



December 19, 2011

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Technical Memorandum: 2011 Wetland Assessment and Mapping of Preserve System  
Acquisitions, East Contra Costa County Habitat Conservancy, Contra Costa County, California

Dear Ms. Fateman:

The purpose of this technical memorandum is to present the results of wetland assessment and mapping on East Contra Costa County Habitat Conservancy (Conservancy) preserve system acquisitions conducted in 2011. The Conservancy is the implementing entity of the East Contra Costa Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP, referred to as “the Plan” hereafter) (Jones & Stokes 2006). The purpose of the Plan is to protect and enhance ecological diversity and function within the rapidly urbanizing region of eastern Contra Costa County.

The Plan describes how to avoid, minimize, and mitigate, to the maximum extent practicable, impacts to wetlands and sensitive communities while allowing for the growth of selected regions of the County. The Plan outlines goals and objectives related to preservation of wetlands (and other aquatic features) and preservation of unique landscape features on acquisitions to the Preserve System. The Plan also describes the responsibilities associated with operating and maintaining the new preserves that will be created to mitigate for the anticipated impacts. The Conservancy is currently working with U.S. Army Corps of Engineers to obtain a Regional General Permit in compliance with Section 404 of the Clean Water Act.

The primary objective of this effort was to ground truth the existing Plan land cover map to ascertain wetland features and streams in the acquisition properties were accurately mapped. Additional objectives were to ground truth alkali grassland mapping and to map landscape features including culverts, seep/springs, native grassland, and rock outcrops. These maps will be used to calculate acreages of wetlands and landscape features preserved, in order to meet goals and objectives outlined in the Plan. The maps will also be used to identify restoration and enhancement opportunities.

This letter includes a summary of Plan goals pertaining to wetlands, mapping methodology including definitions, results, and recommendations.

#### **HCP GOALS PERTAINING TO WETLANDS AND UNIQUE LANDSCAPE FEATURES**

The Plan contains goals and objectives related to the preservation of wetlands (and other aquatic features) and preservation of unique landscape features on acquisitions to the Preserve System. Outlined below is a summary of the goals and objectives that relate directly to preservation of these features. Additional goals and objectives address covered species and measures to preserve and enhance habitat

for these species, which are not listed below. Table 1 summarizes the estimated acquisition requirements for aquatic land cover types under Maximum Urban Development Area and is taken from Table 5-5b in the Plan.

**Goal 1: Preserve wetlands and ponds in the inventory area.**

Objective 1.1. Acquire perennial wetlands at a ratio of 1:1 of wetted acres and protect as part of the Preserve System.

Objective 1.2. Acquire seasonal wetlands at a ratio of 3:1 of wetted acres and protect as part of the Preserve System.

Objective 1.3. Acquire alkali wetlands at a ratio of 3:1 of wetted acres and protect as part of the Preserve System in Zones 2, 5, and 6.

Objective 1.4. Acquire ponds at a ratio of 2:1 of wetted acres and protect as part of the Preserve System.

Objective 1.5. Acquire at least seven of the 13 ponds in Subzone 2c to provides suitable breeding habitat for tri-colored blackbird, California tiger salamander, California red-legged frog, and/or western pond turtle.

Objective 1.6. Acquire slough/channel at a ratio of 0.5:1 of wetted acres and protect as part of the Preserve System.

Objective 1.7. Acquire aquatic (open water) at a ratio of 1:1 of wetted acres and protect as part of the Preserve System.

Objective 1.8. Preserve and maintain contiguous wetland-upland complexes.

**Goal 10: Preserve sufficient habitat in the inventory area to maintain viable populations of grassland-dependent covered species.**

Objective 10.1. Preserve 13,000 acres of annual grassland and 900 acres of alkali grassland.

Objective 10.2. Protect native grassland alliances within the Preserve System.

**Goal 28. Preserve streams and riparian woodland /scrub in the inventory area.**

Objective 28.1. Protect a minimum of 5 linear miles of stream to compensate for permanent loss of habitat.

Objective 28.2. Acquire riparian/scrub at a ration of 2:1 and protect as part of the Preserve System.

**Table 1. Estimated Acquisition Requirements for Aquatic Land Cover Types under Maximum Urban Development Area**

AQUATIC LAND COVER TYPES	ESTIMATED PRESERVATION REQUIREMENT (ACRES)
Riparian woodland/scrub	70
Permanent wetlands	75
Seasonal wetlands	168
Alkali wetland	93
Ponds	16
Slough/channel	36
Aquatic (open water)	12
Perennial streams (miles)	0.8
Intermittent streams (miles)	0.4
Ephemeral streams (miles)	5

## METHODOLOGY

The properties mapped as part of the 2011 wetland assessment include:

- Vaquero Farms North
- Vaquero Farms South
- Martin
- Grandmas' Quarter
- Souza 3
- Souza 1
- Barron

## Field Survey

Botanist/wetland specialist Erin McDermott and senior botanist Heath Bartosh conducted wetland assessment field work on May 9, 10, 11, 13, 25, and 27, and June 3, 2011. Surveys were conducted by driving along access roads and surveying for areas that likely contained wetland features or targeted landscape features. These areas were then surveyed on foot. The existing HCP Land Cover shapefile (dated February 2011) was overlaid on high resolution color aerial field maps at 1: 2,400 scale. All existing wetland features and targeted land cover types were visited on foot to verify they were mapped correctly. Wetland features were hand drawn on the field maps. A GPS point was recorded at the location of the feature and data was recorded on field data forms (attached). Field surveys were reconnaissance in nature and were not a formal wetland delineation and preliminary jurisdictional determination in accordance with the U.S. Army Corps of Engineers' 1987 and revised 2006 Guidelines (Environmental Laboratory 1987, U.S. Army Corps of Engineers 2006).

