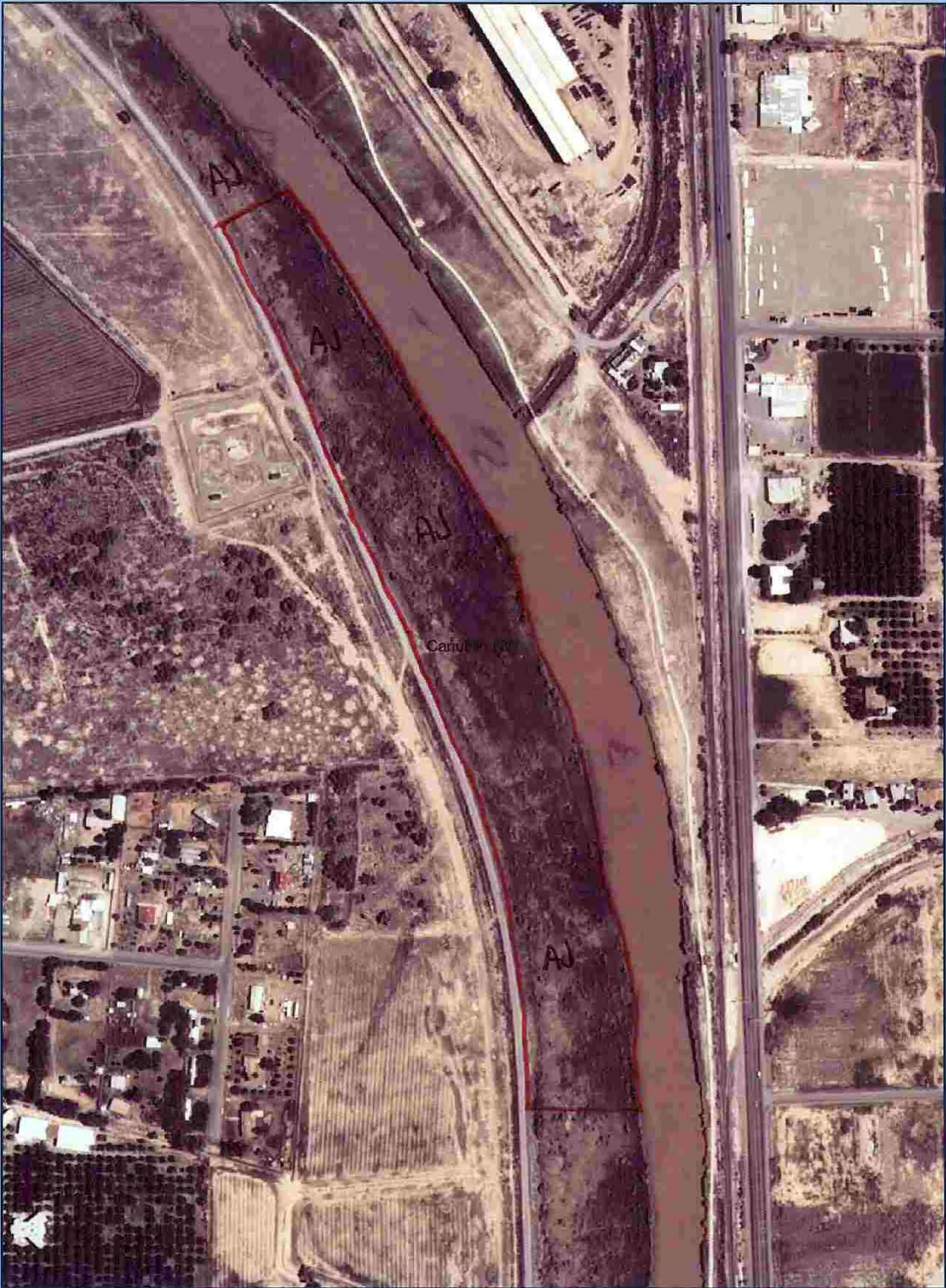
100 50 0 100 Meters

1:5,000



SITE # 25

Canutillo NW



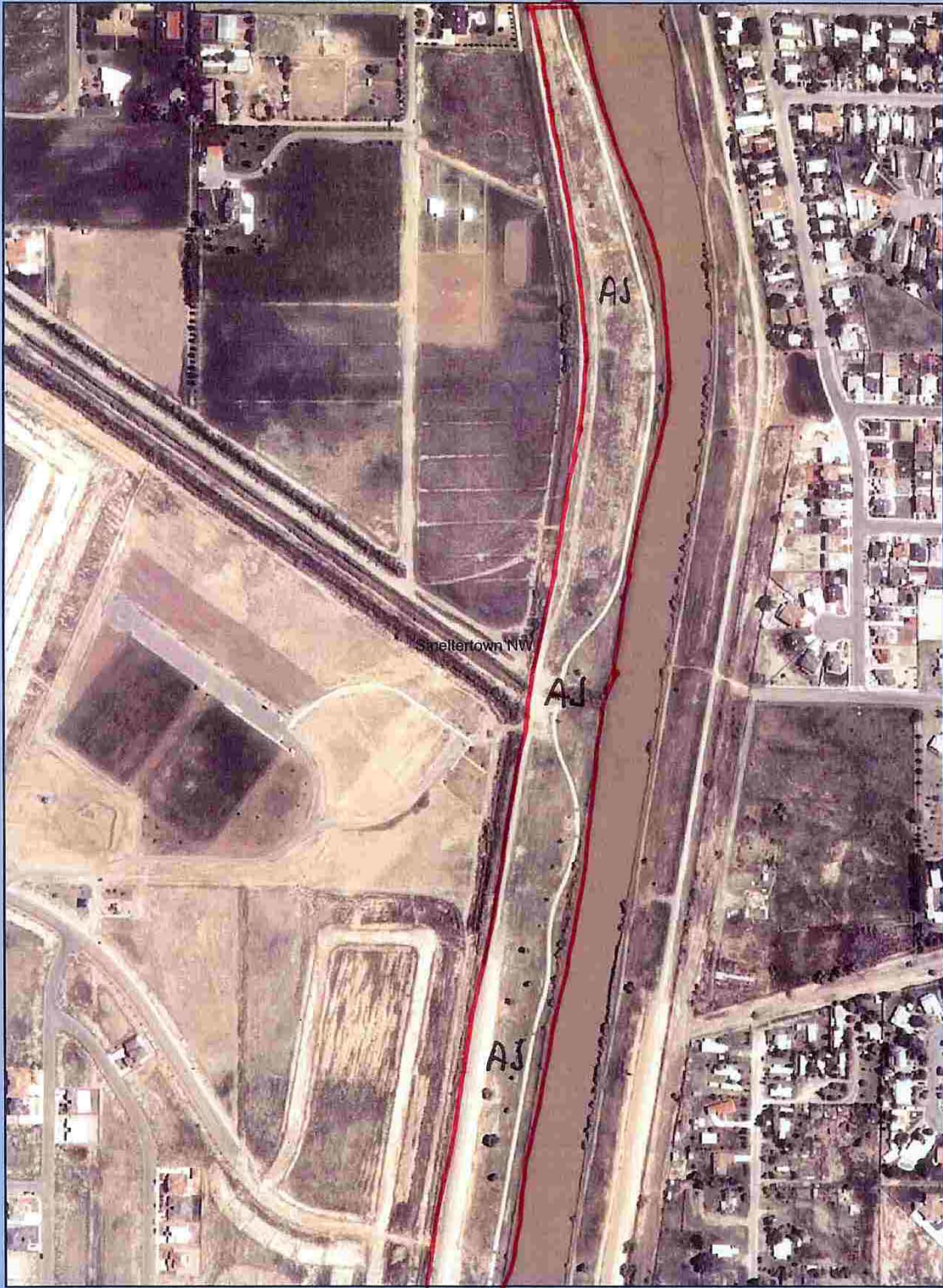
100 50 0 100 Meters

1:5,000



SITE # 26-1

Smelertown NW



100 50 0 100 Meters



1:5,000

N



SITE # 26-2

Smelertown NW



100 50 0 100 Meters



1:5,000



SITE # 27

Smelertown NW

SITE # 28-1



100 50 0 100 Meters

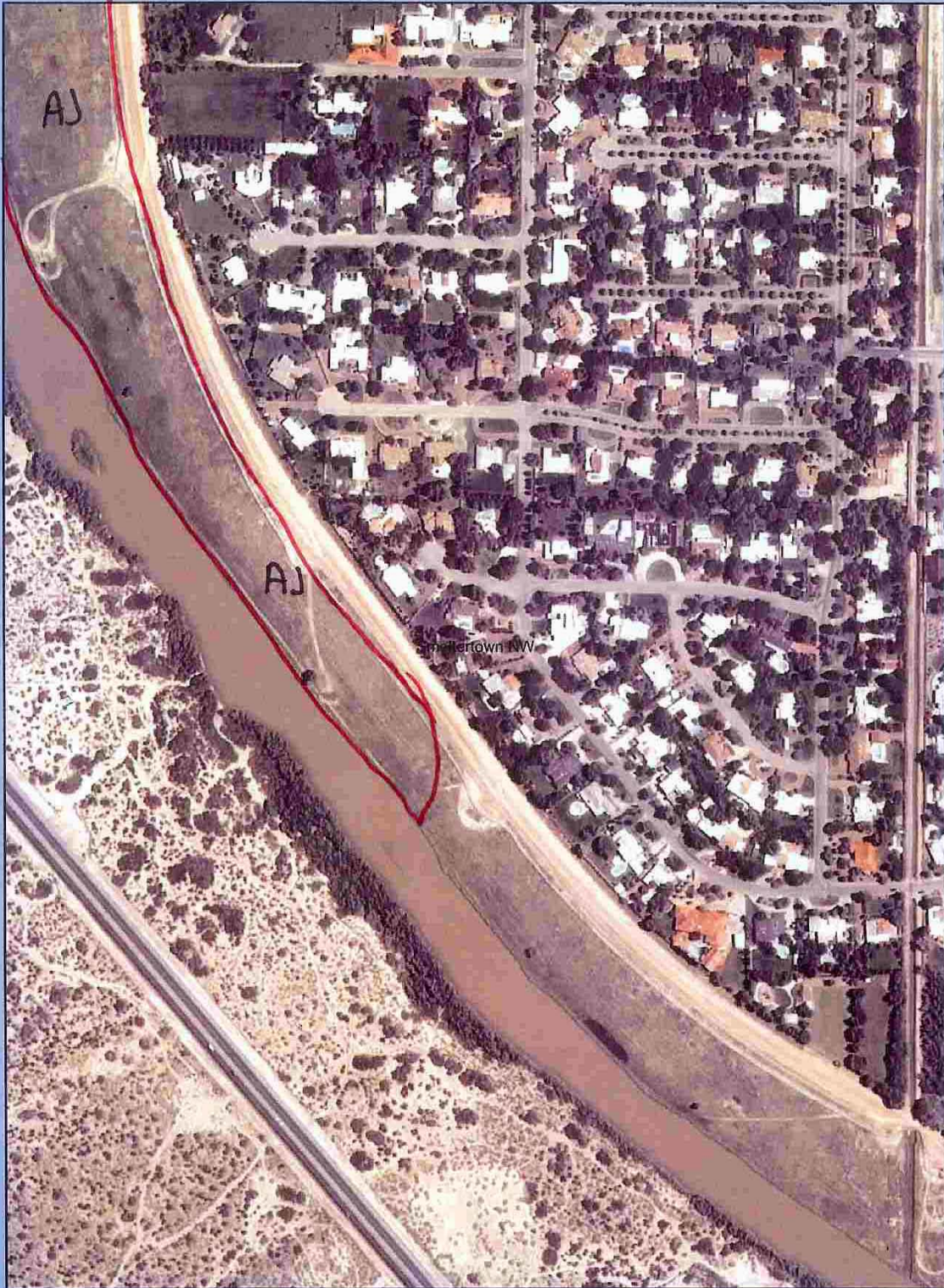


1:5,000



SITE # 28-2

Smelertown NW



100 50 0 100 Meters



1:5,000

N



SITE # 29

Smelertown SW



100 50 0 100 Meters



1:5,000

N



SITE # 30

Smelertown SW



100 50 0 100 Meters



1:5,000

N



APPENDIX 2 – SOIL DESCRIPTIONS

Site No.		Slope	Map Unit	Aspect		Water Table			Photos:
1-1		0.1	AJ	Flat		14 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)		%Clay		%RF	%Visible CaC03	Redox Features
A	0-9	1 f&m sbk	7.5YR 4/2	vfsi	15	v	0	0	none
C1	9-16	SG	10 YR 4/2	fs	4	none	0	0	few black masses
C2	16-20	No data, hole collapsed at 16 inches, quicksand.							
VEGETATION AND NOTES		50 yards from river							
Almost 100% willow canopy cover, 2 large salt cedars, 80 % Inland Salt Grass cover.									
Site No.		Slope	Map Unit	Aspect		Water Table			Photos:
1-2		0.1	AJ	Flat		30 inches			W,N,E,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	1 f&msbk	10YR 4/3	lfs	6	v	10	0	None
C1	6-22	sg	10YR 4/2	lfs	4	v	10	0	None
C2	22-40	sg	10YR 4/3	lfs	4	v	5	0	None
VEGETATION AND NOTES		willow, salt cedar, grasses, weeds Hole collapsed at 40 inches (quicksand) Surface crust 1/4 inch vfsi, gravel on surface,							
Site No.		Slope	Map Unit	Aspect		Water Table			Photos:
1-3		0.1	Br	Flat		> 20 inches??			E,S,W,N
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-12	1 f&msbk	10YR 4/3	lvfs	7	v	0	0	None
C1	12-20	SG	10YR 4/2	lfs	4	v	10	0	None
C2	20+	Hole collapsed, too dry and gravelly			4	v	12	0	None
VEGETATION AND NOTES		Four-wing salt bush is dominant plant, Veg indicates "drier"site. Site 1-3 is higher in elevation than site 1-1 and 1-2. Hole collapsed at 16-20 inches (dry and gravelly)							
Estimate the water table greater than 42 inches, therefore site is Br - Brazito LFS, 0 to 1 percent slopes									

Site No.		Slope	Map Unit	Aspect		Water Table			Photos:
2-1		0.1	Ao	Concave		38 inches			none
Horizon	Depth (inches)	Structure	Color (moist)		%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-2	2 f&m plty	7.5YR 4/2	cl	35	v	0	2-5	none
C1	2-9	2 f&m sbk	7.5YR 4/2	cl	35	v	0	0	none
C2	9-18	SG	7.5YR 4/3	cl	32	v	0	0	none
Ab	18-36	2 f&m sbk	10 YR 4/2	cl	32	v	0	2-5	none
C3	36-42	SG	10 YR 4/2	s	4	none	0	0	none

