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Technical Memorandum: 2012 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 conducted in 2012 on East Contra Costa County Habitat Conservancy (Conservancy) preserve system acquisitions. 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 primary objective of this effort was to ground truth the existing Plan land cover map to ascertain the accuracy of wetland features and streams mapped during Plan development. Additional objectives were to ground truth alkali grassland polygons and to map landscape features including culverts, seep/springs, native grassland, and rock outcrops. These mapped land cover features will be used to calculate acreages of wetlands and landscape features preserved, in order to meet goals and objectives outlined in the Plan. These maps and associated geospatial data (GIS shapefiles) will also be used to identify restoration and enhancement opportunities. This letter includes a summary of Plan goals pertaining to wetlands, mapping methodology, results, and recommendations. The results of the 2011 mapping are presented in the 2011 Technical Memorandum[1].

[1] Nomad Ecology. 2011. Technical Memorandum. 2011 Wetland Assessment and Mapping of Preserve System Acquisitions, East Contra Costa County Habitat Conservancy, Contra Costa County, California. December.

PLAN 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 (Jones & Stokes 2006). 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

Source: Table 5-5b in the Plan (Jones & Stokes 2006)

Methodology

The survey included 11 properties in their entirety and the central portion of Souza 1 as it was excluded from 2011 surveys. The 12 properties mapped as part of the 2012 wetland assessment include:

- Affinito
- Ang
- Chaparral Springs
- Fox Ridge
- Fan
- Irish Canyon
- Lentzner
- Moss Rock
- Souza 1 (portion)
- Thomas Central
- Thomas Kreiger
- Vaquero Farms Central

Although the Barron, Souza 2, and Vaquero Farms North acquisitions were mapped in 2011 a few additional acreages/features were mapped as part of this years' mapping effort. These additional features are not included in this memo but are included in the GIS shapefiles delivered to the Conservancy.

Background Aerial Imagery Analysis

Prior to conducting field work, aerial photo imagery and existing GIS datasets were reviewed to determine locations where wetlands were likely to occur based on aerial photo signature, soils or topography.

Field Survey

Botanist/wetland specialist Erin McDermott and senior botanist Heath Bartosh conducted wetland assessment field work on May 2, 3, 4, and 10, and August 6, 8, 10, and 15, 2012. Field surveys were conducted by driving along access roads and walking to areas inaccessible by vehicles to survey for

features that likely qualify as wetland land cover types or targeted landscape features. Once identified these features were then evaluated by species composition and wetland characteristics. When necessary, evaluation of the presence of hydric soils was conducted by digging soil data pits. The 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 evaluated to verify they were mapped correctly. Wetland features were hand drawn on the field maps. A GPS point was recorded at the location of features that were not clearly visible on the aerial imagery and data was recorded on field data forms (Attachment A). Field surveys were reconnaissance in nature and were not conducted to a level of a formal wetland delineation in accordance with the U.S. Army Corps of Engineers' 1987 and 2008 Guidelines (Environmental Laboratory 1987, U.S. Army Corps of Engineers 2008).

Data Collection

This section details how the Plan defines each aquatic feature/land cover type and what data were 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. Wetland features were characterized as one of the following types using definitions as defined in the Plan:

- alkali wetland
- permanent wetland
- pond
- seasonal wetland

Wetlands (alkali, permanent, and seasonal) were identified as depressional or riverine, these terms are defined below.

Streams/Creeks

Stream mapping errors and omissions were corrected which included locating and mapping additional streams. Mapped creeks and streams that were previously mapped in the inventory area were identified as either intermittent or ephemeral. In addition, incidental observations of culvert locations were mapped however not all culverts 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 features were mapped when encountered during wetland land cover mapping and were a secondary goal of this project:

Point Features
- springs and seeps
- scalds
- sand deposits
- culverts and spring boxes
- isolated riparian trees

Polygon Features
- alkali grassland
- native grassland
- rock outcrops

Definitions

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

Alkali grassland – Alkali grassland areas were defined as areas that meet the alkali grassland definition in the Plan. As defined by the Plan, "dominant grasses in alkali grassland include saltgrass (*Distichlis spicata*) and wild barley (*Hordeum* spp.). The associated herb cover consists of halpophytes including saltbush (*Atriplex* ssp.), alkali heath (*Frankenia salina*), alkali weed (*Cressa truxillensis*), alkali mallow (*Malvella leprosa*), and common spikeweed (*Centromadia pungens*) (Jones & Stokes 2006)." Other field indicators of alkali grassland on site included visible alkali soils, alkali scalds, and low cover of vegetation.

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 Plan, "alkali wetlands support ponded or saturated soil conditions and occur as perennial or seasonally wet features on alkali soils. The vegetation of alkali wetlands is composed of halophytic plant species adapted to both wetland conditions and high salinity levels. Typical species include those common to both seasonal and alkali wetlands such as saltgrass (*Distichlis spicata*), alkali heath (*Frankenia salina*), and common spikeweed (*Centromadia pungens*) (Jones & Stokes 2006)." 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 monspeliensis*), 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, but 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, especially monocots, including cattails (*Typha* spp.) and tules (*Schoenoplectus* spp.) were identified as permanent wetland. These stands of vegetation were mapped when they occurred within ponds as well as in creek channels.

Riverine - Wetlands (alkali, permanent, and seasonal) were identified as depressional or riverine. Wetlands were considered riverine if they were linear and followed an ephemeral or intermittent creek channel. Riverine permanent wetlands generally filled the bottom of the channel and were confined to the

channel. Riverine seasonal and alkali wetlands followed the channel but were wider than the channel in places where channel depth is shallow and water may crest the banks.

Depressional - Wetlands (alkali, permanent, and seasonal) were identified as depressional or riverine. Wetlands were considered depressional if they were not linear, did not follow an ephemeral or intermittent creek channel, or were isolated (off-channel) features.

Intermittent streams – As defined in the Plan (Jones & Stokes 2006), 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 or summer surveys were mapped as intermittent.