## Data Collection

This section details what data was collected during the field mapping effort. Definitions of the features are given below.

### *Wetlands*

Wetland mapping errors and omissions were corrected which included locating and mapping additional wetlands and revising the boundaries of inaccurately mapped wetlands to reflect what was on the ground. Wetlands were identified as depressional or riverine.

Wetland features were characterized as one of the following types using definitions as defined in the Plan:

- alkali wetland
- permanent wetland
- pond
- seasonal wetland

### *Streams/Creeks*

Stream mapping errors and omissions were corrected which included locating and mapping additional streams and revising inaccurately mapped streams. Mapped streams and streams that were previously mapped in the inventory area were identified as either intermittent or ephemeral. In addition culvert locations were mapped. Tree species present along streams were noted and areas with riparian vegetation, as defined in the Plan, were mapped. No sloughs were present in the survey area.

### *Unique Landscape Features*

Alkali grassland mapping errors and omissions were corrected which included locating and mapping additional alkali grassland and revising inaccurately mapped alkali grassland. The following Uncommon Landscape Features were mapped as point features, when encountered during land cover mapping:

- native grassland and type
- rock outcrops
- caves
- springs and seeps
- scalds
- sand deposits

Native grassland was also mapped as a polygon GIS shapefile.

## Definitions

All landcover type definitions followed the descriptions in Section 3.3.2 of the Plan. Further details for select landcover types are given below.

*Alkali wetland* – Alkali wetland areas were defined as areas that meet the alkali grassland or alkali wetland definition in the Plan that also contained wetland hydrology. As defined by the U.S. Army Corps of Engineers (Environmental Laboratory 1987), wetland hydrology is an area that is inundated either permanently or periodically at mean water depths <6.6 ft, or where the

soil is saturated to the surface at some time during the growing season of the prevalent vegetation. Wetland hydrology indicators provide evidence that the site has a continuing wetland hydrologic regime. Wetland hydrology indicators include visual observation of inundation, visual observation of saturation, water marks, sediment deposits, surface soil cracks, drainage patterns, drift lines, and oxidized rhizospheres along living roots, in part.

ICF-Jones & Stokes released a memo (2008) clarifying the difference between alkali grassland and alkali wetland for use in land cover mapping. In it they list several species that they consider to be indicative of alkali wetland including cattail (*Typha* spp.), cocklebur (*Xanthium* spp.) rabbit's foot grass (*Polypogon monspelienses*), rush (*Juncus* spp.), spikerush (*Eleocharis macrostachya*), stinging nettle (*Urtica dioica*) and tule (*Schoenoplectus acutus* var. *occidentalis*). We agree with the species in this list except cattails and tule which are not characteristic of alkali wetland and instead are characteristic of permanent wetland. As a part of this effort we differentiated between alkali grassland and alkali wetland based on the presence of wetland hydrology.

**Permanent wetland** - All wetlands dominated by emergent perennial wetland species including cattails (*Typha* spp.) and tules (*Schoenoplectus* spp.) were identified as permanent wetland. These stands of vegetation were mapped when they occurred on the margins of ponds as well as in creek channels.

**Intermittent streams** – As defined in the glossary of the Plan, intermittent streams are “streams supplied by both rainfall runoff and groundwater; intermittent streams tend to be seasonal, flowing during the rainy season and into the late spring or early summer.” Streams that had a bed and bank, evidence of scour, and contained some moisture during the spring surveys were mapped as intermittent.

**Ephemeral streams** – As defined in the glossary of the Plan, ephemeral streams are “streams that only flow in response to rain events and receives no groundwater input.” Streams that had a bed and bank, may or may not had evidence of scour, and were dry during the spring surveys were mapped as ephemeral.

**Riparian woodland/scrub** – As defined in the Plan, riparian vegetation only includes trees such as Fremont cottonwood (*Populus fremontii*), western sycamore (*Platanus racemosa*), willows (*Salix* spp.), and mule fat (*Baccharis salicifolia*). Oak trees are not considered riparian vegetation.

## **Mapping**

A GIS shapefile (ESRI ArcGIS 9.2) of new and revised land cover types was created by interpreting digital color aerial photography and field notes to delineate boundaries around land cover types, through a “heads-up” digitizing process. Boundaries were heads-up digitized at a scale of 1:1000. The base imagery used was Contra Costa County’s 2009 high resolution imagery. Supplementary imagery used includes 2009 NAIP 1-meter resolution for Contra Costa County and imagery served through Google Earth and Microsoft Bing. A point or polygon shapefile was created that contained culverts, native grasslands, springs and seeps, and alkali scalds. A polyline shapefile was created that contained intermittent creeks that were not included in the existing HCP creeks layer. Ephemeral creeks were hand drawn on field maps but have not been digitized in GIS due to budget constraints.

## RESULTS

The total number of polygons and acreage of each land cover types as a result of the ground truthing and revision is shown in Table 2. Table 2 also shows the number of polygons and acreage for each land cover type in the existing HCP land cover layer and the overall net change as a result of this mapping effort. The total number of polygons and acreage per mapped land cover type for each property are detailed in Tables 3a and 3b below.