VEGETATION AND NOTES: The lower part of this site is Anapra CL and the sideslopes are Brazito LFS

Salt Cedar, Screwbean mesquite, Leafy green weed, Bermuda grass

Site No.		Slope	Map Unit	Aspect		Water Table			Photos:
2-2		0.1	Ao	Concave		45 inches			E,N,S,W
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	2 c sbk	7.5YR 4/3	cl	35	v	0	2-5	none
C1	5-18	2 f&m sbk	7.5YR 4/2	cl	35	v	0	2-5	none
C2	10-30	sg	7.5YR 4/3	fs	8	sl	0	0	none
C3	30-60	sg	10YR 4/2	s	4	sl	0	0	none

VEGETATION AND NOTES: Salt Cedar, Screwbean mesquite, Leafy green weed, Bermuda grass

Site No.		Slope	Map Unit	Aspect		Water Table			Photos:
2-3		0.1	Ao	Concave		43 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	2 c sbk	7.5YR 4/3	cl	35	v	0	2-5	none
C1	6-20	2 f&m sbk	7.5YR 4/2	cl	35	v	0	2-5	none
C2	20-32	sg	7.5YR 4/3	fs	8	sl	0	0	none
C3	32-62	sg	10YR 4/2	s	4	sl	0	0	none

VEGETATION AND NOTES

Salt Cedar, Screwbean mesquite, Leafy green weed, Bermuda grass

Site No.		Slope	Map Unit	Aspect		Water Table			Photos:
2-4		0.1	Ao	Concave		38 inches			none
Horizon	Depth (inches)	Structure	Color (moist)		%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	2 f&m plty	7.5YR 4/2	cl	35	v	0	2-5	none
C1	6-20	2 f&m sbk	7.5YR 4/2	cl	35	v	0	0	none
C2	20-32	m	7.5YR 4/3	cl	32	v	0	0	none
C3	36-42+	SG	10 YR 4/2	s	4	none	0	0	none

VEGETATION AND NOTES: The lower part of this site is Anapra CL and the sideslopes are Brazito LFS



Salt Cedar, Screwbean mesquite, Leafy green weed, Bermuda grass									
Site No.		Slope	Map Unit	Aspect		Water Table			Photos:
3-1		0.1	Br	convex		none			W,S,E,N
Horizon	Depth (inches)	Structure	Color (moist)		%Clay		%RF	%Visible CaC03	Redox Features
A	0-6	1 f&m sbk	10 YR 4/3	lfs	6	v	<1	0	none
C1	6-11	sg	7.5YR 4/3	fs	4	v	<1	0	none
C2	11-42	sg	10 YR 4/3	lfs	8	v	<1	0	none
C3	42-62	sg	10 YR 4/3	fs	4	v sl	<1	0	none

VEGETATION AND NOTES: Scattered weeds and grasses, few mowed screwbean mesquite and salt cedar plants.

Site 3-1 is in the middle of the site.

Site No.		Slope	Map Unit	Aspect		Water Table			Photos:
3-2		0.1	Br	convex		none			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	1 f&msbk	10 YR 4/3	lfs	6	v	<1	0	None
C1	5-21	sg	10 YR 4/3	fs	4	v	<1	0	None
C2	21-42	sg	10 YR 4/3	lfs	8	v	<1	0	None
C3	42-62	sg	10 YR 4/3	fs	4	v sl	<1	0	none

VEGETATION AND NOTES: Same as site 3-1

Site No.		Slope	Map Unit	Aspect		Water Table			Photos:
3-3		0.1	Br	Flat		none			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox features
A	0-6	1 f&msbk	10 YR 4/3	lfs	6	v	<1	0	none
C1	6-19	sg	10 YR 4/3	fs	4	v	<1	0	none
C2	19-37	sg	10 YR 4/3	lfs	6	v	<1	0	none
C3	37-62	sg	10 YR 4/3	fs	4	v sl	<1	0	none
VEGETATION AND NOTES: Same as site 3-1									
Site No.		Slope	Map Unit	Aspect		Water Table			Photos:
4-1		0.1	Br	concave		50 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-10	sg	10 YR 4/3	gr lfs	7	v	16	0	none
C1	10-36	sg	10 YR 4/3	gr fs	4	none	16	0	none
C2	36-60	sg	7.5YR 4/2	fs	4	none	3	0	none
VEGETATION AND NOTES: Young salt cedar along edges, tall green leafy weed (2 feet tall),alkali sacaton, Russian thistle									
This site is an old meander scar on the flood plain									
Site No.		Slope	Map Unit	Aspect		Water Table			Photos:
4-2		0.1	Br	concave		>46			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-8	1 f&msbk	10 YR 4/3	gr lfs	8	v	25	0	None
C1	8-22	sg	10 YR 4/3	gr lfs	8	v	25	0	None
C2	22-46+	m	7.5YR 4/2	cl	34	v	0	2-5	None
VEGETATION AND NOTES: Vegetation same as site 4-1 Hole collapsed, removed 8 buckets of material and hole remained at same depth.									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
4-3		0.1	Br	concave		>42			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-8	1 f&msbk	7.5YR 4/3	gr lfs	8	v	18	0	None
C1	8-36	sg	7.5YR 4/3	gr lfs	8	v	20	0	None
Ab	36-42	2 f&m sbk	7.5YR 4/2	cl	35	v	0	5	None

VEGETATION AND NOTES: 75% Alkali sacaton, few salt cedar along edge of low, tall green weed, gray weed with succulent hairy leaves.

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
5-1		0.1	Br	convex		none			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	1 f&m sbk	7.5YR 4/3	lfs	8	v	12	0	none
C1	5-17	sg	7.5YR 4/3	lfs	8	v	8	0	none
C2	17-24	sg	7.5YR 4/3	fs	4	v	2	0	none
C3	24-32	1 f&m sbk	7.5YR 4/3	fs	6	v	0	0	none
C4	32-62	sg	7.5YR 4/3	fs	4	v	4	0	none

VEGETATION AND NOTES: Screwbean mesquite, Salt cedar, weeds. Salt cedar is solid thicket along riverbank.

Soil profile photo taken in arroyo 150 yards west of site. Site 5 shows influence of local deposition of redder sediments coming from arroyo to the West.

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
5-2		0.1	Br	convex		none			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	1 f&msbk	7.5YR 4/3	lfs	8	v	10	0	None
C1	6-24	sg	7.5YR 4/3	lfs	8	v	12	0	None
C2	24-42	sg	7.5YR 4/3	fs	4	v	2	0	None
C3	42-61	sg	7.5YR 4/3	fs	4	v	5	0	

VEGETATION AND NOTES: Same as site 5-1 Adjacent to the river, site is lower and water table will be nearer the surface.

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
		0.1	Br	convex		none			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	1 f&msbk	7.5YR 4/3	lfs	12	v	10	0	None
C1	5-18	sg	7.5YR 4/3	lfs	8	v	10	0	None
C2	18-39	sg	7.5YR 4/3	fs	5	v	3	0	None
C3	42-61	sg	7.5YR 4/3	fs	2	v	3	0	None

VEGETATION AND NOTES: Same as site 5-1

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
6-1		0.2	Br	concave		none			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	sg	7.5YR 4/2	lfs	6	v	0	0	none
C1	6-18	sg	10 YR 4/3	s	4	v	0	0	none
C2	18-36+	sg	10 YR 4/3	gr s	4	v	30	0	none

VEGETATION AND NOTES: Many young salt cedar, Site 6-1 is in low concave drainageway on floodplain. Large cottonwood to 20 feet scattered across entire site. Hole collapsed at 36 to 40 inches, too dry and gravelly to dig with bucket auger.

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
6-2		0.1	Br	convex		none			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-7	1 f&msbk	7.5YR 4/2	fsl	14	v	0	0	none
C1	7-19	sg	10 YR 4/3	s	4	v	0	0	none
C2	19-37	sg	10 YR 4/3	gr s	4	v	25	0	none
C3	37+	Hole collapsed too dry		gr s	4	none	25	0	none

VEGETATION AND NOTES: Same as site 6-1 except several large cottonwoods are present on site.



Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
6-3		0.1	Br	concave		55		N,E,S,W	
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	1 f&msbk	7.5YR 4/3	lfs	8	v	0	0	none
C1	6-18	sg	10 YR 4/3	fs	6	v	0	0	none
C2	18-24	sg	10 YR 4/3	fs	6	sl	5	0	none
C3	24-42	sg	10 YR 4/3	fs	4	none	2	0	none
C4	42-62	sg	10YR 4/3	fs	4	none	2	0	none
VEGETATION AND NOTES: Same as site 6-1									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
6-4		0.1	Br	convex		none		none	
Horizon	Depth (inches)	Structure	Color (moist)		%Clay		%RF	%Visible CaC03	Redox Features
A	0-7	1 f&msbk	7.5YR 4/3	fsl	14	v	10	0	none
C1	7-19	sg	7.5YR 4/3	fs	4	v	10	0	none
C2	19-37	sg	10 YR 4/3	fs	4	v	5	0	none
VEGETATION AND NOTES: Same as site 6-1									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
6-5		0.1	Br	concave		43 inches		N,E,W,S	
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	1 f&msbk	7.5YR 4/3	lfs	8	v	0	0	none
C1	6-12	sg	7.5YR 4/3	fs	4	v	0	0	none
C2	12-24	sg	10 YR 4/3	s	4	sl	0	0	none
C3	24-36	sg	10 YR 4/3	fs	4	sl	0	0	none
C4	36-62	sg	10 YR 4/3	s	4	sl	0	0	none
VEGETATION AND NOTES: Common young salt cedar, few large cottonwood, alkali sacaton, 50 to 60 percent bare ground									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
6-6		0.1	AJ	concave		43 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	1 f&msbk	7.5YR 4/3	lfs	8	v	0	0	none
C1	5-14	sg	7.5YR 4/3	fs	4	v	0	0	none
C2	14-25	sg	10 YR 4/3	s	4	sl	0	0	none
C3	25-34	sg	10 YR 4/3	fs	4	sl	0	0	none
C4	34-62	sg	10 YR 4/3	s	4	sl	0	0	none
VEGETATION AND NOTES: Same as 6-5									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
6-6		0.1	AJ	concave		42 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	1 f&msbk	7.5YR 4/3	gr lfs	8	v	16	0	none
C1	6-16	sg	7.5YR 4/3	gr lfs	4	v	16	0	none
C2	16-24	sg	10 YR 4/3	s	4	sl	0	0	none
C3	24-36	sg	10 YR 4/3	fs	4	sl	0	0	none
C4	36-62	sg	10 YR 4/3	s	4	sl	0	0	none
VEGETATION AND NOTES: Same as 6-5									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
6-7		0.1	AJ	concave		44 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	1 f&msbk	7.5YR 4/3	lfs	8	v	0	0	none
C1	6-12	sg	7.5YR 4/3	fs	4	v	0	0	none
C2	12-24	sg	10 YR 4/3	s	4	sl	0	0	none
C3	24-36	sg	10 YR 4/3	fs	4	sl	0	0	none
C4	36-62	sg	10 YR 4/3	s	4	sl	0	0	none
VEGETATION AND NOTES: Same as 6-5									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
6-8		0.1	Br	Flat		48 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	1 f&msbk	7.5YR 4/3	lfs	8	v	0	0	none
C1	6-12	sg	7.5YR 4/3	fs	4	v	0	0	none
C2	12-24	sg	10 YR 4/3	s	4	sl	0	0	none

C3	24-36	sg	10 YR 4/3	fs	4	sl	0	0	none
C4	36-62	sg	10 YR 4/3	s	4	sl	0	0	none
VEGETATION AND NOTES: Same as 6-5									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
6-9		0.1	Br	convex		46 inches			N,E,W,S
	Depth (inches)	Structure	Color (moist)		%Clay		%RF	%Visible CaC03	Redox Features
A	0-6	1 f&msbk	7.5YR 4/3	lfs	8	v	0	0	none
C1	6-12	sg	7.5YR 4/3	fs	4	v	0	0	none
C2	12-24	sg	10 YR 4/3	s	4	sl	0	0	none
C3	24-36	sg	10 YR 4/3	fs	4	sl	0	0	none
C4	36-62	sg	10 YR 4/3	s	4	sl	0	0	none
C5									
VEGETATION AND NOTES: same as 6-5									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
7-1		0.1	AK	concave		(+) 6 to 8 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-12	m	7.5YR 3/2	sl	15	none	0	0	
C1	12-30	m	7.5YR 4/2	fsl	4	none	0	0	
C2	?								
VEGETATION AND NOTES: Cat tail, sedges. Water standing 6 to 8 inches deep. Salt cedar around edges of standing water.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
7-2		0.1	AK	concave		19 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A1	0-3	1 f&msbk	7.5YR 4/2	vfl	15	v	0	0	none
A2	3-8	1 f&msbk	7.5YR 4/3	fsl	12	v	0	0	none
C2	8-22	sg	7.5YR 4/3	fs	4	v	0	0	None
C3	22-32	sg	10 YR 4/3	fs	4	v sl	0	0	none
C4	32-40+	sg	10 YR 4/3	fs	4	sl	10	0	none
VEGETATION AND NOTES: Alkali sacaton, 3 large to 50 feet cottonwods, few small mesquite, many young salt cedar, salt efflorescence visible in road.									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
7-3		0.1	AJ	concave		19 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaCO3	Redox Features
A	0-10	sg	10YR 4/3	LFS	8	V	10	none	none
C2	10-22	sg	7.5YR 4/3	fs	4	v	0	0	None
C3	22-32	sg	10 YR 4/3	fs	4	v sl	0	0	none
C4	32-40+	sg	10 YR 4/3	fs	4	sl	10	0	none

VEGETATION AND NOTES: Same as site 7-2. Both 7-1, 7-2 and 7-3 are 3 to 4 feet below average ground elevation.

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
7-4		0.1	Br	convex		> 60 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaCO3	Redox Features
A	0-6	1 f&msbk	10 YR 4/3	lfs	6	v	<1	0	none
C1	6-19	sg	10 YR 4/3	fs	4	v	<1	0	none
C2	19-37	sg	10 YR 4/3	lfs	6	v	<1	0	none
C3	37-62	sg	10 YR 4/3	fs	4	v sl	<1	0	none

VEGETATION AND NOTES: Mostly bare ground, some grass, scattered salt cedar and mesquite (mowed). One large cottonwood.