Ephemeral streams – As defined in the Plan (Jones & Stokes 2006), ephemeral streams are "streams that only flow in response to rain events and receive no groundwater input." Streams that had a bed and bank, were not well-scoured, were not fed by springs or seeps, and were dry during the spring surveys were mapped as ephemeral.

Riparian woodland/scrub – As defined in the Plan (Jones & Stokes 2006), riparian vegetation only includes trees such as Fremont cottonwood (*Populus fremontii* subsp. *fremontii*), western sycamore (*Platanus racemosa*), willows (*Salix* spp.), and mule fat (*Baccharis salicifolia*). As per the Plan, oak trees were not considered riparian vegetation, even though they border creeks on acquisition properties such as Barron and Irish Canyon.

Mapping

A GIS shapefile of new and revised land cover types was created by interpreting digital color aerial photography and field maps to delineate and improve 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 2008 high resolution imagery. Supplementary imagery used includes 2008 NAIP 1-meter resolution for Contra Costa County and imagery served through Google Earth and Microsoft Bing. A point shapefile was created that contained culverts, springs and seeps, and alkali scalds. A polygon shapefile was created that contained native grassland stands. A polyline shapefile was created that contained intermittent creeks that were not included in the existing HCP creeks shapefile. This polyline shapefile also contained existing creeks classified as intermittent, ephemeral, or perennial. Ephemeral creeks that are not in the existing HCP creeks shapefile were hand drawn on field maps but have not been digitized in GIS pending Conservancy direction on process for incorporating the data.

The results of mapping on the 12 properties were compared with the HCP land cover shapefile dated January 2013. The January 2013 HCP land cover shapefile included the results of the 2011 mapping conducted by Nomad Ecology.

RESULTS

The total number of polygons and acreage of each land cover type 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 shapefile (dated January 2013) for the 12 mapped properties and the overall net change for the 12 mapped properties 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, 3b, and 3c below. Maps of each property and mapped features are shown in Attachment B. The total acreage of all land cover types mapped increased except alkali grassland which decreased.

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

LAND COVER TYPES	EXISTING HCP LAND COVER SHAPEFILE		REVISED LAND COVER SHAPEFILE		
	NO. OF POLYGONS	ACREAGE	NO. OF POLYGONS	ACREAGE	CHANGE (IN ACRES)
alkali grassland	19	90.54	32	51.89	-38.65
alkali wetland (riverine)	7	1.18	20	5.06	+6.59
alkali wetland (depressional)			21	2.71	
permanent wetland (riverine)	9	1.92	20	3.38	+1.98
permanent wetland (depressional)			6	0.52	
pond	21	4.41	23	4.72	+0.31
seasonal wetland (riverine)	4	1.63	35	3.05	+3.43
seasonal wetland (depressional)			15	2.01	
wetland (no subtype)[2]	3	0.49	0	0	-0.49
riparian	13	16.56	4	3.21	-13.35
all wetland types combined	**44**	**9.63**	**140**	**21.45**	**+11.82**

[2] These features were remapped as permanent or seasonal wetland features.

Table 3a. Summary of Parcel Totals for Number of Polygons and Total Acreage for Each Land Cover Type

Land Cover Types	Affinito		Ang		Chaparral Springs		Fox Ridge	
	No. of Polygons	Acreage	No. of Polygons	Acreage	No. of Polygons	Acreage	No. of Polygons	Acreage
alkali grassland	-	-	-	-	-	-	10	6.93
alkali wetland (riverine)	-	-	-	-	-	-	-	-
alkali wetland (depressional)	-	-	-	-	-	-	2	0.02
permanent wetland (riverine)	-	-	2	0.39	1	0.04	-	-
permanent wetland (depressional)	-	-	2	0.18	-	-	-	-
pond	-	-	5	0.49	2	0.68	-	-
seasonal wetland (riverine)	-	-	4	0.32	2	0.03	1	0.03
seasonal wetland (depressional)	1	0.05	2	0.01	-	-	1	0.02
riparian	-	-	1	0.01	-	-	-	-
all wetland types combined	**1**	**0.05**	**15**	**1.39**	**5**	**0.75**	**4**	**0.07**

Table 3b. Summary of Parcel Totals for Number of Polygons and Total Acreage for Each Land Cover Type

Land Cover Types	Irish Canyon		Lentzner		Moss Rock		Souza 1 (portion)	
	No. of Polygons	Acreage	No. of Polygons	No. of Polygons	No. of Polygons	Acreage	No. of Polygons	Acreage
alkali grassland	-	-	1	0.12	-	-	11	3.50
alkali wetland (riverine)	-	-	2	0.15	-	-	3	0.48
alkali wetland (depressional)	-	-	3	0.17	-	-	1	0.02
permanent wetland (riverine)	1	0.08	5	0.18	-	-	11	2.69
permanent wetland (depressional)	-	-	-	-	-	-	2	0.31
pond	2	0.31	1	0.04	-	-	4	1.6
seasonal wetland (riverine)	9	0.88	-	-	-	-	1	0.49
seasonal wetland (depressional)	3	0.22	1	0.04	-	-	1	0.99
riparian	1	2.7	-	-	-	-	1	0.07
all wetland types combined	**15**	**1.49**	**12**	**0.58**	**0**	**0**	**23**	**6.58**

Table 3c. Summary of Parcel Totals for Number of Polygons and Total Acreage for Each Land Cover Type

Land Cover Types	Thomas Central		Thomas Kreigor		Vaquero Farms Central	
	No. of Polygons	No. of Polygons	No. of Polygons	Acreage	No. of Polygons	Acreage
alkali grassland	-	-	-	-	10	41.34
alkali wetland (riverine)	-	-	-	-	15	4.44
alkali wetland (depressional)	-	-	-	-	15	2.5
permanent wetland (riverine)	-	-	-	-	-	-
permanent wetland (depressional)	1	0.03	1	0.01	-	-
pond	2	0.23	4	0.65	3	0.72
seasonal wetland (riverine)	2	0.29	16	1.01	-	-
seasonal wetland (depressional)	2	0.15	4	0.53	-	-
riparian	1	0.42	-	-	-	-
all wetland types combined	**7**	**0.70**	**25**	**2.2**	**33**	**7.66**

Wetlands

The overall result of the effort is a refined map with numerous additional wetland features mapped but the total overall acreage increased less dramatically. The number of wetland polygons increased from 44 (in the January 2013 land cover shapefile) to 140 and the total wetland acreage increased from 9.63 acres to 21.45 acres (an increase of 11.82 acres) (Table 2). 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 roughly around features. Refinement of the polygons to conform to the exact boundaries of the features, at a finer scale, resulted in small decreases per feature, and a smaller increase of acreage overall than would be expected based on the increase in number of features mapped.