**Table 2. Summary of Number of Polygons and Total Acreage for Each Land Cover Type Mapped**

LAND COVER TYPES	EXISTING HCP LAND COVER LAYER		REVISED LAND COVER LAYER		
	NO. OF POLYGONS	ACREAGE	NO. OF POLYGONS	ACREAGE	CHANGE (IN ACRES)
alkali wetland	14	16.88	30	12.95	-3.93
permanent wetland	6	2.87	21	6.46	+3.59
pond	21	4.23	28	4.31	+0.08
seasonal wetland	3	1.78	38	3.99	+2.21
riparian	2	1.35	7	2.09	+0.74
alkali grassland	32	129.56	56	94.88	-34.68
rock outcrops	25	13.5	34	14.01	+0.51
all wetland types combined	44	25.76	117	27.71	+1.95

**Table 3a. Summary of Number of Polygons and Total Acreage for Each Land Cover Type Mapped by Parcel Surveyed**

LAND COVER TYPES	VAQUERO FARMS NORTH		VAQUERO FARMS SOUTH		SOUZA 1 (PORTION)		SOUZA 3	
	NO. OF POLYGONS	ACREAGE	NO. OF POLYGONS	ACREAGE	NO. OF POLYGONS	ACREAGE	NO. OF POLYGONS	ACREAGE
alkali wetland	6	1.75	16	6.73	2	1.78	6	3.05
permanent wetland	0	0	13	4.03	3	0.71	4	1.63
pond	6	0.92	9	1.76	1	0.1	4	1.03
seasonal wetland	2	0.08	5	0.13	4	0.76	4	0.79
riparian	0	0	2	0.14	0	0	4	1.68
alkali grassland	15	22.81	24	39.53	2	2.34	16	31.92
all wetland types combined	13	3.05	43	12.65	10	3.35	18	6.50

**Table 3b. Summary of Number of Polygons and Total Acreage for Each Land Cover Type Mapped by Parcel Surveyed**

LAND COVER TYPES	MARTIN		GRANDMA'S QUARTER		BARRON	
	NO. OF POLYGONS	ACREAGE	NO. OF POLYGONS	ACREAGE	NO. OF POLYGONS	ACREAGE
alkali wetland	0	0	1	0.01	0	0
permanent wetland	0	0	0	0	1	0.09
pond	1	0.06	0	0	7	0.43
seasonal wetland	2	0.05	2	0.09	19	2.10
riparian	0	0	0	0	1	0.27
alkali grassland	0	0	1	0.35	0	0
all wetland types combined	3	0.11	3	0.10	27	2.62

## Wetlands

The overall result of the effort is a refined map with numerous additional features mapped but the total overall acreage increased less dramatically. In the case of alkali wetland and alkali grassland, the total acreage mapped decreased. Alkali grassland is discussed under Unique Landscape Features below.

The initial mapping was based on aerial photo interpretation over the entire inventory area at a coarse scale, which resulted in polygons that were drawn loosely around features. Refinement of the polygons to conform to the exact boundaries of the features resulted in small decreases per feature, and a smaller increase overall than would be expected based on the increase in number of features mapped.

Overall the acreage of wetlands increased by 1.95 acres. The decrease in acreage of individual wetland features should not be problematic because goals and objectives in the Plan are based on mitigation ratios for impacted wetland features. Estimated projected impacts were calculated using the existing land cover type layer. It is assumed that the impacts will be smaller than projected because Project proponents will map their features precisely as we did for this effort.

### *Alkali Wetland*

Alkali wetland acreage decreased by 3.93 acres although the number of features increased by 16 polygons. The overall acreage decreased because boundaries in the existing land cover map were drawn much larger than the features on the ground. Generally alkali wetland was only present in the channel or other low areas topographically and was bordered by alkali grassland on all sides. The alkali grassland did not show any evidence of wetland hydrology.

Vaquero Farms South had the largest acreage of alkali wetland (6.73 acre) as is expected since it is the largest acquisition property of the properties with alkaline soils. Vaquero Farms North, Souza 1, and Souza 3 had acreage of alkali wetland (1.75, 1.78, and 3.05 acres, respectively).



### *Permanent Wetland*

Overall, acreage of permanent wetland increased. Permanent wetland was observed in the bottom of intermittent channels, on the margins of ponds, and throughout ponds. Vaquero Farms South had the largest acreage of permanent wetland (4.03 acres) due to extensive stands of tule in channels in the southwest portion of the property.

### *Pond*

The acreage of ponds only increased slightly because ponds are clearly visible on aerial photography and almost all were mapped during the HCP mapping. Ponds were generally present on intermittent creeks that contained an earthen dam to impound water.

### *Seasonal Wetland*

Overall, acreage of seasonal wetlands increased by 2.21 acres and an additional 35 features. Seasonal wetlands were observed both as depressional features and as riverine features in the bottom of stream channels. Barron had the largest amount of seasonal wetland (2.10 acre) due to numerous seeps on the property that filled adjacent seasonal wetlands.

### *Riparian*

None of the acquisition properties contained extensive riparian vegetation; Souza 3 had the most at 1.68 acres. Vaquero Farms North, Vaquero Farms South, Martin, Grandma's Quarter, Souza 1, and Souza 3 are primarily grassland with creeks that are largely unvegetated or contain permanent wetland vegetation. Barron is vegetated along creeks with oak woodland which is not considered riparian vegetation.