This area is 4 feet higher elevation than sites 7-1, 7-2 and 7-3.

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
8-1		0.1	Bs	Flat		52 inches			S only
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaCO3	Redox Features
A1	0-6	1 f&msbk	10 YR 4/3	vfs	12	v	0	2	none
A2	6-12	1 f&m pty	10 YR 4/3	vfs	15	v	0	2-5	none
C2	12-30	sg	10 YR 4/3	s	4	st	0	0	none
C3	30-48	sg	10 YR 4/3	s	4	v	0	0	c m d 7.5YR3/4
C4	48-62	sg	10 YR 4/3	s	4	sl	0	0	c m d 7.5YR3/4

VEGETATION AND NOTES: mowed common young salt cedar and screwbean mesquite, mostly weeds, 50 % bare, no grasses

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
8-2		0.1	Br	convex		>60 inches			W only
	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
Ap	0-12	sg	7.5YR 4/2	lfs	8	v	0	2	none
C1	12-28	sg	10 YR 4/3	fs	4	v	0	0	none
C2	28-50	sg	10 YR 4/3	fs	4	st	0	0	none
C3	50-62	sg	10 YR 4/3	s	4	sl	0	0	none
VEGETATION AND NOTES: No screwbean or salt cedar. Weeds and grasses cover about 20%. Soil at 60 near saturation, WT within a few inches.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
8-3		0.1	Br	convex		60 inches			W only
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
Ap	0-10	sg	7.5YR 4/2	lfs	8	v	0	2-5	none
C1	10-29	sg	10 YR 4/3	fs	4	v	0	0	none
C2	29-47	sg	10 YR 4/3	fs	4	st	0	0	none
C3	47-62	sg	10 YR 4/3	s	4	sl	0	0	none
VEGETATION AND NOTES: Salt cedar along river bank. Weeds and grasses cover about 30%.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
8-4		0.1	Bs	Flat		> 60 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
Site 8-4 is same as site 8-1									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
8-5		0.1	Br	Flat		>60 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	1 f&msbk	10 YR 4/3	lfs	6	v	<1	0	none
C1	6-21	sg	10 YR 4/3	fs	4	v	<1	0	none
C2	21-37	sg	10 YR 4/3	lfs	6	v	<1	0	none
C3	37-62	sg	10 YR 4/3	fs	4	v sl	<1	0	none
VEGETATION AND NOTES: Mostly bare ground, few weeds and grasses.									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
9-1		0.1	AJ/AK	convex		49 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	sg	7.5YR 4/2	lvfs	6	v	<1	0	
C1	5-12	sg	7.5YR 4/3	fsl	8	v	2-5	0	
C2	12-36	sg	7.5YR 4/3	ffsl/l	15	v	<1	0	few reddish and black masses
C3	36-52+	sg	7.5YR 4/3	cs	4	v	<1	0	com. reddish and black masses
VEGETATION AND NOTES: 40% bare, 60 % weeds, grass and Common salt cedar and screwbean mesquite around edges of site 9-1									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
9-2		0.1	AJ/AK	convex		47 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
This site has same soil properties as 9-1 except water table is 2 inches higher									
VEGETATION AND NOTES: Same as hole 9-1									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
9-3		0.1	AK	concave		9 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-10	m	7.5YR 4/2	cl	35	v	0	0	few med red
C1	10-24	m	7.5YR 4/2	scl	28	st	0	0	few med black
C2	24-50	m	7.5YR 4/2	fsl	15	none	0	0	com.reddish and black masses
VEGETATION AND NOTES: 100 % cover grasses, many sedges, common salt cedar, few willow, soil at field capacity at surface.									

Site No.		Slope	Map Unit	Aspect		Water Table			Photos:
9-4		0.1	AJ/AK	convex		42 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	sg	7.5YR 4/3	fs	4	v	0	0	
C1	6-18	sg	7.5YR 4/3	fs	4	v	0	0	
C2	18-48	m	7.5YR 4/3	sl	20	st	0	0	few f&m d, 7.5 YR 4/6 and 2/1 coatings and masses
C3	48-60	m	7.5YR 4/2	sl	15	sl	0	0	com. f&m d reddish and black masses
VEGETATION AND NOTES: North edge of site away from river, common large salt cedar & screwbean mesquite, 90% cover bermuda and medium grasses									
Site No.		Slope	Map Unit	Aspect		Water Table			Photos:
9-5		0.1	AK	concave		23 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-10	2 f&m sbk	7.5YR 4/2	cl	35	v	0	10	
C1	10-20	m	7.5YR 4/2	cl	35	v	0	10	few f&m d, 7.5 YR 4/6 and 2/1 coatings and masses and masses
C2	20-28+	sg	7.5YR 4/3	cs	5	none	0	0	
VEGETATION AND NOTES: Hole collapsed 28 in. (quicksand), 75% salt cedar canopy, mostly bare ground, few weeds, bermuda and other grasses.									
Site No.		Slope	Map Unit	Aspect		Water Table			Photos:
9-6		0.1	AJ/AK	flat		20 inches			one to south
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A1	0-5	2 f&m sbk	7.5YR 4/2	loam	22	v	0	2-5	few f&m d, 7.5 YR 4/6 coatings and masses
A2	5-12	1m abk	7.5YR 4/2	loam	25	v	0	0	few f&m d, 7.5 YR 4/6 and 2/1 coatings and masses
C1	12-36	m	7.5YR 4/2	loam	20	v	0	0	few f&m d, 7.5 YR 4/6 and 2/1 coatings and masses
C2	36-52	sg	10 YR 4/2	loam	5	st	0	0	few f&m d, 7.5 YR 4/6 and 2/1 coatings and masses
VEGETATION AND NOTES: 75% canopy salt cedar to 12 feet, 100% Bermuda grass cover, few giant sacaton, few sedges.									

Site No.		Slope	Map Unit	Aspect		Water Table			Photos:
9-7		0.1	AK	flat		20 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A1	0-6	2 f&m sbk	7.5YR 4/2	loam	22	v	0	2-5	few fine and med distinct 7.5 YR 4/6 coatings and masses
A2	6-11	1m abk	7.5YR 4/2	loam	25	v	0	0	few fine and med 7.5 YR 4/6 and 2/1 coatings and masses
C1	11-33	m	7.5YR 4/2	loam	20	v	0	0	few fine and med 7.5 YR 4/6 and 2/1 coatings and masses
C2	33-54+	sg	10 YR 4/2	loam	5	st	0	0	few fine and med 7.5 YR 4/6 and 2/1 coatings and masses
VEGETATION AND NOTES: 75% canopy salt cedar to 12 feet, 100% Bermuda grass cover, few giant sacaton, few sedges.									
Site No.		Slope	Map Unit	Aspect		Water Table			Photos:
9-8		0.1	AK	flat		21 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A1	0-6	2 f&m sbk	7.5YR 4/2	loam	22	v	0	2-5	few fine and med distinct 7.5 YR 4/6 coatings and masses
A2	6-13	1m abk	7.5YR 4/2	loam	25	v	0	0	few fine and med 7.5 YR 4/6 and 2/1 coatings and masses
C1	13-30	m	7.5YR 4/2	loam	20	v	0	0	few fine and med 7.5 YR 4/6 and 2/1 coatings and masses
C2	30-62	sg	10 YR 4/2	loam	5	st	0	0	few fine and med 7.5 YR 4/6 and 2/1 coatings and masses
VEGETATION AND NOTES: 60 to 90% canopy cover salt cedar , few to common sedges and Bermuda grass.									
Site No.		Slope	Map Unit	Aspect		Water Table			Photos:
9-9		0.1	AK	flat		37 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A1	0-6	1 f&m sbk	7.5YR 4/2	loam	18	v	5	2	
A2	6-12	1 f&m sbk	7.5YR 4/2	fsl	15	v	5	0	
C1	12-24	m	7.5YR 4/2	fsl	15	v	0	0	
C2	24-42	m	10 YR 4/2	loam	18	v	0	0	
C3	42-48+	m	10 YR 4/2	vfsl	12	v	0	0	
VEGETATION AND NOTES: Mixed salt cedar and screwbean mesquite, 100% Bermuda, few giant sacaton.									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
9-10		0.1	AK	flat		21 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaCO3	Redox Features
A1	0-3	sg	7.5 YR 3/2	loam	18	v	2-5	2-5	0
C1	3-6	m	7.5 YR 3/2	scl	23	v	2-5	2-5	0
C2	6-12	m	7.5 YR 4/3	lfs	10	none	0	0	c,vf,d 7.5YR 4/6 and 2/1 stains and masses
C3	12-24+	sg	10 YR 4/2	scl	5	none	0	0	c,vf,d 7.5YR 4/6 and 2/1 stains and masses
VEGETATION AND NOTES: Screwbean mesquite, 75-80 % Bermuda cover, no salt cedar, near north site boundary away from river.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
9-11		0.1	AK	flat		20 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaCO3	Redox Features
A1	0-5	1 f&m abk	7.5 YR 3/2	cl	37	v	0	2	
C1	5-20	m	7.5 YR 3/2	cl	37	v	0	0	f,f,d 7.5YR 4/6 and 2/1 stains and masses
C2	20-36	m	10 YR 4/2	fs	4	sl	0	0	f,f,d 7.5YR 4/6 and 2/1 stains and masses
VEGETATION AND NOTES: Dominated by salt cedar, common screwbean mesquite, 60 to 70 % cover Bermuda, giant sacaton few to common weeds.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
9-12		0.1	AK	flat		22 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaCO3	Redox Features
A1	0-6	1 f&m sbk	7.5 YR 4/2	scl	25	v	0	2	
A2	6-12	1 f&m sbk	7.5 YR 4/2	scl	27	v	0	0	
C1	12-28	sg	7.5 YR 4/3	fs	6	none	0	0	common, coarse, distinct, 7.5YR 4/6 & 2/1 masses
C2	28-36+	sg	10 YR 4/2	fs	6	none	0	0	common, coarse, distinct, 7.5YR 4/6 & 2/1 masses
VEGETATION AND NOTES: Screwbean mesquite, weeds, Bermuda, inland salt grass, common young salt cedar.									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
10-1		0.1	Bs	convex		>60 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A1	0-5	sg	7.5YR 4/3	ls	6	v	10	0	none
C1	5-10	sg	7.5YR 4/3	ls	6	v	10	0	none
Ab	10-18	1 f&m sbk	7.5YR 4/3	vfsi	13	v	5	0	none
C2	10-30	1 f&m sbk	7.5YR 4/3	vfsi	14	sl	0	0	none
C3	30-44	sg	7.5YR 4/3	ls	6	sl	0	0	none
C4	44-62+	sg	7.5YR 5/3	s	4	none	0	0	none

VEGETATION AND NOTES: Common young salt cedar,mature along river bank, russian thistle, scattered grasses. This site is Brazito VFSL thick variant buried by 10 inches of lfs.

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
10-2		0.1	Bs	flat		>60 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	1 f&m sbk	7.5YR 4/3	vfsi	13	v	5	0	none
C2	6-12	1 f&m sbk	7.5YR 4/3	vfsi	14	sl	0	0	none
C3	12-42	sg	7.5YR 4/3	ls	6	sl	0	0	none
C4	42-62+	sg	7.5YR 5/3	s	4	none	0	0	none

VEGETATION AND NOTES: Common young salt cedar,mature along river bank, russian thistle, scattered grasses.

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
10-3		0.1	Bs	convex		>60 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-9	2 f&msbk	7.5YR 4/2	vfsi	18	v	5	2	none
C1	9-24	sg	7.5YR 4/2	fsl	15	v	0	0	none
C2	24-36-	sg	7.5YR 4/3	ls	8	v	0	0	none
C3	36-62	sg	10YR 4/3	fsl	4	none	0	0	none

VEGETATION AND NOTES: 50% salt cedar, weed, scattered grasses alkali sacaton, dropseed var.

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
10-4		0.1	Br	concave	> 60 inches				N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A1	0-5	1 f&m sbk	10 YR 4/3	s	4	v	10	7-10	none
C1	5-18	sg	10 YR 5/3	s	4	v	2	0	none
Ab	18-36	2 f&m sbk	7.5YR 4/2	cl	35	v sl	0	7-10	few distinct 7.5YR 4/6 ped coatings
C2	36-48	sg	10YR 4/3	s	4	v sl	2	0	none

VEGETATION AND NOTES: Hole collapsed 48 inches, dry sand. Common small salt cedar 3 to 6 feet, 60% bare, few alkali sacaton, weeds plains bristle grass

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
10-5		0.1	Ao		> 60 inches				N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	2 f&m sbk	7.5YR 4/2	cl	32	v	0	7	
C1	6-42	sg	10 YR 4/3	fs	4	st	0	0	few 7.5YR ped coatings in upper part.

VEGETATION AND NOTES: Hole collapsed 42 inches, too dry. Common young salt cedar, scattered weeds and grasses, 50% bare ground.

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
17-1		0.1	Br	flat	47 inches				1 south
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-8	sg	10 YR 6/3	lfs	5	v	0	0	
C1	8-24	sg	10 YR 6/3	lcs	5	sl	0	0	
C2	24-36	sg	7.5YR 4/3	lcs	5	sl	0	0	common fine and medium distinct 5YR 4/4 ped coatings.
C3	36-42	m	7.5YR 4/2	clay	45	st	0	0	common fine and medium distinct 5YR 4/4 ped coatings.
C4	42-62	sg	7.5YR 4/3	csl	15	st	0	0	

VEGETATION AND NOTES: Common screwbean mesquite, scattered salt cedar (10% cover), 7% old growth, 3% young. Dug three holes, two holes could not penetrate past 24 inches due to gravel. Exposure along river bank is skeletal at 24 to 36 inches.