Alkali Wetland

Alkali wetland acreage increased from 1.18 acres to 7.77 acres (an increase of 6.59 acres) and the number of features increased from 7 to 41 polygons (an increase of 32 polygons) (Table 2) primarily due to Vaquero Farms Central. Vaquero Farms Central had the largest acreage of alkali wetland (4.44 acre of riverine and 2.50 acre of depressional alkali wetland features) (Table 3c). Fox Ridge, Lentzner[3], and the portion of Souza 1 also had small amounts of alkali wetland (0.02, 0.32, and 0.50 acre, respectively).

[3] The Lentzner restoration area was mapped based on current conditions and the results of this year's restoration monitoring, which indicate only Transect 3 is currently within the seep fed wetland. This polygon should be revised upon completion of the Lentzner monitoring period (December 2013).

Permanent Wetland

Permanent wetland acreage increased from 1.92 acres to 3.90 acres (an increase of 1.98 acres) and the number of features increased from 9 to 26 polygons (an increase of 17 polygons) (Table 2). The majority of permanent wetland observed was riverine (3.38 acres). A small amount (0.52 acre) of depressional permanent wetland was also observed. Depressional permanent wetlands were fed by seeps and were often feeding drainages below. They were also present near creeks on adjacent flood plains. Souza 1 had the largest acreage of permanent wetland (3.00 acres) due to extensive stands of tule and bulrush in Brushy Creek and the tributary of Brushy Creek.

Pond

The acreage of ponds only increased slightly because ponds are clearly visible on aerial photography and almost all were accurately mapped during the HCP mapping. Two additional ponds were mapped on Thomas North and Vaquero Farms North.

Seasonal Wetland

Seasonal wetland acreage increased from 1.63 acres to 5.06 acres (an increase of 3.43 acres) and the number of features increased from 4 to 50 polygons (an increase of 46 polygons) (Table 2). Seasonal wetlands were observed both as riverine features (3.05 acres) and depressional features (2.01 acres). Irish Canyon had the largest amount of riverine seasonal wetland (0.88 acre) due to numerous seeps in ephemeral and intermittent drainages. Riverine seasonal wetlands were present on Ang, Chaparral Springs, Fox Ridge, Irish Canyon, Souza 1, Thomas Central, and Thomas Kreiger. Depressional seasonal wetlands were present on Affinito, Ang, Fox Ridge, Irish Canyon, Lentzner, Souza 1, Thomas Central, and Thomas Kreiger.

Riparian

Riparian acreage decreased from 16.56 acres to 3.21 acres (a decrease of 13.35 acres) and the number of features decreased from 13 to 4 polygons (a decrease of 9 polygons) (Table 2). This decrease is due to areas that were mapped as riparian that are actually oak woodland, which is not considered riparian vegetation as per the Plan. Affinito, Ang, Chaparral Springs, Lentzner, Moss Rock, and much of Irish Canyon contain creeks that are vegetated with oak woodland. None of the acquisition properties contained extensive riparian vegetation; Irish Canyon had the most at 2.70 acres. Fox Ridge, Souza 1, Thomas Central, and Vaquero Farms Central contain creeks that bisect through grassland with little riparian vegetation. Scattered cottonwoods and willows that did not form stands were mapped as points.

Unique Landscape Features

Alkali Grassland

Mapped alkali grassland decreased from 90.54 acres to 51.89 acres as a result of the map ground truthing and refinement based on species composition. This is mainly due to the reduction in size of alkali grassland features on Vaquero Farms Central. Alkali grassland was originally mapped for the Plan using the extent of alkaline soils from the Contra Costa County soil survey (USDA 1977). The boundaries of select alkaline soil types were inaccurately used as the extent of alkaline grassland within the inventory area. Soil survey boundaries reflect course level mapping efforts that generalize alkaline areas but do not strictly correspond to actual alkaline grassland stands on the ground. When conducting ground truthing, we observed that many of the areas that were mapped as alkaline soils using the soil survey boundaries contained dense, tall, non-native annual grassland lacking alkaline species composition and vegetative cover typical of alkali grasslands in the region. Most areas that were originally mapped as alkali grassland

in the existing HCP land cover shapefile did contain some alkali grassland, just not to the extent that was originally mapped.

Vaquero Farms Central had the largest acreage of alkali grassland (41.34 acres). Fox Ridge and the portion of Souza 1 also contained alkali grassland (6.93 acres and 3.50 acres, respectively). 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 is a more accurate representation of alkali grassland currently in the Preserve System applicable to that goal, it also suggests that the original acreage goal may not be attainable and that this phenomenon will be repeated on additional acquisitions. 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 wetland mapping field work. Types and acreages of native grasslands recorded include 52.44 acres of purple needlegrass (*Stipa pulchra*) grassland, 2.8 acres of creeping wildrye (*Elymus triticoides*), and 0.3 acre of one-sided bluegrass (*Poa secunda* subsp. *secunda*) grassland. Native grassland was mapped on Affinito, Chaparral Springs, Fox Ridge, Souza 1, Thomas Kreiger, and Vaquero Farms Central. The majority of the mapped native grassland was purple needlegrass grassland on Souza 1 (50.14 acres) where extensive stands were observed, primarily on north facing slopes. 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.