## **Unique Landscape Features**

### *Alkali Grassland*

Mapped alkali grassland decreased from 129.56 acres to 94.88 acres as a result of the map ground truthing and remapping. This is mainly due to the reduction in size of five large alkali grassland features on Vaquero Farms North and South. These areas were originally mapped for the Plan using the Contra Costa County soil survey to show alkaline soil types combined with aerial photo interpretation. When conducting ground truthing, we observed that many of the areas that were mapped as alkaline soils in the Soil Survey (USDA 1977) contained dense, tall, non-native annual grassland, and not alkaline grassland. The pattern that was observed repeatedly was alkali wetland was present in the low portions of the channel, and was bordered by alkali grassland, which transitioned to non-native grassland the further one moved away from the wetland feature. Therefore most areas originally mapped as alkali grassland contained some alkali grassland, just not the extent that was originally mapped.

It is possible that fill may have been placed over some of the areas that are mapped as alkaline soils but contain non-native grassland, particularly in the large alkaline valley present on Vaquero Farms South. On the Land Waste Management parcel, an area containing non-native grassland on alkaline soil was excavated and it was determined that fill had been placed over the original alkali grassland. These areas may present an opportunity for restoration of alkali grassland habitat.

Vaquero Farms South had the largest acreage of alkali grassland (39.53 acres), as is expected since it is the largest acquisition property of the properties with alkaline soils. Vaquero Farms North and Souza 3 also had large amounts of alkali grassland. (23.45 and 31.92 acres, respectively). Alkali grassland was observed along the banks of intermittent creeks on Vaquero



Farms North, Vaquero Farms South, and Souza 3. Alkali grassland generally formed a narrow band along the creeks that extended from the ordinary high water line to the top of bank, and then decreased as the adjacent hillslope ascended.

The decrease in mapped alkali grassland is problematic because preservation goals in the Plan are based on the original mapping which estimated that approximately 1,997 acres occurred in the inventory area (Table 5-8 in the Plan). Objective 10.1 identifies a target of 900 acres of alkali grassland preserved in the Preserve System. The decrease as a result of map refinement is problematic not only because it reduces the acreage of alkali grassland currently in the Preserve System applicable to that goal, it also suggests that this phenomenon will be repeated in other properties resulting in less alkali grassland in the inventory area than previously estimated. Therefore reaching the target of 900 acres may prove to be difficult.

#### *Native Grassland*

Native grassland stands were mapped when they were encountered during the field work. 54 acres of purple needlegrass (*Stipa pulchra*) grassland and 0.7 acre of creeping wildrye (*Elymus triticoides*) grassland were mapped. All of the mapped stands were on Vaquero Farms South and Souza 3. Because the survey area was not systematically surveyed for this land cover type, there are likely several times the acreage mapped actually present on the ground, particularly on Farms South and Souza 3.

#### *Seeps/Springs*

Twenty seeps/springs were mapped as point features in the study area. Fourteen of the 20 were on the Barron property. These features seeped out of the hillslope and filled adjacent seasonal wetlands.

### **RECOMMENDATIONS**

We recommend continuing to conduct wetland assessment and mapping on acquisition properties in 2012 using the same methodology. Properties that should be targeted in 2012 include:

- Vaquero Farms Central (320 acres)
- Chaparral Springs (333 acres)
- Affinito (116 acres)
- Ang (461 acres)
- Schwartz (153 acres)

Other properties identified by Conservancy personnel will also be targeted.

Sincerely,



Erin L. McDermott  
Principal  
ISA Certified Arborist – WE7318A  
Botanist, Wetland & GIS Specialist  
Nomad Ecology

**REFERENCES**

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi. January. 100 pp. plus appendices.

ITS-Jones and Stokes. 2008. Memo: Definitions for HCP/NCCP Alkali Wetland and Grasslands. From Shannah Anderson to John Kopchik & Abigail Fateman. September 9, 2008.