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
17-2		0.1	Bs	concave		48 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	m	10YR 2/1	vfs	18	st		0	
C1	6-14	1 f&m sbk	7.5YR 4/3	vfs	18	st	0	3-5	many oxidized rhizospheres
C2	14-30	1 f&m sbk	7.5YR 4/4	vfs	14	st	0	0	
C3	30-36	1 f&m sbk	10YR 5/2	vfs	14	st	0	0	c, m, d, 7.5YR 5/6 and 10YR 2/1 masses
C4	36-60	sg	10YR 5/3	fs	7	st	0	0	
VEGETATION AND NOTES: Surface compacted, vegetation similar to site 17-1									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
17-3		0.1	Br	flat		>60 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-10	sg	10YR 4/4	fs	4	st	0	0	none
C1	10-21	sg	10YR4/3	lfs	6	st	0	0	none
C2	21-60	sg	7.5YR 4/3	fsl	9	st	0	0	none
VEGETATION AND NOTES: Less woody veg than site 17-1, mostly short grasses, surface blackened apparently by fire Slightly lower landscape position than site 17-1.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
18-1		0.1	Ao	concave		42 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	2 f&m sbk	7.5YR 3/2	cl	32	v	0	2-5	
C1	6-36	sg	10YR 4/3	lfs	8	sl	6-18	0	few fine distinct 7.5YR 5/6 masses
C2	36-48	sg	10YR 4/3	lcs	5	none	0	0	few medium faint 10YR 3/1 masses
VEGETATION AND NOTES: Dominantly Bermuda, common (5-10%) young salt cedar, few clover, bladder pod, 4 large cottonwoods, 3 have been cut down by beaver, 3 young cottonwoods.									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
18-2		0.1	AJ	concave		27 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-2	2m sbk	7.5YR 5/2	cl	32	v	0	0	
C1	2-5	sg	7.5YR 4/3	lcs	6	none	0	0	
C2	5-12	m	7.5YR 4/2	cl	32	none	0	0	
C3	Dec-32	sg	10YR 4/3	ls	6	sl	0	0	
C4	32-40+	sg	10YR 4/3	ls	6	sl	0	0	
VEGETATION AND NOTES: Hole collapsed at 40 inches, quicksand. Vegetation is same as site 18-1									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
18-3		0.1	AJ						N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-9	sg	10YR 4/3	lfs	6	v	2-5	0	none
Ab	9-15	2 f&m sbk	7.5YR 3/2	cl	32	v	0	2-5	none
C1	15-45	sg	10YR 4/3	lfs	8	sl	6-18	0	few fine distinct 7.5YR 5/6 masses
C2	45-62	sg	10YR 4/3	lcs	5	none	0	0	few mwidium faint 10YR 3/1 masses
VEGETATION AND NOTES: This site is Anapra CL with 40 % covered by 4 to 10 inches of LS with 2 to 5 percent gravel. 60% has cl or scl surface texture. The cl/scl layer is 5 to 12 inches thick whether it is on the surface or is buried. This is a small site and the vegetation is same as site 18-1									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
18-4		0.1	AJ	convex		27 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-9	sg	7.5YR 5/2	ls	6	v	0	0	
Ab	9-24	2 f&m sbk	7.5YR 4/2	cl	32	v	0	2-5	
C1	24-32	sg	10YR 4/3	ls	6	v	0	0	Common medium distinct 7.5YR 4/6 and 5/6 accumulations
C2	32+	sg	10YR 4/3	fs	4	sl	0	0	
VEGETATION AND NOTES: Same as site 18-1									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
18-5		0.1	AJ	concave		27 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-9	1 f&m sbk	7.5YR 3/2	cl	30	v	0	2.5	
C1	9-18	sg	10YR 4/3	ls	6	v	0	0	f,m,d 7.5YR 4/6 5/6 accumulations
C2	18-42	sg	10YR 4/3	ls	6	sl	1-2	0	
C3	42+	sg	10YR 4/3	ls	6	sl	1-2	0	
VEGETATION AND NOTES: Vegetation same as 18-1									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
18-6		0.1	AJ			27 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	2 f&m sbk	7.5YR 3/2	cl	32	v	0	2-5	
C1	6-34	sg	10YR 4/3	lfs	8	sl	10-15	0	few fine distinct 7.5YR 5/6 masses
C2	36-50	sg	10YR 4/3	lcs	5	none	0	0	few mwidium faint 10YR 3/1 masses
VEGETATION AND NOTES: Vegetation same as 18-1									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
19-1		0.1	Br	convex		49 inches			E,S,N,W
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-4	sg	10YR 4/3	fs	4	v sl	0	0	none
C1	4-36	sg	10YR 5/3	fs	4	v sl	0	0	none
C2	36-54	sg	10YR 4/3	fs	4	v sl	0	0	none
C3	54-62	sg	10YR 4/3	fs	4	v sl	0	0	none

VEGETATION AND NOTES: A "sand dune that has overblown the north west corner of the site.

This is a small site with planted cottonwoods along a walking path. Willows along part of river bank. Few scattered bank young salt cedar and mature plants along riverbank . Site covered with scattered scorpion weed and leafless green weed. 75% bare ground.

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
19-2		0.1	Br	convex		>62 inches			S,W,N
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-4	sg	7.5YR 4/3	fs	4	sl	0		
C1	4-36	sg	10YR 4/3	fs	4	sl	0	see notes	
C2	36-54	sg	10YR 4/3	lfs	4	v	0		
C3	54-62	sg	10YR 4/3	lfs	4	v	0		

VEGETATION AND NOTES: 2 inch layer of SiL 28% clay with many threads and films of CaCO3.

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
19-3		0.1	Br	convex		52 inches			N,W,S,E
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	sg	10YR 4/3	fs	4	noe	0	0	none
C1	5-24	sg	10YR 4/3	fs	4	none	0	0	none
C2	24-62	sg	10YR 4/3	fs	4	none	0	0	none

VEGETATION AND NOTES: Sand is finer in 0 to 24 inch section. Coarser with depth to 60 inches, never "coarse" sand.

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
19-4		0.1						N,E,W,S	
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
AC1	0-4	sg	10YR 4/3	fs	4	v	0	0	none
C2	4-36	sg	10YR 4/3	fs	4	sl	0	0	none
C3	36+	sg	10YR 4/3	fs	4		15+	0	none
VEGETATION AND NOTES: 1-2 inch layer Si C L at 28-30 inches. Gravel at 36, could not penetrate. Mature planted cottonwoods along path.									
Willows along part of river bank, few scattered young salt cedar across site, mature salt cedar along river bank. Site has 50 % cover of weeds, scorpion weed (25%), leafless green weed (50%), and 25% tall leafy green weed.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
20-1		0.1	AK	Flat		33 inches		none	
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-8	sg	10YR 4/3	lfs	6-8	v	00	0	few fine distinct 7.5YR 4/6
C1	8-24	sg	10YR 4/3	fsl	12-15	v	0	0	few fine distinct 7.5YR 4/6
C2	24-60	sg	10YR 4/3	lfs	6-8	sl	0	0	few fine distinct 10YR 2/1
VEGETATION AND NOTES: Dominantly grasses, mostly Bermuda, few salt cedar, one prickly pear									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
20-2		0.1	AJ	concave		42 inches		none	
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-8	sg	10YR 4/3	lfs	8	v	0	2	none
C1	8-22	m	7.5YR 4/3	si c l	28	v	0	0	none
C2	22-36	sg	10YR 4/3	lfs	7	st	0	0	none
C3	36-48	sg	10YR 4/4	lfs	7	none	0	0	c,f,&m, d 7.5YR 4/4 and 4/6 coatings & masses
C4	48-62	sg	10YR 4/3	lfs	7	none	0	0	none
VEGETATION AND NOTES: Near 100% coverage of grasses mostly Bermuda, few weeds no woody veg. except along river bank.									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
20-3		0.1	AK	concave		30 inches		E,S,N,PLANT	
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	1 f&m sbk	7.5YR 4/3	sl	112	v	0	2	few fine distinct 7.5YR 4/6
C1	6-24	m	7.5YR 4/3	scl	18-27	v	0	0	common fine distinct 7.5YR 4/6
C2	24-48	m	7.5YR 4/2	scl	32-35	v	0	0	many fine and medium distinct 7.5YR 4/4, 4/6 and 2/1
VEGETATION AND NOTES: common Yerba Madura (wet indicator), inland salt grass dominates, sedges along river bank.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
20-4		0.1	AK	convex		25 inches		E,S,W,N	
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	1 f&m sbk	7.5YR 4/3	ls	8	v	0	2	none
C1	5-14	M	7.5YR 4/3	ls	8	v	0	0	none
C2	14-18	M	7.5YR 4/2	scl	26-28	v	0	0	c,f,&m, d 7.5YR 4/4 and 4/6 coatings & masses
C3	18-24	M	7.5YR 4/3	sicl	32-35	v	0	5	c,f,&m, d 7.5YR 4/4 and 4/6 coatings & masses
C4	24-36	M	7.5YR 4/2	sicl	32-35	v	0	0	c,f,&m, d 7.5YR 4/4 and 4/6 coatings & masses
C5	36-42	M	7.5YR 4/3	fsl	14	st	0	0	c,f,&m, d 7.5YR 4/4 and 4/6 coatings & masses
VEGETATION AND NOTES: Mostly grasses, no yerba madura, no sedges,									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
20-5		0.1	AJ			20 inches		N,E,W,S	
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	2 f&m sbk	7.5YR 4/2	lfs	7	v	0	0	
C1	5-24	sg	10YR 5/3	fs	4	sl	0	0	
C2	24-42	sg	7.5YR 4/3	fs	4	sl	0	0	
VEGETATION AND NOTES: Alkali sacaton, Bermuda, Inland salt grass, few young salt cedar, few mature and young cottonwood, few willow, few acacia									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
20-6		0.1	Br	convex		54 inches		N,W,S,E	
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-4	sg	10YR 4/3	fs	4	v sl	0	0	
C1	4-22	sg	10YR 4/3	fs	4	v sl	0	0	
C2	22-30	sg	7.5YR 4/3	si l	18	v	0	0	
C3	30-48	sg	10YR/5/3	si l	24	st	0	5	c,m,d 7.5YR 4/6 & 10YR 2/1 concentrations
C4	48-63	sg	10 YR 4/2	vfsl	11	st	0	0	
VEGETATION AND NOTES: site is duned, C2 22 to 24 inch layer is 10YR 2/1, established cottonwoods with wire protection, few salt cedar, giant sacaton, 50 percent bare ground, common short "wooly" leafed weeds,few "native" willows.									