Seeps/Springs

Seeps and springs were mapped when they were encountered during the wetland mapping field work. Twenty-two seeps/springs were mapped as point features in the study area and all of the parcels contained seeps/springs. Because the survey area was not systematically surveyed for seeps/springs, there are likely additional seeps present on the surveyed parcels.

SUMMARY

Table 4 summarizes the estimated preservation acreage required for as aquatic land cover types and alkali grassland as outlined in Table 5-5b of the Plan (which is based on the Maximum Urban Development Area) and in the objectives of the Plan. Based on the estimated preservation requirements in the Plan, additional acreage is needed for all aquatic land cover types and alkali grassland.

Table 4. Summary of Preserved Acreage and Suggested Additional Acquisition Property Targets

Select Land Cover Types	Estimated Preservation Requirement (acres)	Acquisition Properties Total[1] (acres)	Suggested Additional Acquisition Property Targets
Riparian woodland/scrub	70	7	Corridors along Marsh Creek, upstream from Round Valley
Permanent wetland	75	11[2]	------
Seasonal wetland	168	19[2]	Lone Tree Valley, Horse Valley, Deer Valley and parts of Briones Valley
Alkali wetland	93	24[2]	Areas south of Discovery Bay and east of Byron Highway; around Knightsen.
Ponds	16	10	------
Alkali Grassland	900	162	Areas south of Discovery Bay and east of Byron Highway, around Knightsen.

[1]For all Acquisition Properties included in the Conservancy shapefile (dated December 2011) and calculated using the HCP Land Cover shapefile (dated January 2013) and updated with 2012 revisions.
[2]Includes riverine and depressional features.

Recommendations

We recommend continuing to continue wetland assessment and mapping on unsurveyed acquisition properties in 2013 using the same methodology.

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.

Jones & Stokes. 2006. *East Contra Costa County Habitat Conservation Plan and Natural Community Conservation Plan.* October. (J&S 01478.01.) San Jose, CA.

U.S. Army Corps of Engineers. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

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

ATTACHMENTS

Attachment A: Blank Field Data Form
Attachment B: Mapped Features (Sheet Index and 8 sheets)

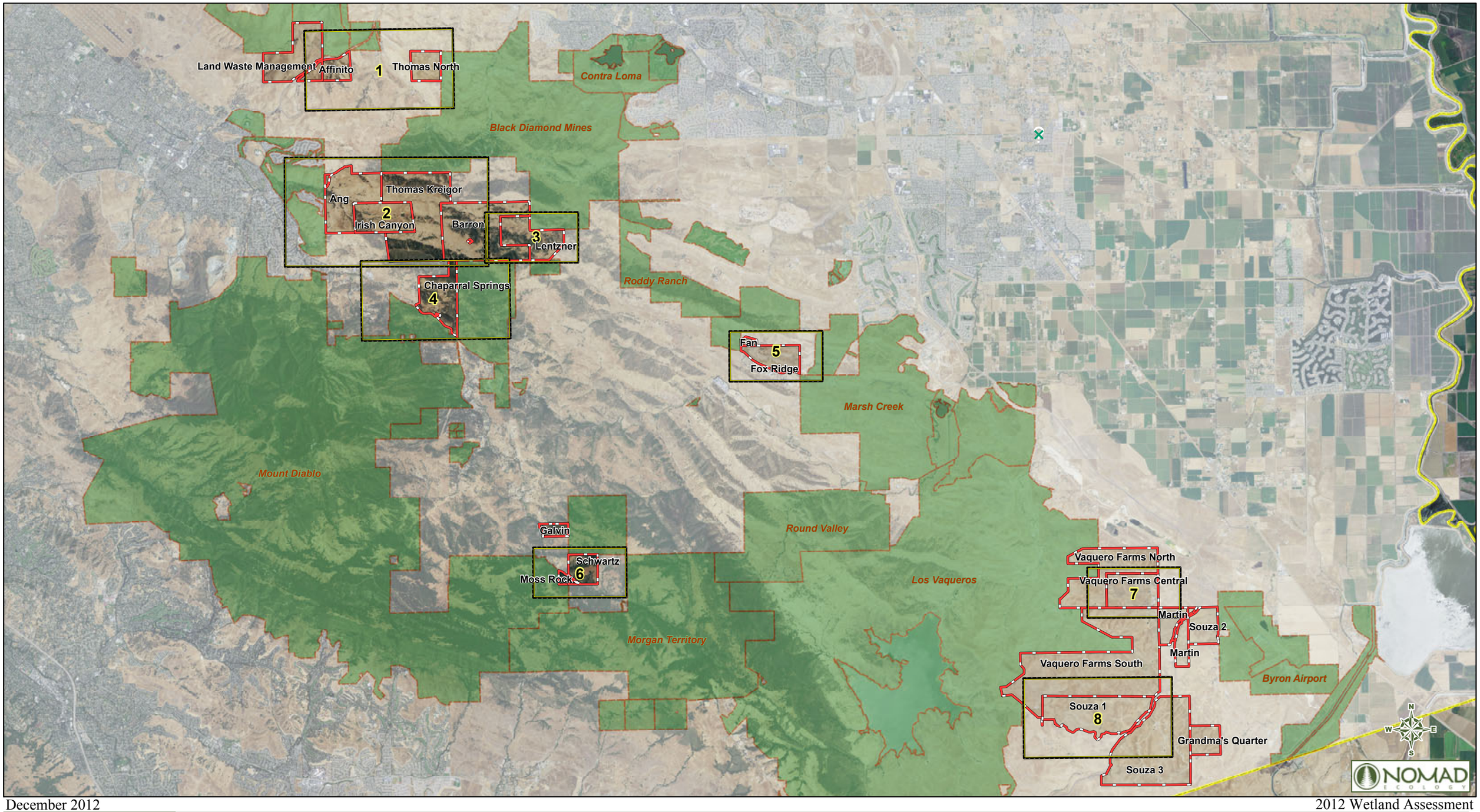
Date:_____________ Parcel:_________________ Personnel:_______________________ Page:____of_____