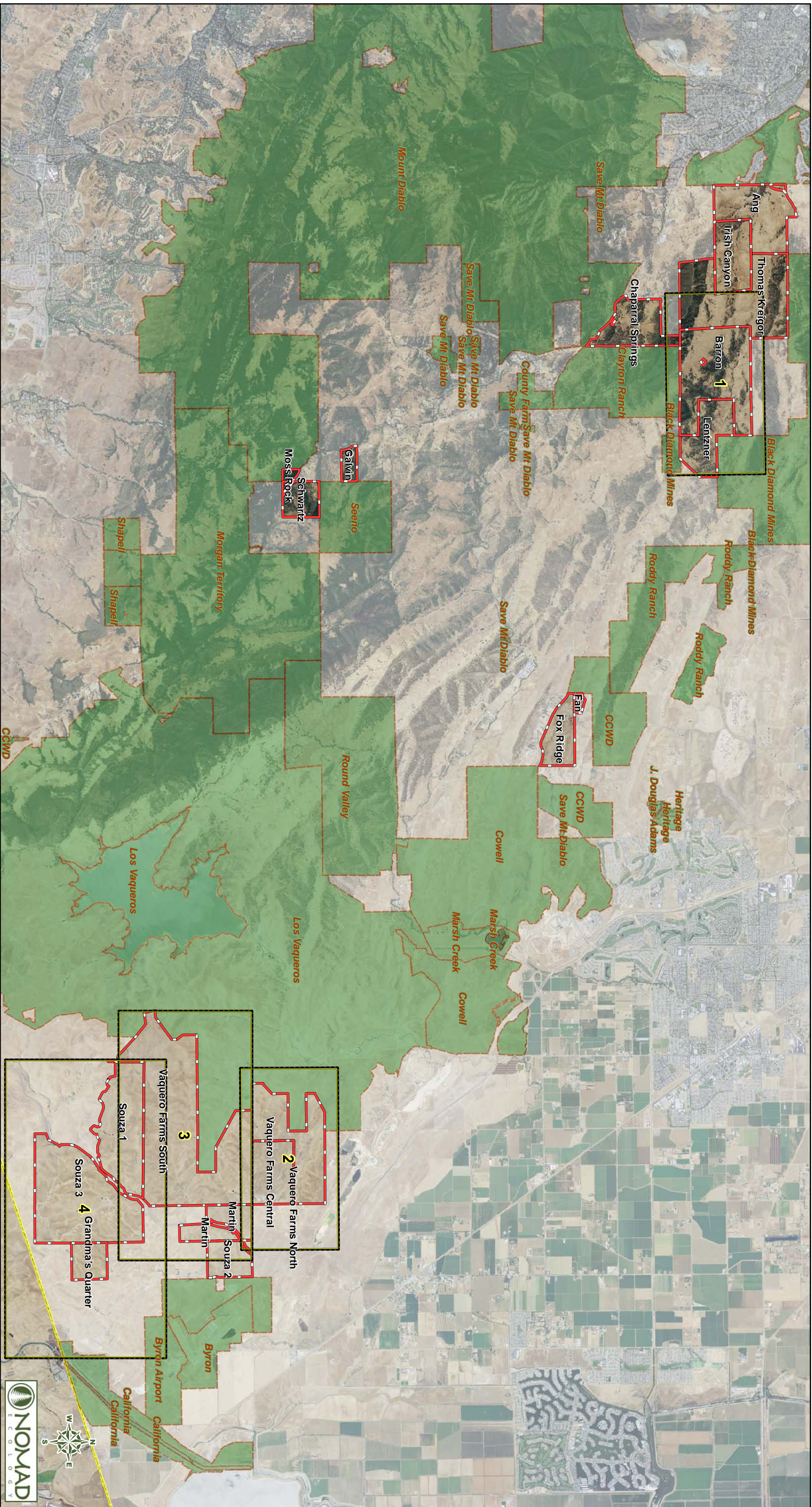
U.S. Army Corps of Engineers. 2006. Interim Regional Supplement to the Corps Engineers Wetland Delineation Manual: Arid West Region. ERDC/EL TR-06-16. U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi. December.

U.S. Department of Agriculture (USDA). 1977. *Soil Survey of Contra Costa County*. Natural Resources Conservation Service

**ATTACHMENTS**

Maps





December 2011

# **Draft 2011 Wetland Assessment**

# Attachment A

# Wetland Assessment Survey Area 2011

# Acquisition Wetland Assessment East Contra Costa County

Habitat Conservancy

## Legend

## Acquisition Parcels

## Public Land and Easements

## County Boundaries

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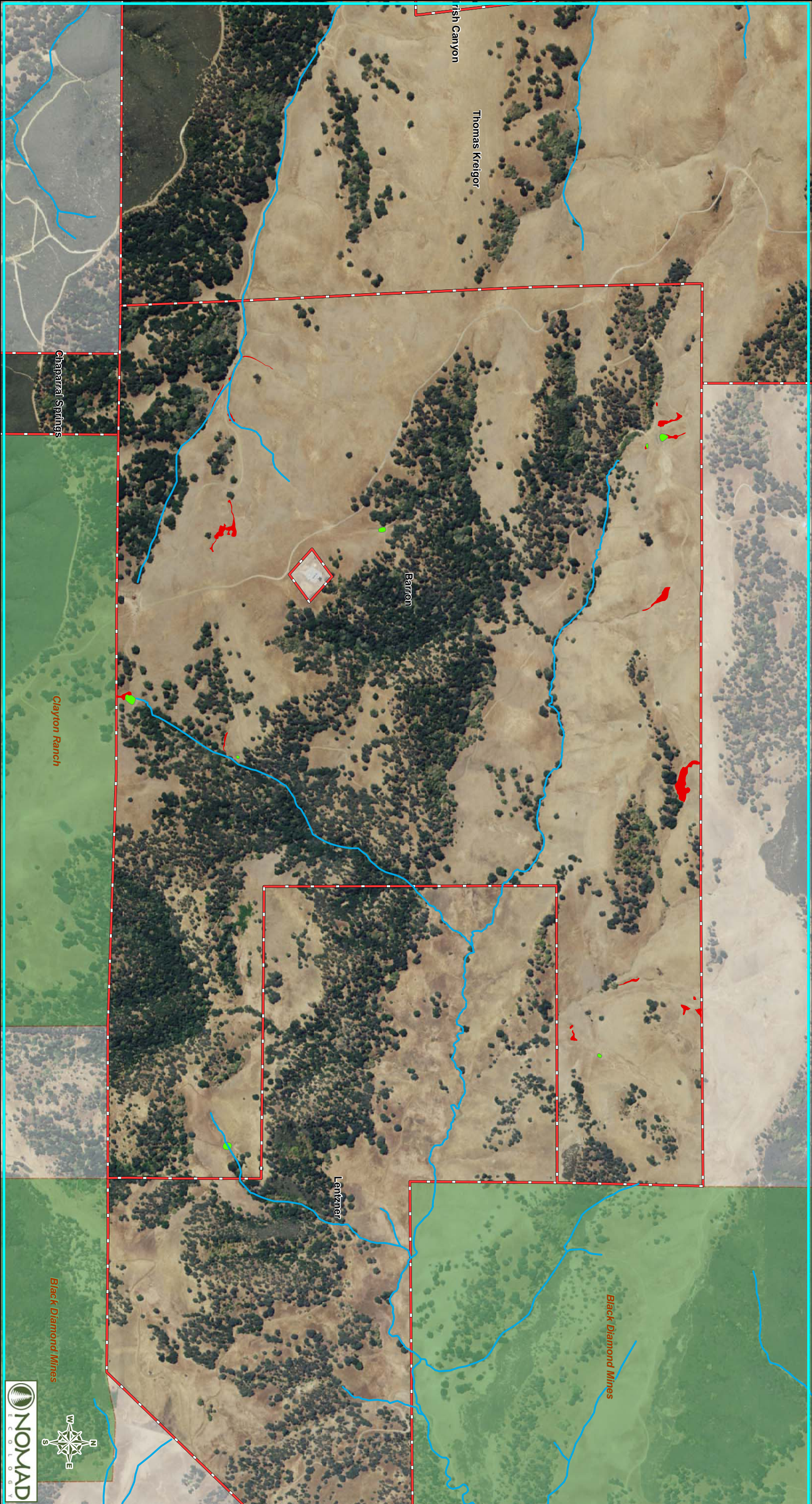