Site No.	Slope	Map Unit	Aspect	Water Table			Photos:		
20-7	0.1	AJ	convex	37 inches			N,W,S,E		
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	sg	10YR 4/2	fs	4	v	0	0	
C1	5-14	sg	10YR 4/3	lfs	8	v	0	0	
C2	14-18	m	7.5YR 4/3	sl	17	v	0	2.5	
C3	18-24	m	7.5YR 4/3	cl	27	v	0	5	c,m,d 7.5YR 4/6 & 10YR 2/1 concentrations
C4	24-28	m	7.5YR 4/3	scl	18	v	0	0	c,m,d 10YR 2/1 concentrations
C5	28-52	m	7.5YR 4/2	fsl	14	v	0	0	c,m,d 7.5YR 4/6 & 10YR 2/1 concentrations
VEGETATION AND NOTES: C5 horizon is stratified 2-inch layers of l, sl, scs, lfs. Site is at end of road 150 feet West of river bank and is a disturbed area.									
No wet indicator plants. Bermuda grass is dominant plant with common Russian thistle, kochia, and willows. The river bank is lined with willows,									
Site No.	Slope	Map Unit	Aspect	Water Table			Photos:		
20-8	0.1	AJ	convex	32 inches			N,W,S,E		
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	sg	10YR 4/2	fs	4	v	0	0	
C1	5-18	sg	10YR 4/3	lfs	8	v	0	0	
C2	18-24	m	7.5YR 4/3	sl	17	v	0	2.5	
C3	24-32	m	7.5YR 4/3	cl	27	v	0	5	c,m,d 7.5YR 4/6 concentrations
C4	32-36	m	7.5YR 4/3	scl	18	v	0	0	c,m,d 7.5YR 4/6 & 10YR 2/1 concentrations
VEGETATION AND NOTES: Dominant cover is Bermuda grass with common inland salt grass, Common (10) willows to 15 feet and 1 cottonwood.									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
21-1		0.1	Br	convex		42 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-9	sg	7.5YR 4/3	lfs	8	st	0	0	
C1	9-36	sg	7.5YR 4/3	lfs	8	st	0	0	
C2	36-42	sg	7.5YR 3/2	sicl	28	st	0	0	7.5YR 4/4 and 7.5YR 3/1
C3	42-48	sg	10YR 4/3	lfs	7	sl	0	0	7.5YR 4/6 and 7.5YR 2.5/1
C4	48-60	sg	10YR 4/3	lfs	6	sl	0	0	
VEGETATION AND NOTES: Scattered young salt cedar (15%), Bermuda, weeds, kochia									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
21-2		0.1	Br	flat		42 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	1 f&m sbk	7.5YR 4/3	fsl	10	st	0	0	
C1	6-24	sg	7.5YR 4/3	lfs	8	v	0	0	Many fine distinct 7.5YR 3/2, YR 4/4 masses
C2	24-32	sg	7.5YR 4/3	lfs	8	v	0	0	Few f, d, 7.5YR 3/2, YR 4/4 masses, 10YR 2/1 depletions
C3	32-60	sg	7.5YR 4/3	lfs	6	sl	0	0	
VEGETATION AND NOTES: 2-inch si cl lense in 18-24 layer. Veg same as site 21-1.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
21-3		0.1	Br	convex		42 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A1	0-6	sg	7.5YR 4/2	lfs	8	v	0	0	
A2	6-18	1 f&msbk	7.5YR 4/3	vfs	17	v	0	2	
C1	18-24	sg	7.5YR 4/3	lfs	6	sl	0	0	Few 7.5YR 4/6 accumulations
C2	24-42	sg	7.5YR 4/3	lfs	8	0	0	0	
C3	42-60	sg	7.5YR 4/3	lfs	6	0	0	0	Few 7.5YR 4/6 accumulations
VEGETATION AND NOTES: Veg same as 21-1									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
22-1		0.1	AJ	convex		47 inches			SE,S,N,Pat
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	! F&m sbk	7.5YR 3/2	fsl	9	v	0	2	
C1	5-18	sg	10YR 4/3	ls	6	v	0	0	com f and m dist 7.5YR 4/6 and 7.5 YR 2.5/1 masses
C2	18-22	m	10YR 4/2	si l	26	v	0	0	com f and m dist 7.5YR 4/6 and 7.5 YR 2.5/1 masses
C3	22-36	sg	10YR 4/3	ls	4	v	0	0	com f and m dist 7.5YR 4/6 and 7.5 YR 2.5/1 masses
C4	36-52+	sg	10YR 4/3	ls	4	sl	0	0	com f and m dist 7.5YR 4/6 and 7.5 YR 2.5/1 masses
VEGETATION AND NOTES: 20% salt cedar 3-6 feet, dominated by weeds, Bermuda, and inland salt grass. Very fine mica lakes throughout soil.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
22-2		0.1	AJ	coxves		45 inches			Pat, mike and hole,N,E,SE
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	sg	10YR 4/2	fsl	9	v	0	2-5	
C1	5-30	sg	10YR 4/3	lfs	6	v	0	0	
C2	30-60	sg	10YR 4/3	lfs	4	sl	0	0	com fine distinct 7.5YR 4/6 and 7.5 YR 5/6 masses
VEGETATION AND NOTES: Veg same as site 22-1									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
22-3		0.1	AJ	convex		23 inches			Pat-hole
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	0-6	7.5YR 4/3	fsl	10	v	0	2	none
C1	6-12	6-12	7.5YR 4/2	cl	30	v	0	0	few
C2	12-24	12-24	10YR 4/3	ls	6	sl	0	0	common 7.5YR 4/6
C3	24-36+	24-36+	10YR 4/3	ls	6	nione	0	0	few medium distinct black 7.5YR 2.5/1
VEGETATION AND NOTES: Hole collapsed 36 inches(quicksand) Veg same as site 22-1									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
22-4		0.1	AJ	concave		50 inches			S,N, salt crust
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	sg	7.5YR 4/3	fsl	10	v	0	2	
C1	6-18	sg	7.5YR 4/2	lfs	8	v	0	0	
C2	18-36	sg	10YR 4/3	lfs	8	st	0	0	
C3	36-52+	sg	10YR 4/3	ls	6	sl	0	0	
VEGETATION AND NOTES: 10% salt cedar, dominated by alkali sacaton, common "succulent" weeds, few acacia.									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
23-1		0.3	AJ	convex		42 inches			Pat and truck,N,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	1 f&m sbk	7.5YR 4/3	fsl	8	v	0	0	
C1	5-18	sg	7.5 YR 4/3	fsl	6	v	0	0	few fine distinct,7.5YR 4/6
Ab	18-22	m	7.5 YR 4/2	sil	18	v	0	1	few fine distinct,7.5YR 4/6
C2	22-36	sg	10 YR 4/3	ls	4	v	0	0	common fine distinct,7.5YR 4/6
C3	36-48+	sg	10 YR 4/3	ls	4	st	0	0	common medium distinct,7.5YR 4/6 and 7.5YR 2.5/1
VEGETATION AND NOTES: 10% salt cedar, 30% alkali sacaton, weeds 50%, Bare ground 10%, mostly gopher holes.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
23-2		0.5	AJ	flat		42 inches			NONE
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	1 f&m sbk	7.5 YR 4/3	fsl	8	v	0	0	
Ab	5-12	1 f&m sbk	7.5 YR 4/2	cl	20	v	0	2	few fine distinct,7.5YR 4/6
C1	12-36	m	10 YR 4/3	ls	5	v	0	0	common fine distinct,7.5YR 4/6
C2	36-48+	sg	10 YR 4/3	ls	5	st	0	0	common medium distinct,7.5YR 4/6 and 7.5YR 2.5/1
VEGETATION AND NOTES: 2-5 % salt cedar; alkali sacaton; sienna bean.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
23-3		0.1	AJ	flat		44 inches			mike/truck,S,N,ground cover example
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-4	1 f&m sbk	7.5 YR 4/3	vfs	10	v	0	0	None
C1	4-12	sg	10 YR 4/3	lfs	6	v	0	0	None
C2	12-36	sg	10 YR 4/3	ls	4	sl	0	0	None
C3	36-48+	sg	10 YR 4/3	ls	4	0	0	0	None
				ls	4	0	0	0	None
VEGETATION AND NOTES: hole collapsed at 48 inches (quicksand)									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
24-1		0.1	AJ	concave		34 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A1	0-2	sg	10 YR 4/3	fs	4	v	0	0	0
Ab	2-6	m	10 YR 4/3	si l	17	v	0	0	0
C1	6-18	1f&m sbk	10 YR 4/3	ls	6	st	0	0	common med dist 7.5YR4/6 & 10YR 2/1 to 1/4 in. thick
C2	18-36+	sg	10 YR 4/2	ls	6	sl	0	0	few med distinct 10YR 2/1 masses
VEGETATION AND NOTES: Hole collapsed at 36 inches (quicksand) 100% grass cover inland salt grass and Bermuda grass, common weeds.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
24-2		0.1	AJ	flat		24 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A1	0-5	1 f&m sbk	10YR 3/2	ls	6	v	0	0	0
A2	5-12	1 f&m sbk	10YR 3/2	scl	18	v	0	0	0
C1	12-24+	sg	10YR 4/3	fs	2-4	sl	0	0	common med dist 7.5YR4/6 & 10YR 2/1 to 1/4 in. thick
VEGETATION AND NOTES: 100% cover inland salt grass and Bermuda grass, common salt cedar, mesquite and weeds.									
CaCO3 or other salt on surface and upper ped faces of A1.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
24-3		0.1	AJ	flat		17 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A1	0-6	1 f&m sbk	10YR 4/3	ls	6-8	v	0	0	0
A2	6-18	1 f&m sbk	5YR 4/3	c	45	v	0	0	0
C1	18-24+	sg	10YR 4/3	fs	4	sl	0	0	common med dist 7.5YR4/6 & 10YR 2/1 to 1/4 in. thick
VEGETATION AND NOTES: 100% cover inland salt grass and Bermuda grass, common salt cedar and few sedges.									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
24-4		0.1	AJ		24 inches				none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A1	0-10	1 f&m sbk	10YR 4/3	ls	6-8	v	0	0	0
A2	10-18	1 f&m sbk	5YR 4/3	c	45	v	0	0	0
C1	18-24+	sg	10YR 4/3	fs	4	sl	0	0	common med dist 7.5YR4/6 & 10YR 2/1 to 1/4 in. thick
VEGETATION AND NOTES: 100% cover inland salt grass and Bermuda grass, common salt cedar and few sedges, common weeds.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
24-5		0.1	AJ	flat	24 inches				none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A1	0-9	1 f&m sbk	10YR 4/3	ls	6-8	v	0	0	0
C1	9-28+	sg	10YR 4/3	fs	4	sl	0	0	c, m, d, 7.5YR4/6 & 10YR 2/1 to 1/4 in. thick
VEGETATION AND NOTES: 100% cover inland salt grass and Bermuda grass, common salt cedar and few sedges, common weeds.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
24-6		0.1	AJ	flat	29 inches				N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	1 F&M SBK	10YR 5/3	lfs	8	v	0	2	0
C1	5-12	sg	10YR 4/3	lfs	8	v	0	0	c, m, d, 7.5YR4/6
2C2	12-24	sg	10YR 4/3	ls	5	st	0	0	c, m, d, 7.5YR4/6
2C3	24-42+	sg	10YR 4/3	ls	5	0	0	0	c, m, d, 7.5YR4/6 & 10YR 2/1 coatings and masses
VEGETATION AND NOTES: 100% cover inland salt grass and Bermuda grass, common salt cedar, mesquite and weeds.									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
25-1		0.1	AJ	flat	26 inches				N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	1f&m sbk	10YR 4/2	fsl	18	v	0	1	0
C1	5-20	sg	10YR 4/3	fsl	4-6	v	0	0	common medium distinct 7.5YR4/6
C2	20-36+	sg	10YR 4/3	fsl	4-6	0	0	0	few coarse distinct 7.5YR4/6 coatings and masses
VEGETATION AND NOTES: 100% cover inland salt grass and Bermuda grass, common salt cedar, few acacia, mesquite and sedges, common tall weeds with red flowers and thorns.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
25-2		0.1	AJ	flat	32 inches				N,E,W,S, weed with red flowers and thorns
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	2 f&m sb	7.5YR 3/2	cl	32	v	0	0	
C1	6-12	sg	10YR 4/2	fs	4	0	0	0	
C2	12-18	sg	10YR 4/3	fs	4	0	0	0	few c, d, 7.5YR4/6 coatings and masses
C3	18-36	sg	10YR 4/2	fs	4	0	0	0	
VEGETATION AND NOTES: 100% cover inland salt grass and Bermuda grass, common salt cedar, few acacia, mesquite and sedges, common tall weeds with red flowers and thorns.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
25-3		0.1	AJ	flat	29				N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	1f&m sbk	7.5YR 4/2	vfs	15	v	0	0	
C1	5-9	m	10YR 4/3	si l/vfs	18	v	0	0	
C2	9-20	sg	10YR 4/3	si l/vfs	23	v	0	0	
C3	20-36+	sf	10YR 4/3	fs	4	sl	0	0	few m, d, 7.5YR4/6 coatings and masses
VEGETATION AND NOTES: 100% cover inland salt grass and Bermuda grass, common salt cedar, few screwbean mesquite and 1 honey mesquite, common tall weeds with red flowers and thorns.									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
26-1		0.1	AJ	flat		30 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	1 f&msbk	7.5YR 3/3	loam	15	v	00	0	0
C1	6-12	sg	7.5YR 4/4	fs	4	v	0	0	0
Ab	12-23	1 f&msbk	7.5YR 4/3	loam	17	v	0	0	0
C2	23-60	sg	7.5YR 3/3	fs	4	vv sl	0	0	common 7.5YR 3/4 & 10YR 2/1 masses
VEGETATION AND NOTES: Walking Park, Bermuda, planted cottonwoods, salt cedar along river bank									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
26-2		0.1	AJ	flat		30 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-8	1 f&m sbk	7.5YR 3/3	loam	17	v	0	0	0
C1	8-14	sg	7.5YR 4/4	s	4	v	0	0	0
Ab	14-22	2 f&m bk	2.5YR 4/2	si cl	37	v	0	0	few 7.5YR 2.5/1 masses
C2	22-60	m	7.5YR 4/3	vfsl	15	v	0	0	common 7.5YR 3/4 & 10YR 2/1 masses
C3		sg	7.5YR 4/3	fs/vfsl	4-8	0	0	0	common 10YR 2/1 masses
VEGETATION AND NOTES: Walking Park, Bermuda, planted cottonwoods, salt cedar along river bank- C4 is stratified fs and vfsl									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
26-3		0.1	AJ	convex		40 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	0	%Visible CaC03	Redox Features
A	0-8	sg	7.5YR 4/3	lvfs	6	v	0	0	0
C1	8-13	sg	7.5YR 4/3	fs	4	v	0	0	0
Ab	13-24	1 f&m sbk	7.5YR 4/2	loam	15	v	0	0	few 7.5YR 2.5/1 masses
C2	24-40	sg	7.5YR 4/3	fs	4-8	sl	0	0	common 7.5YR 3/4 & 10YR 2/1 masses
C3	40-60	sg	7.5YR 4/3	fs	4-8	0	0	0	common 10YR 2/1 masses
VEGETATION AND NOTES: Walking Park, Bermuda, planted cottonwoods, salt cedar along river bank. The north 400 yards of site 26 appears to have 10-13 inches of fs/lvfs fill placed on surface.									

APPENDIX 2 - Soil Descriptions

Site No.		Slope	Map Unit	Aspect		Water Table			Photos:
27-1		0.1	AK	flat		31 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A1	0-3	1 m pty	7.5YR 4/2	loam/clay	20/45	v	0	0	
A2	3-8	1 f&m sbk	7.5YR 4/2	loam	20	v	0	0	
C1	8-19	sg	7.5YR 4/3	loam	23	v	0	0	
C2	19-40+	sg	10YR 4/2	fsl	8	sl	0	0	few fine distinct black 7.5YR 2.5/1 masses
VEGETATION AND NOTES: 75 % canopy cover salt cedar and willow, some Bermuda grass. Portions of site 27-1 have 1 to 3 inch surface crust of clay/silty clay loam with pty structure.									
Site No.		Slope	Map Unit	Aspect		Water Table			Photos:
27-2		0.1	AK	convex		28 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	2 m sbk	7.5YR 3/2	c	45	v	0	0	
C1	6-23	m	7.5YR 3/2	c	45	v	0	0	
C2	28-42	sg	10YR 4/2	fs	6	sl	0	0	few fine distinct black 7.5YR 2.5/1 masses
VEGETATION AND NOTES: 95 % canopy cover salt cedar to 20+ feet, few scattered mature cottonwoods to 30+ feet.									
Site No.		Slope	Map Unit	Aspect		Water Table			Photos:
27-3		0.1	AK	convex		28 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	2 m sbk	7.5YR 3/2	c	45	v	0	0	
C1	5-27	m	7.5YR 3/2	c	45	v	0	0	
C2	27-42	sg	10YR 4/2	fs	6	sl	0	0	few fine distinct black 7.5YR 2.5/1 masses
VEGETATION AND NOTES: 95 % canopy cover salt cedar to 20+ feet, few scattered mature cottonwoods to 30+ feet.									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
27-4		0.1	AK	convex		42 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-8	1 f&m sbk		loam	18	v	0	0	
C1		m		loam	18	v	0	0	
C2		sg		fs	5	0	0	0	few fine distinct black 7.5YR 2.5/1 masses

VEGETATION AND NOTES: 95 % canopy cover salt cedar to 20+ feet, few scattered mature cottonwoods to 30+ feet.
 This hole is on a "sandbar" high 2 feet above surrounding areas.

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
27-5		0.1	AK	convex		42 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	2 m sbk	7.5YR 3/2	c	45	v	0	0	
C1	6-30	m	7.5YR 3/2	c	45	v	0	0	
C2	30-42	sg	10YR 4/2	fs	6	sl	0	0	few fine distinct black 7.5YR 2.5/1 masses

VEGETATION AND NOTES: 95 % canopy cover salt cedar to 20+ feet, few scattered mature cottonwoods to 30+ feet.
 Observed a box tortoise, two cottontails, doves, quail covey, and snakes on this site.

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
27-6		0.1	AK	convex		>60 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A1	0-3	1 m plty	7.5YR 4/2	clay	42	v	0	0	
A2	3-8	1 f&m sbk	7.5YR 4/2	loam	20	v	0	0	
8-21	21	sg	7.5YR 4/3	loam	23	v	0	0	
C2	21-40+	sg	10YR 4/2	fs	6	sl	0	0	few fine distinct black 7.5YR 2.5/1 masses

VEGETATION AND NOTES: 95 % canopy cover salt cedar to 20+ feet, Hole is on a high area 6 to 8 feet above the surrounding low areas.