GPS Pt./Polygon	Add Remove Change	
Wetland alkali wetland aquatic permanent wetland pond seasonal wetland other wetland	**Stream** ephemeral intermittent underground aboveground culvert size_______	**Landscape Features** native grassland rock outcrops caves springs and seeps . scalds sand deposits
Dominant species	**Hydrology Indicators**	**Wetland Location** depressional riverine
	Soil Indicators	**Riparian species**
Notes		

GPS Pt./Polygon	Add Remove Change	
Wetland alkali wetland aquatic permanent wetland pond seasonal wetland other wetland	**Stream** ephemeral intermittent underground aboveground culvert size_______	**Landscape Features** native grassland rock outcrops caves springs and seeps . scalds sand deposits
Dominant species	**Hydrology Indicators**	**Wetland Location** depressional riverine
	Soil Indicators	**Riparian species**
Notes		

GPS Pt./Polygon	Add Remove Change	
Wetland alkali wetland aquatic permanent wetland pond seasonal wetland other wetland	**Stream** ephemeral intermittent underground aboveground culvert size_______	**Landscape Features** native grassland rock outcrops caves springs and seeps . scalds sand deposits
Dominant species	**Hydrology Indicators**	**Wetland Location** depressional riverine
	Soil Indicators	**Riparian species**
Notes		

GPS Pt./Polygon	Add Remove Change	
Wetland alkali wetland aquatic permanent wetland pond seasonal wetland other wetland	**Stream** ephemeral intermittent underground aboveground culvert size_______	**Landscape Features** native grassland rock outcrops caves springs and seeps . scalds sand deposits
Dominant species	**Hydrology Indicators**	**Wetland Location** depressional riverine
	Soil Indicators	**Riparian species**
Notes		



December 2012

2012 Wetland Assessment

Legend

- Acquisition Parcels
- Sheet Number
- Public Land and Easements
- County Boundaries

Attachment A

Wetland Assessment Survey Area 2012

Acquisition Wetland Assessment
East Contra Costa County
Habitat Conservancy

East Contra Costa County Habitat Conservancy

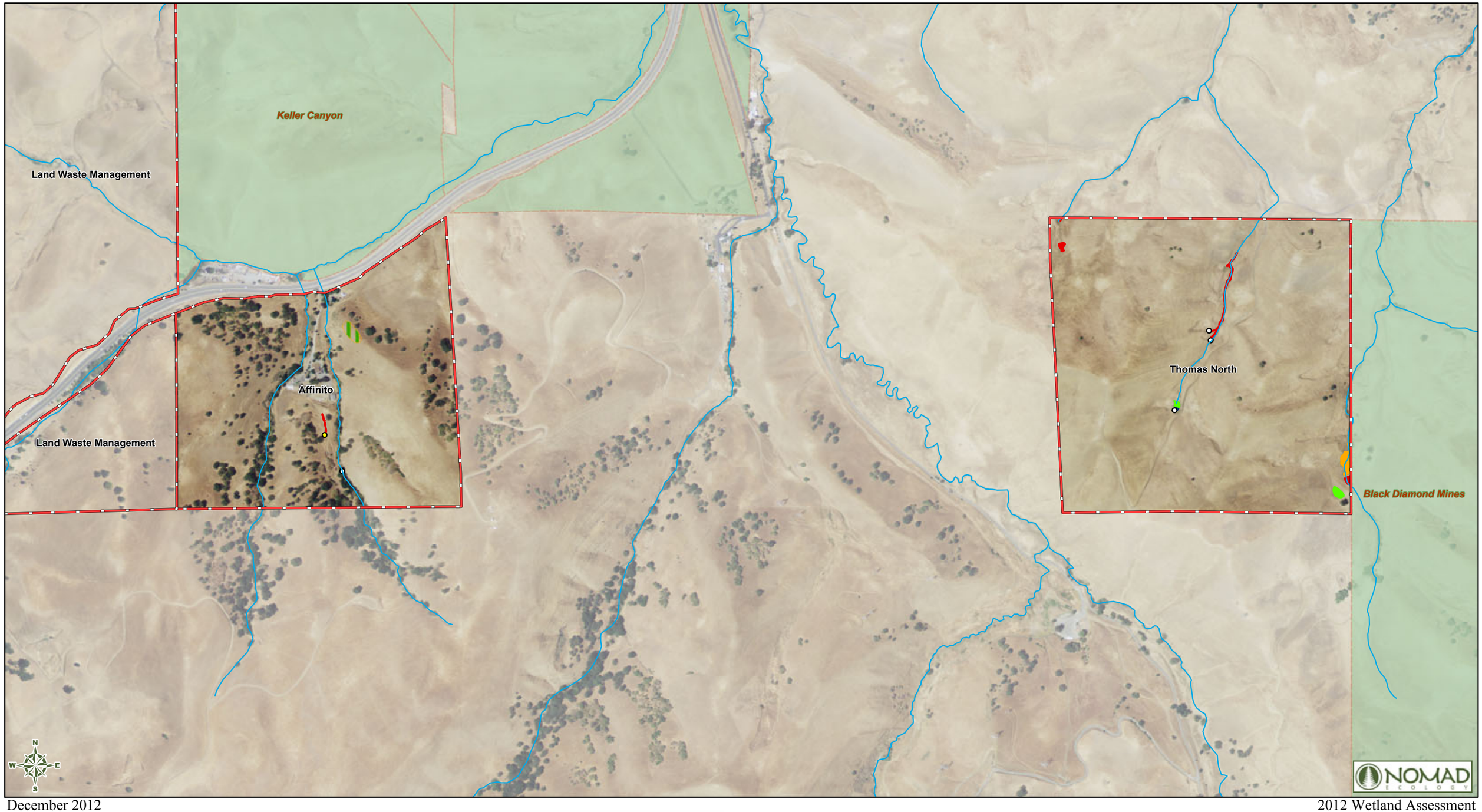
1:95,040

0 0.75 1.5 Miles

Sheet Index

Sources: NAIP 2009; Contra Costa County. Projection: NAD 83 UTM Zone 10 North.