**East Contra Costa County  
Habitat Conservancy**

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












December 2011

Legend

- |  |                                       |   |                   |
|--|---------------------------------------|---|-------------------|
|  | Acquisition Parcels                   |  | permanent wetland |
|  | Public Land and Easements             |  | pond              |
|  | HCP Creeks Layer (February 2011)      |  | rock outcrops     |
|  | Additional Intermittent Creeks Mapped |  | seasonal wetland  |
|  |                                       |    | alkali grassland  |
|  |                                       |    | alkali wetland    |

Attachment A

Mapped Features of the Barron Property

Acquisition Wetland Assessment  
East Contra Costa County  
Habitat Conservancy

Draft 2011 Wetland Assessment



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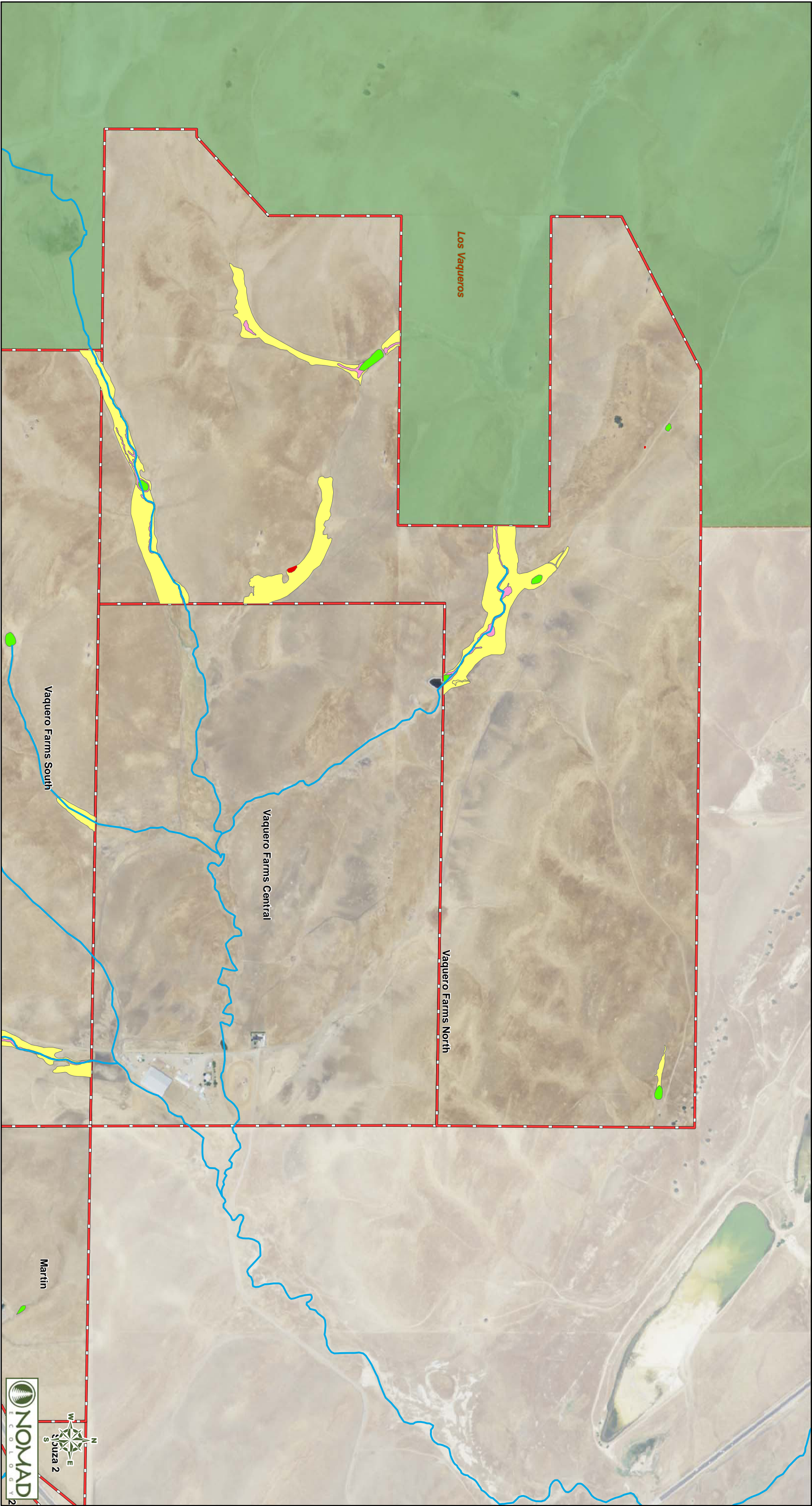