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
27-7		0.1	AK	concave		19 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-8	1 m gr/prsm	10 YR 4/3	lfs	6	none	0	0	
C1	8-20+	sg	10YR 3/3	sg	4	none	0	0	
VEGETATION AND NOTES: Veg same as 27-6 with numerous willows along river bank. This hole is 30 feet from river on very Southeast corner of site. 27 about 75 feet from river channel.									
River has backed water up a low area to within 10 feet of hole. This hole is adjacent to a sandy area that has dunes 10 to 15 feet higher than the site.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
27-8		0.1	AK	concave		30 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	1 m sbk	10YR 3/2	c	42	v	0	2	
B	5-16	1 m sbk	7.5YR 4/2	c	42	v	0	5	few fine distinct black 7.5YR 2.5/1 masses
C1	16-28	m	7.5YR 3/1	cl	26	v	0	5	few fine distinct black 7.5YR 2.5/1 masses
C2	28-36+	sg	10YR 3/2	s	4	0	0	0	entire soil horizon is reduced
VEGETATION AND NOTES: Solid cover mature salt cedar 95% canopy, no understory plants.									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
28-1		0.1	AJ	flat		54 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	1 f&m sbk	7.5YR 4/2	loam	12	v	0	0	0
C1	5-14	sg	7.5YR 4/3	fs	4	v	0	0	0
C2	14-28	m	7.5YR 4/2	fsl	10	v	0	0	c, m, d, 7.5YR4/6 coatings and masses
C3	28-48	m	10YR 3/2	scl	19	v	0	0	f, m, d, 7.5YR 4/6 &7.5YR 2.5/1 masses
C4	48-60	m	10YR 3/2	cl	32	v	0	0	c, m, d, 7.5YR 2.5YR 2.5/1 masses
VEGETATION AND NOTES: Mowed salt cedar, weeds, grass. Redox features indicate water table commonly above 42 inches = Agua wet									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
28-2		0.1	AJ	concave		50 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	1 f&m sbk	7.5YR 4/2	loam	15	v	0	0	0
C1	6-15	sg	7.5YR 4/3	fs	4	v	0	0	0
C2	15-34	m	7.5YR 4/2	fsl	10	v	0	0	c, m, d, 7.5YR4/6 coatings and masses
C3	34-51	m	10YR 3/2	scl	20	v	0	0	f, m, d, 7.5YR 4/6 &7.5YR 2.5/1 masses
C4	51-60	m	10YR 3/2	cl	32	v	0	0	c, m, d, 7.5YR 2.5YR 2.5/1 masses
VEGETATION AND NOTES: Mowed salt cedar, weeds, grass, sedges. Mature salt cedar along river bank Redox indicate WT normally above 42"									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
28-3		0.1	AJ	flat		32 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A1	0-5	1 f&m sbk	7.5YR 4/2	loam	18	v	0	0	
A2	5-12	1 f&m sbk	7.5YR 4/3	fsl	15	v	0	0	
Ab	12-16	1 f&m sbk	7.5YR 4/2	loam	18	v	0	2-5	
C1	16-24	m	7.5YR 4/2	c	40	v	0	0	c, m, d, 7.5YR 10YR 3/1 masses
C2	24-36+	sg	7.5YR 4/2	vfs	15	v	0	0	
VEGETATION AND NOTES: Mowed salt cedar, weeds, grass. Willow along river bank, one cottonwood.									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
28-4		0.1	AJ			46 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	1 f&m sbk	7.5YR 4/2	loam	21	v	0	1	
C1	6-12	sg	7.5YR 4/3	lfs	10	v	0	0	
C2	12-24	sg	7.5YR 4/3	fs	4	sl	0	0	
C3	24-48+	sg	7.5YR 4/3	fs	4	sl	0	0	f, m, d, 7.5YR 4/6 & 7.5YR 2.5/1 masses
VEGETATION AND NOTES: Mowed, Bermuda, inland salt grass, few salt cedar, alkali sacaton. Originally mapped Ge and Bf, not correct now.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
28-5		0.1	AJ	cconcave		36 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	1 f&m sbk	7.5YR 4/2	loam	14	v	0	0	
C1	6-16	sg	7.5YR 4/3	fs	5	v	0	0	
C2	16-30	m	7.5YR 4/2	fsl	11	v	0	0	
C3	30-48+	m	10YR 3/2	scl	21	v	0	0	f, m, d, 7.5YR 4/6 & 7.5YR 2.5/1 masses
VEGETATION AND NOTES:									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
29-1		0.1	AJ	flat	40 inches				N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-5	1 f&m sbk	7.5YR 4/2	loam/vfsl	12	v	0	0	0
C1	5-10	sg	7.5YR 4/3	vfsl	15	v	0	0	0
C2	10-24	sg	7.5YR 4/2	fsl	15	v	0	0	
C3	24-36	sg	10YR 5/3	fs	4	sl	0	0	
C4	36-48+	sg	10YR 5/3	fs	4	v	0	0	c, m, f, 7.5YR 4/6, & 2.5YR 2.5/1 masses
VEGETATION AND NOTES: Few young salt cedar comon cottonwood & screwbean mesquite, 65% Bermuda cover, common "leafless" green weed, 150 feet from river. Surface layer has 2 inch layer with 2 med. pty structure.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
29-2		0.1	AJ	convex	>60 inches				none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	1 f&m sbk	7.5YR 3/2	loam/vfsl	15	v	0	0	0
C1	6-33	sg	7.5YR 4/2	lvfs	8	v	0	0	0
C2	33-42	m	7.5YR 4/2	loam	24	st	0	0	c, m, d, 7.5YR4/6 coatings and masses
C3	42-60	m	7.5YR 4/2	vfsl	12	st	0	0	c, m, d, 7.5YR 4/6 & 7.5YR 2.5/1 masses
VEGETATION AND NOTES: Common "leafless" green weed, few mature cottonwood, 80% Bermuda, few salt cedar 5 to 20 ft. Site is several feet above river water level. Redox indicates WT normally above 42 inches.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
29-3		0.1	Br	flat	50 inches				N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A1	0-10	sg	10YR 5/3	fsl	4	st	0	0	
C1	10-30	sg	7.5YR 4/3	lvfs	8	st	0	0	f, m, f, 7.5YR 4/6, & 2.5YR 2.5/1 masses
C2	30-60	sg	7.5YR42	lvfs	8	sl	0	0	f, m, f, 7.5YR 4/6, & 2.5YR 2.5/1 masses
VEGETATION AND NOTES: Bermudagrass,sienna bean, scattered salt cedar and screwbean mesquite, cat tails next to river, than holes 1 and 2. hole is higher in elevation than surrounding area. "Sand dune" in appearance. Weak redox features.									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
29-4		0.1	AJ	flat		40 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	2 f&m gr	7.5YR 3/2	loam	18	v	0	2-5	0
C1	6-19	m	7.5YR 4/3	vfs	10	v	0	0	0
C2	19-26	m	7.5YR 4/2	cl	30	v	0	0	
C3	36-36	m	7.5YR 4/2	cl	42	v	0	0	
C4	36-48+	m	7.5YR 4/2	vfs	15	v	0	0	c, m, f, 7.5YR 4/6, & 2.5YR 2.5/1 masses
VEGETATION AND NOTES: 100% Bermuda grass, few young salt cedar, screwbean mesquite, salt cedar and silver leaf willow along river bank.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
29-5		0.1	AJ	concave		39 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A	0-6	1 f & m gr	7.5YR 3/2	loam	18	v	0	2-5	0
C1	6-14	sg	7.5YR 4/3	lfs	10	v	0	0	0
Ab	14-18	1 f&m sbk	7.5YR 3/2	loam	18	v	0	0	0
C2	18-42+	sg	7.5YR 4/2	fs	6	sl	0	0	c, m, d, 7.5YR 2.5YR 2.5/1 masses
VEGETATION AND NOTES: Mowed salt cedar, weeds, grass, sedges. Mature salt cedar along river bank									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
30-1		0.1	AJ	flat		47 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay		%RF	%Visible CaC03	Redox Features
A	0-5	1 f&m sbk	7.5YR 3/3	loam	20	v	0	2-5	
C1	5-17	sg	7.5YR 4/4	fs	4	v	0	0	
C2	17-20	m	7.5YR 4/2	cl	32	v	0	2-5	
C3	20-36	sg	7.5YR 4/3	fs	6	v	0	0	c, m, d, 7.5YR 4/6 masses
C4	36-44	m	10YR 4/2	si l	23	v	0	0	c, m, d, 7.5YR 4/6 & 2.5YR 2.5/1 masses
C5	46-60	m	10YR 4/3	vfs	15	v	0	0	c, m, d, 2.5YR 2.5/1 masses
VEGETATION AND NOTES: Park area, irrigated bermuda (mowed), few scattered salt cedar, palnted and irrigated trees, pecan? and cottonwood. Redox features indicate water tables commonly above 36 inches.									

Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
30-2		0.1	AJ	flat		61 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
C1	0-6	1 m pty	7.5YR 4/2	l/vfsl	12	v	0	0	0
C2	6-24	m	7.5YR 4/3	vfsl	10	v	0	0	0
C3	24-35	m	7.5YR 4/2	stratified	varies	v	0	0	
C4	35-40	m	10YR 5/3	loam	26	sl	0	0	
C5	40-60	m	10YR 5/3	vfsl	16	v	0	0	c, m, f, 7.5YR 4/6, & 2.5YR 2.5/1 masses
VEGETATION AND NOTES: C3 horizon stratified vfsl, si l, fs. 2inches each. Veg same as 30-1, not as developed as a park at this time.									
Redoomorphic features indicate water table commonly above 40 inches, soil is moderately well drained.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
30-3		0.1	AJ	convex		34 inches			N,E,W,S
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
Ap	0-6	sg	7.5YR 4/2	lfs	8	v	0	0	0
C1	6-15	sg	7.5YR 4/3	fs	4	v	0	0	0
C2	15-34	m	7.5YR 4/2	loam	24	v	0	0	c, m, f, 7.5YR 4/6, & 2.5YR 2.5/1 masses
VEGETATION AND NOTES: Common young salt cedar, few mature cottonwoods, 100 % Bermudagrass cover, commom sedges.									
Mature salt cedar along river bank.									
Site No.		Slope	Map Unit	Aspect	Water Table				Photos:
30-4		0.1	AJ	flat		46 inches			none
Horizon	Depth (inches)	Structure	Color (moist)	Texture	%Clay	Efferves.	%RF	%Visible CaC03	Redox Features
A1	0-6	1 f&m sbk	7.5YR 3/3	loam	20	v	0	2	
C1	6-18	sg	7.5YR 4/4	fs	5	v	0	0	
C2	18-25	m	7.5YR 4/2	cl	35	v	0	2	
C3	25-37	sg	7.5YR 4/3	fs	8	v	0	0	f, m, d, 7.5YR 4/6 & 10YR 3/1 masses
C4	37-47	m	7.5YR 4/2	si l	25	v	0	0	m, m, d, 7.5YR 4/6 & 10YR 3/1 masses
C5	47-60	m	10YR 4/2	vfsl	14	v	0	0	
VEGETATION AND NOTES: Common young salt cedar, willow along river bank, planted pecan trees.									

APPENDIX 3 – THE 1:2 EXTRACTION SALT PREDICTION METHOD:

This method was used to estimate the salinity of the soils mapped in this project. A soil sample is mixed with water and allowed to stand overnight. The electrical conductivity (EC) of the mixture is measured using an electronic bridge. The EC by this method is used to indicate the presence of soluble salts (U.S. Salinity Laboratory Staff, 1954).

Equipment

1. Electronic balance, ± 0.01 g sensitivity
2. Conductivity bridge, with automatic temperature adjustment, $25 \pm 0.1^\circ\text{C}$, Hanna Model 993310, Hanna Instruments, Inc. Woonsocket, RI
3. Plastic cups, 30 ml (1 fl. oz.), with covers
4. Dispenser, 50 ml syringe
5. Reverse osmosis (RO) water,
6. Calibration solutions: Hanna 1.413, 5.000 and 12.880 mmhos/ cm (dS/m)

Procedure

1. Weigh 5.0 g of <2-mm, air-dry soil in a 30-ml cup.
2. Add 10 ml of RO water to sample using a syringe.
3. Swirl to mix, cap, and allow to stand overnight.
4. Standardize the conductivity bridge using RO water (blank) and Hanna calibration solution.
5. Read conductance of supernatant solution directly from the bridge.
6. Record conductance to 0.01 mmhos/cm (dS/m)

Report

1. Report prediction conductance to the nearest 0.01 mmhos/ cm (dS/m).

Calculations

1. No calculations are required for this procedure.
2. Use the following relationship to estimate the total soluble cation or anion concentration (meq/L) in the soil. $\text{EC (mmhos/ cm)} \times 10 = \text{Cation or Anion (meq/ L)}$
3. Use the following relationship to estimate the total soluble cation or anion concentration (meq/g oven-dry soil) in the soil.







$$\text{EC (mmhos/cm)} \times 20 = \text{Cation (meq /g soil)}$$

$$\text{EC (mmhos/cm)} \times 20 = \text{Anion (meq/g soil)}$$

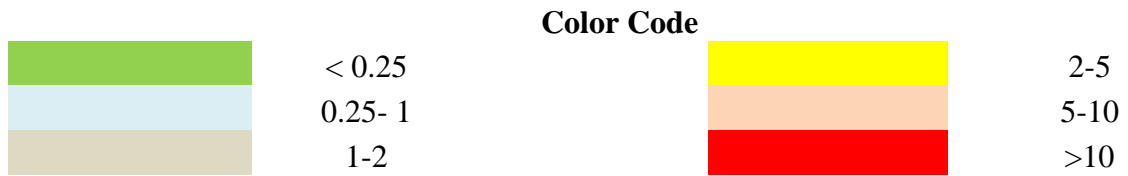
APPENDIX 4 – SALINITY TEST VALUES SORTED BY HAZARD

Site No.	Depth (inches)	Rating (millimhos per centimeter)	Site No.	Depth (inches)	Rating (millimhos per centimeter)	Site No.	Depth (inches)	Rating (millimhos per centimeter)
08-2	0-6	0.00	27-1	36	0.08	19-3	60	0.62
08-2	24	0.00	07-2	24	0.09	23-3	0-6	0.65
10-5	0-6	0.00	20-5	24	0.10	27-2	24	0.65
10-5	36	0.00	02-2	42	0.11	20-4	42	0.26
19-3	0-6	0.00	03-1	60	0.11	22-3	36	0.26
19-3	24	0.00	07-2	39	0.11	24-1	24	0.26
19-1	0-6	0.01	20-5	42	0.11	30-3	36	0.26
02-2	24	0.02	21-2	48	0.11	22-4	48	0.28
03-1	0-6	0.02	09-1	52	0.12	29-2	0-6	0.28
10-1	0-6	0.02	10-4	48	0.13	21-1	48	0.29
21-3	24	0.02	17-1	24	0.14	29-1	24	0.29
30-4	36	0.02	20-7	52	0.14	19-1	24	0.30
09-2	24	0.03	23-3	24	0.14	26-1	42	0.30
09-2	52	0.03	24-1	36	0.14	19-2	0-6	0.31
09-4	60	0.03	21-2	24	0.15	21-1	0-6	0.34
25-3	36	0.03	09-5	24	0.16	10-1	60	0.35
27-1	24	0.03	20-7	0-6	0.16	20-3	48	0.35
19-1	60	0.04	25-3	24	0.16	09-11	24	0.36
20-6	0-6	0.04	25-2	36	0.17	20-2	36	0.37
21-3	0-6	0.04	9-9	48	0.18	22-1	48	0.38
03-1	24	0.05	10-4	0-6	0.19	04-3	0-6	0.39
09-6	48	0.05	20-1	24	0.21	09-6	24	0.39
20-1	48	0.05	27-2	48	0.21	01-1	0-6	0.43
21-3	48	0.05	23-2	48	0.22	08-1	24	0.43
09-4	0-6	0.06	24-2	24	0.22	29-2	60	0.43
17-1	0-6	0.06	25-2	24	0.22	08-2	60	0.46
29-1	60	0.06	02-1	42	0.23	09-1	0-6	0.46
18-1	48	0.07	18-1	24	0.23	20-6	60	0.48
22-3	24	0.07	23-3	48	0.23	19-2	24	0.53
26-1	24	0.08	21-2	0-6	0.25	09-4	24	0.55