Contra Costa County, California



December 2012

2012 Wetland Assessment

Legend

- Acqusition Parcels
- Public Land and Easements
- Creeks
- Additional Creeks Mapped

Refined Land Cover Features

Wetlands, Alkali Grassland, and Riparian

- Alkali Grassland
- Alkali Wetland
- Permanent Wetland
- Pond
- Riparian
- Seasonal Wetland

Native Grassland*

- Creeping Wildrye
- One-Sided Bluegrass
- Purple Needlegrass

Other Features*

- Spring/Seep
- Spring Box
- Water Tank
- Culvert

Attachment A

Mapped Features of the Affinito and Thomas North Properties

Acquisition Wetland Assessment
East Contra Costa County
Habitat Conservancy

East Contra Costa County Habitat Conservancy

1:9,600

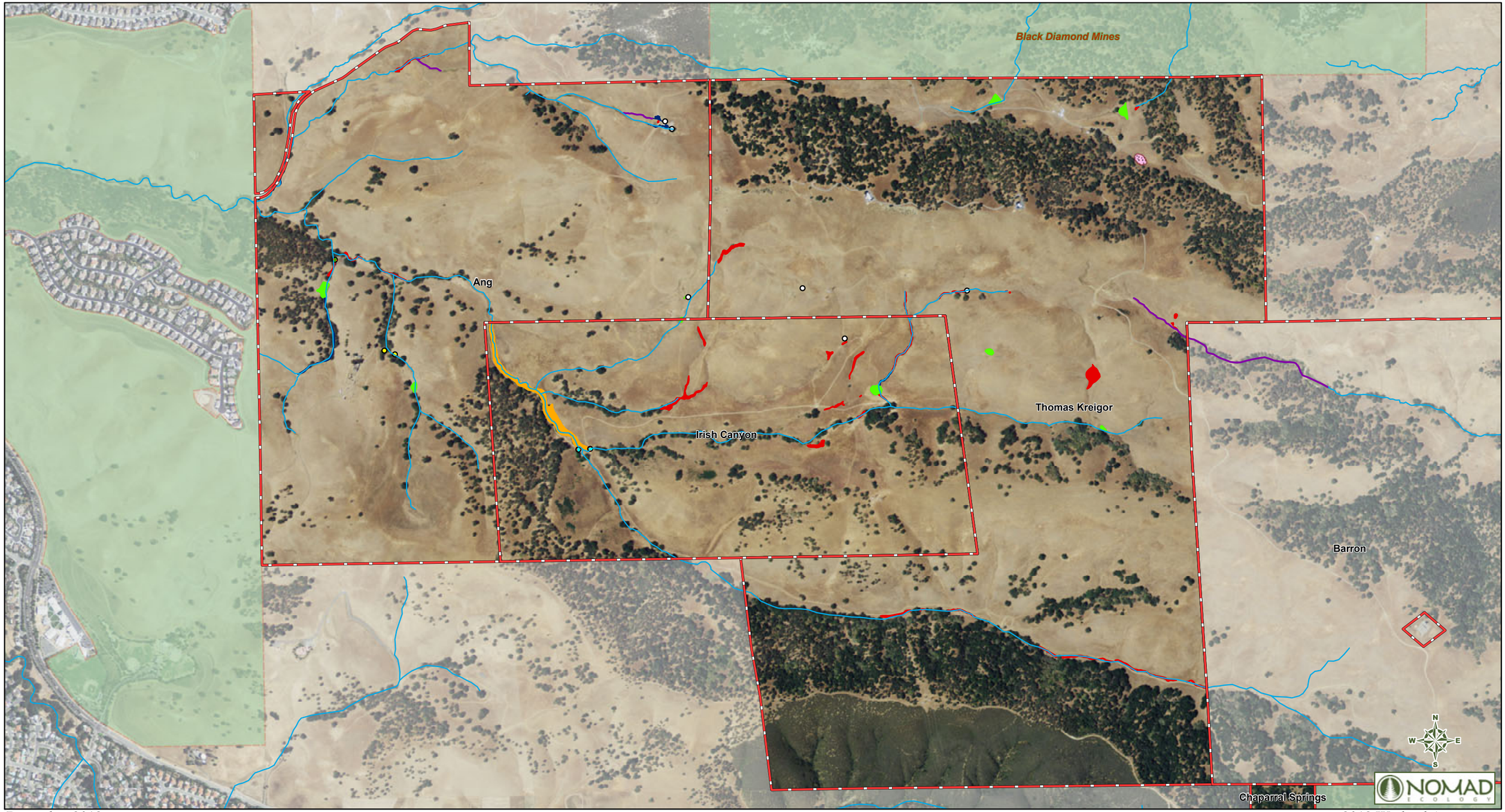
0 400 800 Feet

Sheet 1 of 8

Sources: NAIP 2009; Contra Costa County Projection: NAD 83 UTM Zone 10 North.

*These features were mapped when encountered during wetland land cover mapping and were a secondary goal of this project. Not all map sheets contain all of these features.

Contra Costa County, California



December 2012

2012 Wetland Assessment

Legend

Acqusition Parcels	Refined Land Cover Features	Permanent Wetland	Native Grassland*	Other Features*
Public Land and Easements	Wetlands, Alkali Grassland, and Riparian	Pond	Creeping Wildrye	Spring/Seep
Creeks	Alkali Grassland	Riparian	One-Sided Bluegrass	Spring Box
Additional Creeks Mapped	Alkali Wetland	Seasonal Wetland	Purple Needlegrass	Water Tank
				Culvert

Attachment A

Mapped Features of the Ang, Irish Canyon, and Thomas Kreiger Properties

Acquisition Wetland Assessment

East Contra Costa County

Habitat Conservancy

East Contra Costa County Habitat Conservancy

Sheet 2 of 8

1:12,000

0 500 1,000

Feet

Sources: NAIP 2009; Contra Costa County Projection: NAD 83 UTM Zone 10 North.