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East Contra Costa County  
Habitat Conservancy





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**Draft 2011 Wetland Assessment**

Legend

Acquisition Parcels

Public Land and Easements

HCP Creeks Layer (February 2011)

Additional Intermittent Creeks Mapped

Revised Land Cover

Wetlands, Alkali Grassland, and Rock Outcrops

alkali grassland

alkali wetland

permanent wetland

pond

rock outcrops

seasonal wetland

**Attachment A**

Mapped Features of the Vaquero Farms North Property

Acquisition Wetland Assessment

East Contra Costa County

Habitat Conservancy

East Contra Costa County  
Habitat Conservancy

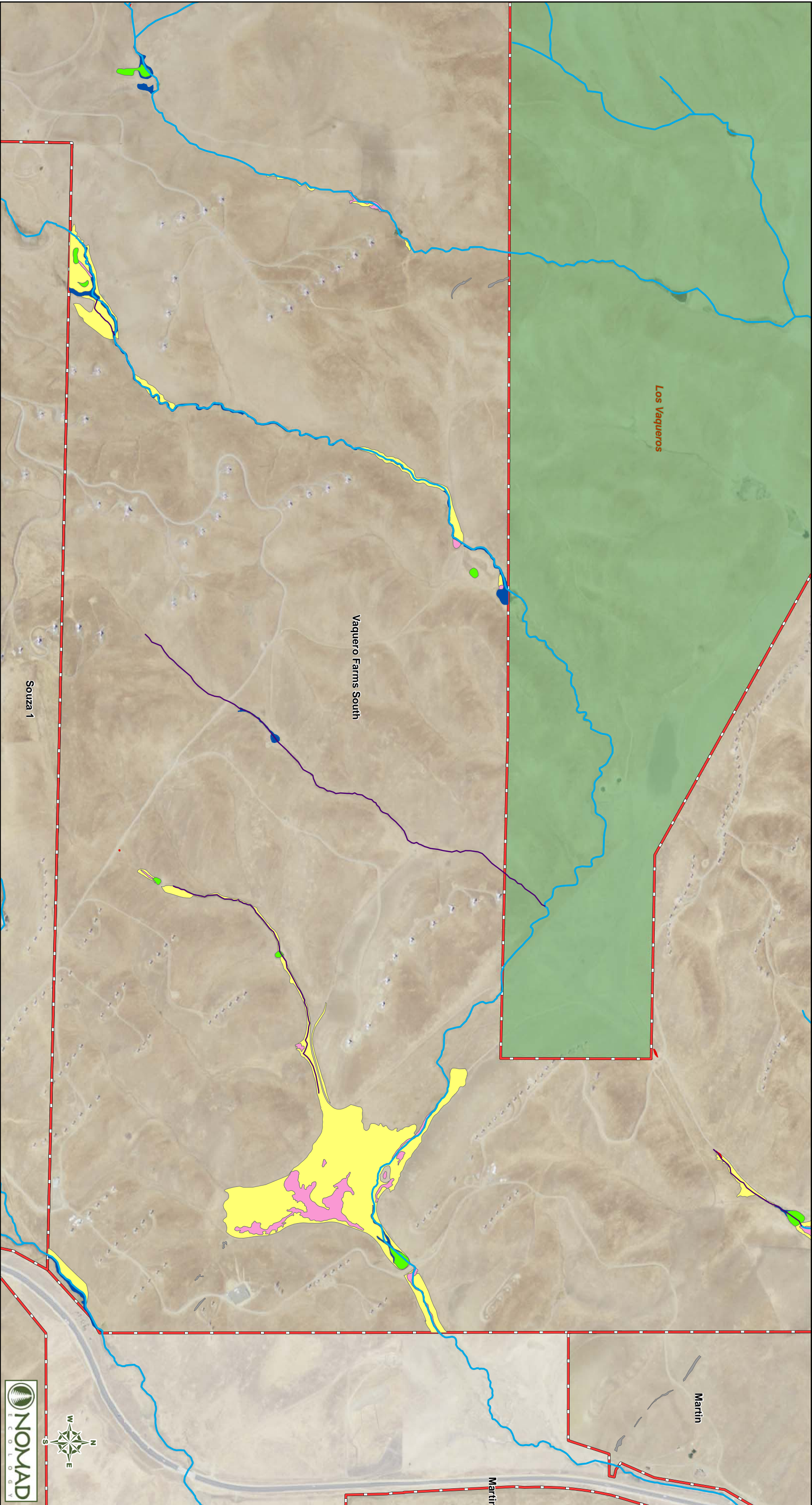
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Sheet 2 of 4