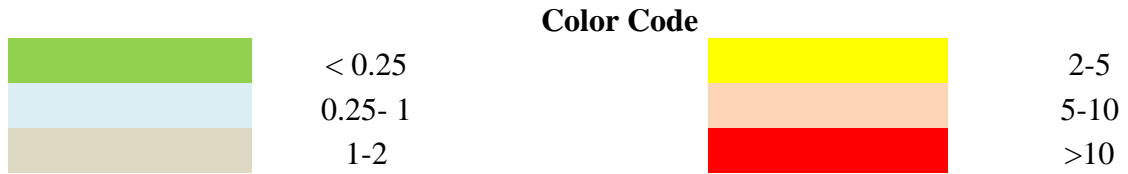
Site No.	Depth (inches)	Rating (millimhos per centimeter)	Site No.	Depth (inches)	Rating (millimhos per centimeter)	Site No.	Depth (inches)	Rating (millimhos per centimeter)
10-3	0-6	0.61	29-2	24	1.75	30-1	0-6	7.92
30-3	24	0.61	22-1	0-6	1.87	30-2	24	7.94
30-1	48	0.67	01-1	36	1.96	30-2	0-6	13.18
08-1	0-6	0.69	20-2	24	2.16	17-2	0-6	16.88
29-1	0-6	0.73	09-9	0-6	2.17			
22-4	24	0.75	02-2	0-6	2.23			
23-2	24	0.75	10-3	48	2.28			
17-2	56	0.78	30-3	0-6	2.32			
27-2	0-6	0.78	10-4	24	2.41			
20-3	24	0.83	22-4	0-6	2.55			
20-5	0-6	0.85	04-3	39	2.56			
09-12	36	0.87	18-1	0-6	2.67			
09-2	0-6	0.89	30-1	24	2.76			
30-2	60	0.89	20-6	24	2.86			
19-2	60	0.93	09-12	0-6	2.95			
08-1	60	0.94	20-3	0-6	3.21			
25-2	0-6	0.94	30-4	0-6	3.47			
30-4	24	1.00	22-3	0-6	3.61			
09-9	24	1.03	20-7	24	3.62			
01-1	24	1.06	26-1	0-6	3.91			
10-5	24	1.07	20-4	0-6	4.08			
24-2	0-6	1.07	09-5	0-6	4.35			
09-12	24	1.11	09-11	0-6	4.45			
21-1	24	1.12	02-1	0-6	4.70			
25-3	0-6	1.13	02-1	24	5.06			
20-2	0-6	1.17	09-1	24	5.24			
10-1	24	1.34	22-1	24	5.75			
27-1	0-6	1.44	20-4	24	5.84			
07-2	0-6	1.47	09-6	0-6	6.16			
23-2	0-6	1.48	10-3	24	6.80			
17-1	42	1.51	24-1	0-6	6.82			
20-1	0-6	1.68	17-2	24	7.04			

Code	Rating	Hazard
	< 0.25	NONE
	0.25- 1	VERY LOW
	1-2	LOW
	2-5	MODERATE
	5-10	HIGH
	>10	SEVERE

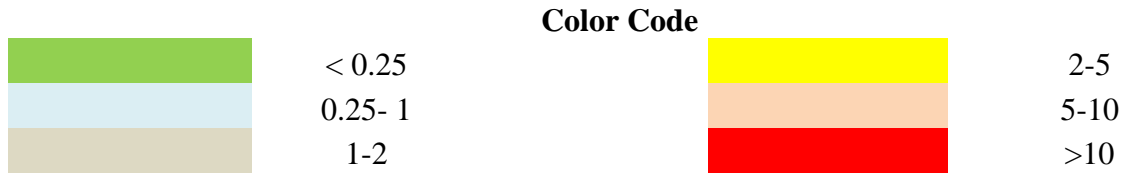
APPENDIX 5 – SALINITY HAZARD



Site No.	Depth (inches)	Rating (dS/m)
1-1	0-6	0.43
	24	1.06
	36	1.96
2-1	0-6	4.70
	24	5.06
	42	0.23
2-2	0-6	2.23
	24	0.02
	42	0.11
3-1	0-6	0.02
	24	0.05
	60	0.11
4-3	0-6	0.39
	24	0.66
	39	2.56
7-2	0-6	1.47
	24	0.09
	39	0.11
8-1	0-6	0.69
	24	0.43
	60	0.94
8-2	0-6	0.00
	24	0.00
	60	0.46
9-1	0-6	0.46
	24	5.24
	52	0.12
9-2	0-6	0.89
	24	0.03
	52	0.03



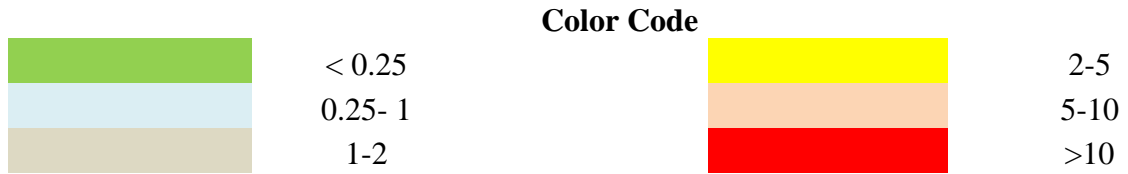
Site No.	Depth (inches)	Rating (dS/m)
9-4	0-6	0.06
	24	0.55
	60	0.03
9-5	0-6	4.35
	24	0.16
9-6	0-6	6.16
	24	0.39
	48	0.05
9-9	0-6	2.17
	24	1.03
	48	0.18
9-11	0-6	4.45
	24	0.36
9-12	0-6	2.95
	24	1.11
	36	0.87
10-1	0-6	0.02
	24	1.34
	60	0.35
10-3	0-6	0.61
	24	6.80
	48	2.28
10-4	0-6	0.19
	24	2.41
	48	0.13
10-5	0-6	0.00
	24	1.07
	36	0.00
17-1	0-6	0.06
	24	0.14
	42	1.51
17-2	0-6	16.88



Site No.	Depth (inches)	Rating (dS/m)
	24	7.04
	56	0.78
18-1	0-6	2.67
	24	0.23
	48	0.07
19-1	0-6	0.01
	24	0.30
	60	0.04
19-2	0-6	0.31
	24	0.53
	60	0.93
19-3	0-6	0.00
	24	0.00
	60	0.62
20-1	0-6	1.68
	24	0.21
	48	0.05
20-2	0-6	1.17
	24	2.16
	36	0.37
20-3	0-6	1.17
	24	2.16
	48	0.37
20-4	0-6	3.21
	24	0.83
	42	0.35
20-5	0-6	4.08
	24	5.84
	42	0.26
20-6	0-6	0.85
	24	0.10
	60	0.11



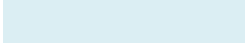





Site No.	Depth (inches)	Rating (dS/m)
20-7	0-6	0.04
	24	2.86
	52	0.48
21-1	0-6	0.16
	24	3.62
	48	0.14
21-1	0-6	0.34
	24	1.12
	48	0.29
21-2	0-6	0.25
	24	0.15
	48	0.11
21-3	0-6	0.04
	24	0.02
	48	0.05
22-1	0-6	1.87
	24	5.75
	48	0.38
22-3	0-6	3.61
	24	0.07
	36	0.26
22-4	0-6	2.55
	24	0.75
	48	0.28
23-2	0-6	1.48
	24	0.75
	48	0.22
23-3	0-6	0.65
	24	0.14
	48	0.23
24-1	0-6	6.82
	24	0.26



Site No.	Depth (inches)	Rating (dS/m)
	36	0.14
24-2	0-6	1.07
	24	0.22
25-2	0-6	0.94
	24	0.22
	36	0.17
25-3	0-6	1.13
	24	0.16
	36	0.03
26-1	0-6	3.91
	24	0.08
	42	0.30
27-1	0-6	1.44
	24	0.03
	36	0.08
27-2	0-6	0.78
	24	0.65
	48	0.21
29-1	0-6	0.73
	24	0.29
	60	0.06
29-2	0-6	0.28
	24	1.75
	60	0.43
30-1	0-6	7.92
	24	2.76
	48	0.67
30-2	0-6	13.18
	24	7.94
	60	0.89
30-3	0-6	2.32
	24	0.61

Color Code

	< 0.25		2-5
	0.25- 1		5-10
	1-2		>10

Site No.	Depth (inches)	Rating (dS/m)
	36	0.26
30-4	0-6	3.47
	24	1.00
	36	0.02
27-7	seep	5.87
20-6a	crust	>19.99

APPENDIX 6 – OFFICIAL SOIL SERIES DESCRIPTIONS

LOCATION AGUA AZ+NM

Established

Series

Rev.

SDH/JEJ

07/2008

AGUA SERIES

The Agua series consists of very deep, well drained soils that formed in recent stream alluvium from mixed sources. Agua soils are on flood plains, and alluvial fans. They have slopes of 0 to 3 percent. The average annual precipitation is about 9 inches and the mean annual air temperature is about 63 degrees F.

TAXONOMIC CLASS: Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, calcareous, thermic Typic Torrifluvents

TYPICAL PEDON: Agua loam, cultivated (colors are for dry soil unless otherwise noted).

Ap--0 to 12 inches; light brownish gray (10YR 6/2) loam, dark brown, moist, massive; hard, friable, slightly plastic; many very fine roots; common fine tubular pores; 3 percent gravel; slightly effervescent; moderately alkaline (pH 8.2); clear smooth boundary (12 to 25 inches thick).

C1--12 to 27 inches; pale brown (10YR 6/3) weakly stratified loam, brown (7.5YR 4/4) moist; massive; hard, friable, slightly sticky, slightly plastic; few very fine roots; few very fine tubular pores; 10 percent gravel; strongly effervescent; moderately alkaline (pH 8.2); clear smooth boundary (12 to 25 inches thick).

2C2--27 to 60 inches; light yellowish brown (10YR 6/4) and varicolored stratified sand and very gravelly sand, yellowish brown (10YR 5/4) moist; single grain; loose; few very fine roots; common fine interstitial pores; 35 percent gravel; slightly effervescent; moderately alkaline (pH 8.0).

TYPE LOCATION: Graham County, Arizona; 1,150 feet north and 1,450 feet west of SE corner sec. 16, T.6S., R.25E.

RANGE IN CHARACTERISTICS:

Soil moisture: Soil moisture - Intermittently moist in the soil moisture control section during July-August and December-January. Driest during May and June. Typic aridic soil moisture regime.

Reaction: slightly to strongly alkaline

Salinity: non-saline to strongly saline

Carbonates: disseminated or as thin filament or threads

Organic matter content: less than 1 percent

Rock fragments: the upper part has less than 35 percent gravel in any subhorizon and usually less than 15 percent; the lower part has less than 35 percent in any horizon but individual subhorizons range from 0 to 60 percent.

Depth to sandy substratum: 20 to 40 inches

A and C horizons

Hue: 7.5YR, 10YR

Value: 5 to 7 dry, 3 to 5 moist

Chroma: 2 to 4 dry, 3 or 4 moist

Texture: stratified very fine sandy loam, loam, silt loam (averages less than 18 percent clay)

2C horizons

Hue: 10YR, 7.5YR

Value: 5 to 7 dry, 3 to 5 moist

Chroma: 2 to 4, dry or moist

Texture: stratified loamy sand, fine sand, or sand with some pedons having a few thin layers of finer textured materials.

COMPETING SERIES: This is the [Maricopa](#) (AZ) series. Maricopa soils have textures of loamy very fine sand, fine sandy loam, and sandy loam in the upper part of the control section.

GEOGRAPHIC SETTING: Agua soils are on nearly level to gently sloping flood plains, alluvial fans at elevations of 2,200 to 5,000 feet. Slopes are dominantly 0 to 1 percent but range to 3 percent. These soils formed in recent stream alluvium from mixed sources. The climate is arid and semi-arid continental. The mean annual temperature ranges from 56 to 69 degrees F. and the average annual precipitation ranges from 7 to 12 inches. The frost-free season is 165 to 275 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the [Arizo](#), [Glendale](#), [Mohave](#) and [Pima](#) soils. Arizo soils have sandy-skeletal control sections. Glendale and Pima soils have fine-silty control section. In addition, Pima soils have value of 5 or less dry, 3 or less moist. Mohave soils have an argillic horizon and a fine-loamy control section.

DRAINAGE AND PERMEABILITY: Well drained; slow runoff, moderate permeability.

USE AND VEGETATION: Nonirrigated areas are used for livestock grazing. Irrigated areas are used for growing cotton, grain sorghum, small grains and alfalfa. Native vegetation consists of creosote bush, triangle bursage, mesquite, catclaw, and cacti, with an understory of bush muhly, black grama, sand dropseed, and Arizona Cottontop.

DISTRIBUTION AND EXTENT: Southern Arizona and New Mexico. Agua soils are moderately extensive. This soil occurs in LRR-D, MLRAs 40, 41, 42.

MLRA OFFICE RESPONSIBLE: Phoenix, Arizona

SERIES ESTABLISHED: Graham County, Arizona; 1971.

REMARKS: diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from 0 to 12 inches (Ap horizon)

Entisol feature - the absence of diagnostic subsurface horizons

Fluvial feature - irregular decrease in organic carbon in the zone from 12 to 60 inches (C1, 2C2 horizons)

Classified according to Soil Taxonomy, Second Edition, 1999.