Contra Costa County, California

Black Diamond Mines

Lentzner

Barron

Clayton Ranch

Black Diamond Mines

N
W
E
S

December 2012

2012 Wetland Assessment

Legend

Acquisition Parcels
Public Land and Easements
Creeks
Additional Creeks Mapped

Refined Land Cover Features
Wetlands, Alkali Grassland, and Riparian
Alkali Grassland
Alkali Wetland**

Permanent Wetland
Pond
Riparian
Seasonal Wetland

Native Grassland*
Creeping Wildrye
One-Sided Bluegrass
Purple Needlegrass

Other Features*
Spring/Seep
Spring Box
Water Tank
Culvert

**The Lentzner restoration area was mapped based on current conditions and the results of this year's restoration monitoring, which indicate only Transect 3 is currently within the seep fed wetland. This polygon should be revised upon completion of the Lentzner monitoring period (December 2013).

*Theses features were mapped when encountered during wetland land cover mapping and were a secondary goal of this project. Not all map sheets contain all of these features.

Attachment A

Mapped Features of the Lentzner Property

Acquisition Wetland Assessment
East Contra Costa County
Habitat Conservancy

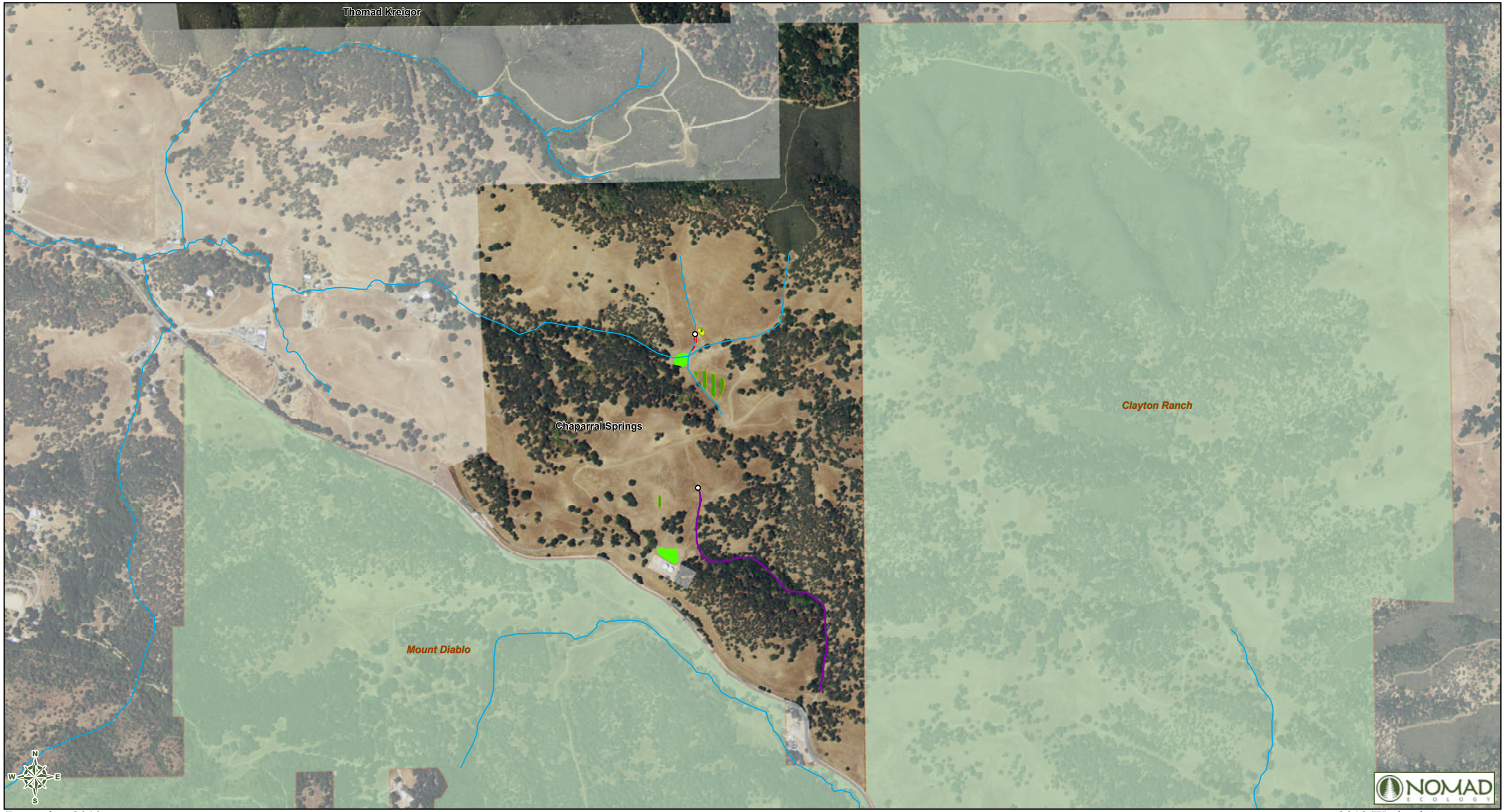
East Contra Costa County Habitat Conservancy

1:6,000
0 250 500
Feet

Sheet 3 of 8

Sources: NAIP 2009; Contra Costa County Projection: NAD 83 UTM Zone 10 North.

Contra Costa County, California



December 2012

2012 Wetland Assessment

Legend

Public Land and Easements
Creeks
Additional Creeks Mapped

Refined Land Cover Features
Wetlands, Alkali Grassland, and Riparian
Alkali Grassland
Alkali Wetland

Permanent Wetland
Pond
Riparian
Seasonal Wetland

Native Grassland*
Creeping Wildrye
One-Sided Bluegrass
Purple Needlegrass

Other Features*
Spring/Seep
Spring Box
Water Tank
Culvert

*Theses features were mapped when encountered during wetland land cover mapping and were a secondary goal of this project. Not all map sheets contain all of these features.