December 2011

Legend

Acquisition Parcels

Public Land and Easements

HCP Creeks Layer (February 2011)

Additional Intermittent Creeks Mapped

Revised Land Cover

Wetlands, Alkali Grassland, and Rock Outcrops

alkali grassland

alkali wetland

permanent wetland

pond

rock outcrops

seasonal wetland

Attachment A

Mapped Features of the Vaquero Farms South Property

Acquisition Wetland Assessment

East Contra Costa County

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East Contra Costa County  
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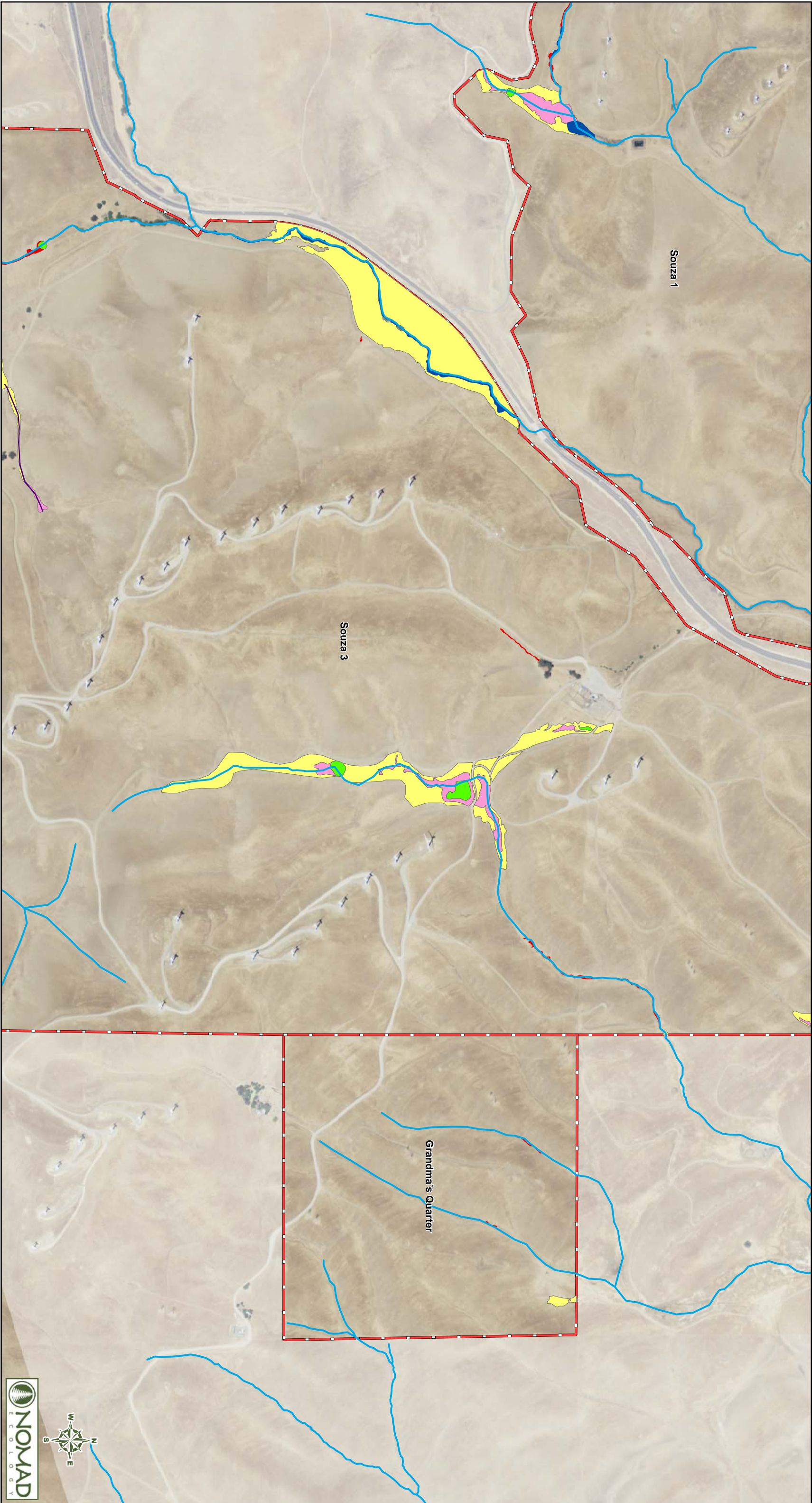
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Sheet 3 of 4

Draft 2011 Wetland Assessment







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Legend

Acquisition Parcels

Public Land and Easements

HCP Creeks Layer (February 2011)

Additional Intermittent Creeks Mapped

Revised Land Cover

Wetlands, Alkali Grassland, and Rock Outcrops

alkali grassland

alkali wetland

permanent wetland

pond

rock outcrops

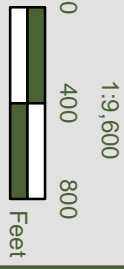
seasonal wetland

Attachment A

Mapped Features of the Souza 3 Property  
Acquisition Wetland Assessment  
East Contra Costa County  
Habitat Conservancy



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Draft 2011 Wetland Assessment