Updated competing series section 3/17/08, CEM

National Cooperative Soil Survey U.S.A.

LOCATION ANAPRA TX+NM

Established

Series

Rev.

ERB/HBJ/JCW/WWJ

04/2006

ANAPRA SERIES

The Anapra series consists of deep, well drained, moderately slowly permeable soils on bottomlands. These nearly level soils formed in stratified loamy material underlain by sandy material. Slopes range from 0 to 1 percent.

TAXONOMIC CLASS: Fine-silty over sandy or sandy-skeletal, mixed, superactive, calcareous, thermic Typic Torrifuvents

TYPICAL PEDON: Anapra silty clay loam--cultivated. (Colors are for dry soil unless otherwise stated.)

Ap--0 to 10 inches; brown (10YR 5/3) silty clay loam, brown (10YR 4/3) moist; structureless; hard; firm; moderately alkaline; effervescent; clear smooth boundary. (6 to 14 inches thick)

A--10 to 26 inches; brown (10YR 5/3) silty clay loam; brown (10YR 4/3) moist; weak fine subangular blocky structure; hard; firm; few fine pores; and root channels; few evident bedding planes in the lower part; moderately alkaline; effervescent; abrupt wavy boundary. (10 to 24 inches thick)

2C--26 to 60 inches; pinkish gray (7.5YR 7/2) fine sand; brown (7.5YR 5/2) moist; structureless; loose; very friable; evident bedding planes; a few strata 1/2 to 1 inch thick of slightly darker loam; moderately alkaline; noneffervescent.

TYPE LOCATION: El Paso County, Texas; from the intersection of Texas Highway 20 and Farm Road 258 northwest of Fabens, 0.9 mile northwest on Texas Highway 20, then 50 feet northeast in cropland.

RANGE IN CHARACTERISTICS:

Soil moisture - Intermittently moist in the soil moisture control section during July-August. Typic aridic soil moisture regime.

Thickness of the loamy layer: 18 to 36 inches

Reaction: moderately alkaline A horizons

Hue: 10YR or 7.5YR

Value: 5 or 6

Chroma: 2 through 4

Texture: silt loam, clay loam, or silty clay loam

C horizon

Hue: 7.5YR or 10YR

Value: 6 or 7

Chroma: 2 through 4

Texture: fine sand or loamy fine sand with few to common lenses or thin strata of loam, silt loam, or silty clay loam

COMPETING SERIES: There are no competing series.**GEOGRAPHIC SETTING:** Anapra soils are on flood plains of major streams. Slopes are less than 1 percent. The regolith consists of loamy and sandy sediments many feet thick. The climate is arid with an average annual precipitation of 4 to 12 inches, and a Thornthwaite P-E index of 10 to 15. The mean annual air temperature ranges from 60 degrees to 68 degrees F.**GEOGRAPHICALLY ASSOCIATED SOILS:** These are the [Glendale](#), [Harkey](#), and [Saneli](#) series and the [Gila](#), [Tigua](#), and [Vinton](#) series. Gila, Harkey, and Vinton soils have less than 18 percent clay. Glendale soils lack contrasting textures in the control section. Saneli soils are clayey in the upper part of the control section. Tigua soils have more than 35 percent clay throughout the 10- to 40-inch control section.**DRAINAGE AND PERMEABILITY:** Well drained; slow runoff; moderately slow permeability.**USE AND VEGETATION:** These soils are used for irrigated cropland. Crops are mostly cotton, grain sorghums, and vegetables.**DISTRIBUTION AND EXTENT:** In the Trans-Pecos region of West Texas and in New Mexico. Series is of minor extent. This soil occurs in LRR-D, MLRA 42.**MLRA OFFICE RESPONSIBLE:** Phoenix, Arizona**SERIES ESTABLISHED:** El Paso County, Texas; 1970.**REMARKS:** Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - The zone from 0 to 10 inches (Ap horizon)

Entisol feature - The absence of diagnostic subsurface horizons

Fluvial feature - Irregular decrease in organic carbon in the zone from 10 to 60 inches (A1, C horizons)

Anapra soils were previously classified in the Glendale series and the Alluvial great soil group.

Classified according to Soil Taxonomy Second Edition, 1999.

When the competing series section was updated in September 2001, questions were raised about the pedon description of this series. A field study of the type location is recommended to update the description.

National Cooperative Soil Survey U.S.A.

LOCATION BELEN NM

Established

Series

Rev.

DSP/CDL/RJA/WWJ

05/2006

BELEN SERIES

The Belen series consists of very deep, well drained soils that formed in clayey alluvium of old oxbow lakes that are underlain by loamy alluvium several feet thick. Slopes are 0 to 1 percent. The mean annual precipitation is about 8 inches, and the mean annual temperature is about 59 degrees F.

TAXONOMIC CLASS: Clayey over loamy, smectitic, calcareous, thermic Vertic Torrifluvents

TYPICAL PEDON: Belen clay loam--cultivated. (Colors are for dry soil unless otherwise noted.)

Ap--0 to 7 inches; brown (7.5YR 5/2) clay loam, brown (7.5YR 4/4) moist; weak medium subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; common fine roots; common very fine and few pores; strongly effervescent; strongly alkaline (pH 8.5); abrupt smooth boundary. (0 to 10 inches thick)

C1--7 to 31 inches; reddish gray (5YR 5/2) clay, reddish brown (5YR 4/3) moist; few fine distinct mottles of reddish yellow (7.5YR 6/6) in the lower part; massive with few very weak thin plates; very hard, very firm, very sticky, very plastic; common very fine roots in the upper part; common very fine pores; few intersecting slickensides; strongly effervescent; moderately alkaline (pH 8.4); clear smooth boundary. (14 to 26 inches thick)

2C2--31 to 60 inches; light brown (7.5YR 6/4) fine sandy loam, brown (7.5YR 5/4) moist; common medium faint mottles of reddish yellow (7.5YR 6/6); massive; slightly hard, very friable, common very fine tubular pores; strongly effervescent; strongly alkaline (pH 8.7).

TYPE LOCATION: Valencia County, New Mexico; about 2,800 feet north and 2,000 feet west of headquarters of New Mexico penitentiary farm.

RANGE IN CHARACTERISTICS:

Soil moisture - Intermittently moist in the soil moisture control section during July-August and December-January. Driest during May and June. Typic aridic soil moisture regime.

Soil Temperature: 59 to 72 degrees F.

Reaction: Moderately to very strongly alkaline.

Depth to contrasting layer: 20 to 36 inches.

Calcium carbonate equivalent: Less than 15 percent, carbonates usually disseminated but range to fine soft masses, threads, and thin coatings.

Rock fragments: 5 to 15 percent gravel.

Salinity: nonsaline to strongly saline.

A horizon: Hue - 7.5YR or 10YR

Value: 4, 5, or 6

Chroma: 2 or 3 dry, and 2 through 4 moist

Texture: Clay loam or clay

C horizon: Hue - 5YR or 7.5YR

Value: 5 or 6 dry, 3 through 5 moist

Chroma: 1 through 4

Texture: Silty clay or clay

Relict Mottles: None in upper part of the C to common in the lower part.

Cracks: 1 to 2 cm. wide to depths of 20 inches or more in most years unless irrigated.

2C horizon: Hue - 7.5YR or 10YR

Value: 6 or 7 dry, 4 or 5 moist

Chroma: 2 through 4 dry or moist

Texture: Silt loam to very fine sand with less than 20 percent clay. Relict Mottles: Few to common

COMPETING SERIES: There are no competing series.

GEOGRAPHIC SETTING: Belen soils are on nearly level flood plains of major streams at elevations of 3,000 to 5,500 feet. Slopes are 0 to 1 percent. The soils formed in clayey alluvium of old oxbow lakes that are underlain by loamy alluvium several feet thick. The climate is semiarid to arid continental. At the type location average annual temperature is 58 to 65 degrees F. and annual precipitation is 8 to 10 inches. Much of the precipitation falls during the summer in heavy thunderstorms of short duration. The Thornthwaite P-E Index is about 14. The frost-free period is 180 to 220 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the [Agua](#), [Anapra](#), [Armijo](#), [Brazito](#), [Gila](#), [Glendale](#), and [Vinton](#) soils. Agua, Anapra, Brazito, Gila, Glendale, and Vinton soils have texture coarser than clay throughout the control section. Armijo, Brazito, Gila, Glendale, and Vinton soils lack a contrasting horizon in the lower part of the control section.

DRAINAGE AND PERMEABILITY: Well drained; relict mottles indicate that drainage has been restricted in the past. Presently, the water table is deeper than 60 inches. Surface runoff is slow to very slow. Permeability is slow to very slow in the C1 horizon and moderate in the 2C2 horizon.

USE AND VEGETATION: Used for cultivated crops and permanent pasture where irrigated. Alfalfa, small grains, and sorghum are common irrigated crops. The more alkali and saline areas are usually used as unimproved range or pasture. Native vegetation is primarily alkali sacaton, saltgrass, fourwing saltbush, and annuals.

DISTRIBUTION AND EXTENT: Belen soils are in southern New Mexico and are moderately extensive. This soil occurs in LRR-D, MLRA 42.

MLRA OFFICE RESPONSIBLE: Phoenix, Arizona

SERIES ESTABLISHED: Valencia County (East Valencia Area), New Mexico, 1970.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon: The zone from 0 to 2 inches (A horizon).

Entisol feature: Lack of diagnostic horizons.

Fluvent feature: Irregular decrease in organic carbon.

Contrasting Particle Size: Absolute difference of more than 25 percent at 31 inches.

Classified according to Soil Taxonomy Second Edition, 1999.

National Cooperative Soil Survey U.S.A.

LOCATION BRAZITO NM+AZ TX

Established

Series

Rev.

CDL/RJA/PDC/CEM

06/2009

BRAZITO SERIES

The Brazito series consists of very deep, well drained, rapidly permeable soils that formed in sandy alluvium derived from a variety of igneous and sedimentary rocks. Brazito soils are on the flood plains and low terraces of major streams and have slopes of 0 to 5 percent. The mean annual precipitation is about 8 inches. The mean annual air temperature is about 61 degrees F.

TAXONOMIC CLASS: Mixed, thermic Typic Torripsamments

TYPICAL PEDON: Brazito loamy fine sand - cultivated. (Colors are for dry soil unless stated otherwise.)

Ap--0 to 5 inches; brown (10YR 5/3) loamy fine sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine, and fine roots; common very fine irregular pores; strongly effervescent; moderately alkaline (pH 8.2); abrupt wavy boundary. (3 to 10 inches thick)

C--5 to 70 inches; very pale brown (10YR 7/3) fine sand, brown (10YR 5/3) moist; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; common fine irregular pores; moderately alkaline (pH 8.0). (60 or more inches thick)

TYPE LOCATION: Dona Ana Co., New Mexico; 500 feet west of the northeast corner of Section 9, T. 23 S., R. 1 E. 106 degrees, 50 minutes, 15 seconds west longitude; 32 degrees, 19 minutes, 44 seconds north latitude.

RANGE IN CHARACTERISTICS:

Soil Moisture: Intermittently moist in some parts of the soil moisture control section during December through March and July through September. Driest during May and June. Typic aridic soil moisture regime.

Soil Temperature: 60 to 72 degrees F.

Reaction: neutral to moderately alkaline

Particle-size control section: silt plus clay averages less than 10 percent

A horizon

Hue: 7.5YR, 10YR

Value: 4 to 6 dry, 3 to 6 moist
Chroma: 2 to 4, dry or moist

C horizon

Hue: 10YR, 7.5YR

Value: 4 to 7 dry, 3 to 5 moist

Chroma: 1 to 4, dry or moist

COMPETING SERIES: These are Artir (I)(CA), [Birdcanyon](#) (CA), [Bluepoint](#) (NV), Boxjoe (I)(CA), Butterbredt (I)(CA), [Cajon](#) (CA), [Copia](#) (NM), [Kajoe](#) (I)(CA), [Koehn](#) (CA), [Maynard Lake](#) (NV), [Moapa](#) (NV), Morongo (T)(CA), [Pintura](#) (UT), [Toquop](#) (NV), [University](#) (I)(NM), Yander (T)(CA), and [Yturbide](#) (NM) series. Birdcanyon, Bluepoint, Cajon, Koehn, Maynard Lake, Pintura, Moapa and Toquop soils are in the [Mohave](#) Desert and are moist in some part of the soil moisture control section for less than 20 days cumulative between July and September. Yturbide soils have more than 15 percent rock fragments in the control section. Copia soils have hues of 2.5YR, 5YR and 7.5YR and chromas of 6 to 8. Artir, Boxjoe, Butterbredt, Kajoe, and University soils are inactive. Morongo and Yander soils do not have a description (OSD) and cannot be competed.

GEOGRAPHIC SETTING: The Brazito soils are on flood plains, alluvial fans, and low terraces of major streams. Slopes are generally less than 5 percent. The soil formed in sandy alluvium many feet thick derived from rhyolite, andesite, monzonite, granite, quartzite, basalt, sandstone and limestone. The climate is semiarid to arid continental. The mean annual air temperature is 58 to 70 degrees F; and the mean annual precipitation is 8 to 12 inches. Much of the precipitation falls during summer in heavy thunderstorms of short duration. Elevation ranges from 2,000 to 5,300 feet. The frost-free period is 220 to 280 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing [Bluepoint](#), [Vinton](#) and [Yturbide](#) soils in addition to the [Gila](#), [Glendale](#) and [Harkey](#) soils. The Gila, Glendale and Harkey soils have textures finer than loamy fine sand.

DRAINAGE AND PERMEABILITY: Well to excessively well drained; surface runoff is slow; permeability is rapid.

USE AND VEGETATION: Used for irrigated cropland, livestock grazing and urban land. Irrigated crops are cotton, alfalfa, small grains, grain sorghums and vegetables. Present vegetation is very sparse and includes salt grass, arrowgrass, and willows.

DISTRIBUTION AND EXTENT: Southern New Mexico, Arizona and Texas. Brazito soils are of moderate extent. MLRA is 40, 41 and 42.

MLRA OFFICE RESPONSIBLE: Phoenix, Arizona

SERIES ESTABLISHED: Dona Ana County, New Mexico, Mesilla Valley; 1912.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from 0 to 5 inches (Ap horizon)

Entisol feature - the absence of diagnostic subsurface horizons

Classified according to Soil Taxonomy, Second Edition, 1999; Keys to Soil Taxonomy, Tenth Edition, 2006

Revised for the correlation of AZ675, 5/2009, WWJ

National Cooperative Soil Survey U.S.A.