Attachment A

Mapped Features of the Chaparral Springs Property

Acquisition Wetland Assessment
East Contra Costa County
Habitat Conservancy

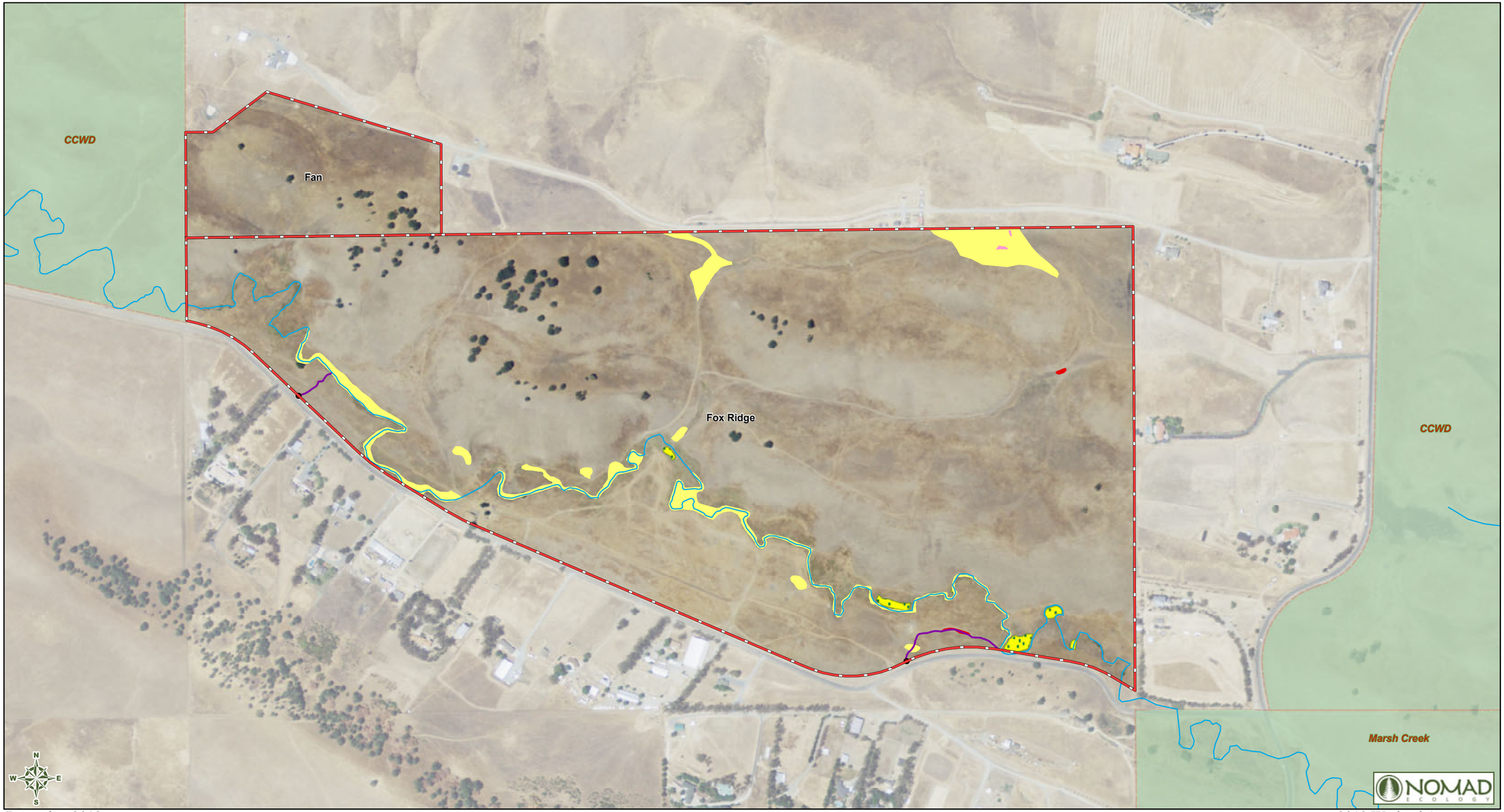
East Contra Costa County Habitat Conservancy

1:9,600
0 400 800
Feet

Sheet 4 of 8

Sources: NAIP 2009; Contra Costa County Projection: NAD 83 UTM Zone 10 North.

Contra Costa County, California



December 2012

2012 Wetland Assessment

Legend

Acqusition Parcels	Refined Land Cover Features	Permanent Wetland	Native Grassland*	Other Features*
Public Land and Easements	Wetlands, Alkali Grassland, and Riparian	Pond	Creeping Wildrye	Spring/Seep
Creeks	Alkali Grassland	Riparian	One-Sided Bluegrass	Spring Box
Additional Creeks Mapped	Alkali Wetland	Seasonal Wetland	Purple Needlegrass	Water Tank
				Culvert

*Theses features were mapped when encountered during wetland land cover mapping and were a secondary goal of this project. Not all map sheets contain all of these features.

Attachment A

Mapped Features of the Fan and Fox Ridge Properties

Acquisition Wetland Assessment

East Contra Costa County

Habitat Conservancy

East Contra Costa County Habitat Conservancy

1:6,000

0 250 500

Feet

Sheet 5 of 8

Sources: NAIP 2009; Contra Costa County Projection: NAD 83 UTM Zone 10 North.

Contra Costa County, California

Seeno

Schwartz

Moss Rock

Mount Diablo

N

W

E

S

NOMAD ECOLOGY

December 2012

2012 Wetland Assessment

Legend

Acqusition Parcels

Public Land and Easements

Creeks

Additional Creeks Mapped

Refined Land Cover Features

Wetlands, Alkali Grassland, and Riparian

Alkali Grassland

Alkali Wetland

Permanent Wetland

Pond

Riparian

Seasonal Wetland

Native Grassland*

Creeping Wildrye

One-Sided Bluegrass

Purple Needlegrass

Other Features*

Spring/Seep

Spring Box

Water Tank

Culvert

*Theses features were mapped when encountered during wetland land cover mapping and were a secondary goal of this project. Not all map sheets contain all of these features.

Attachment A

Mapped Features of the Moss Rock Property

Acquisition Wetland Assessment

East Contra Costa County

Habitat Conservancy

East Contra Costa County Habitat Conservancy

1:6,000

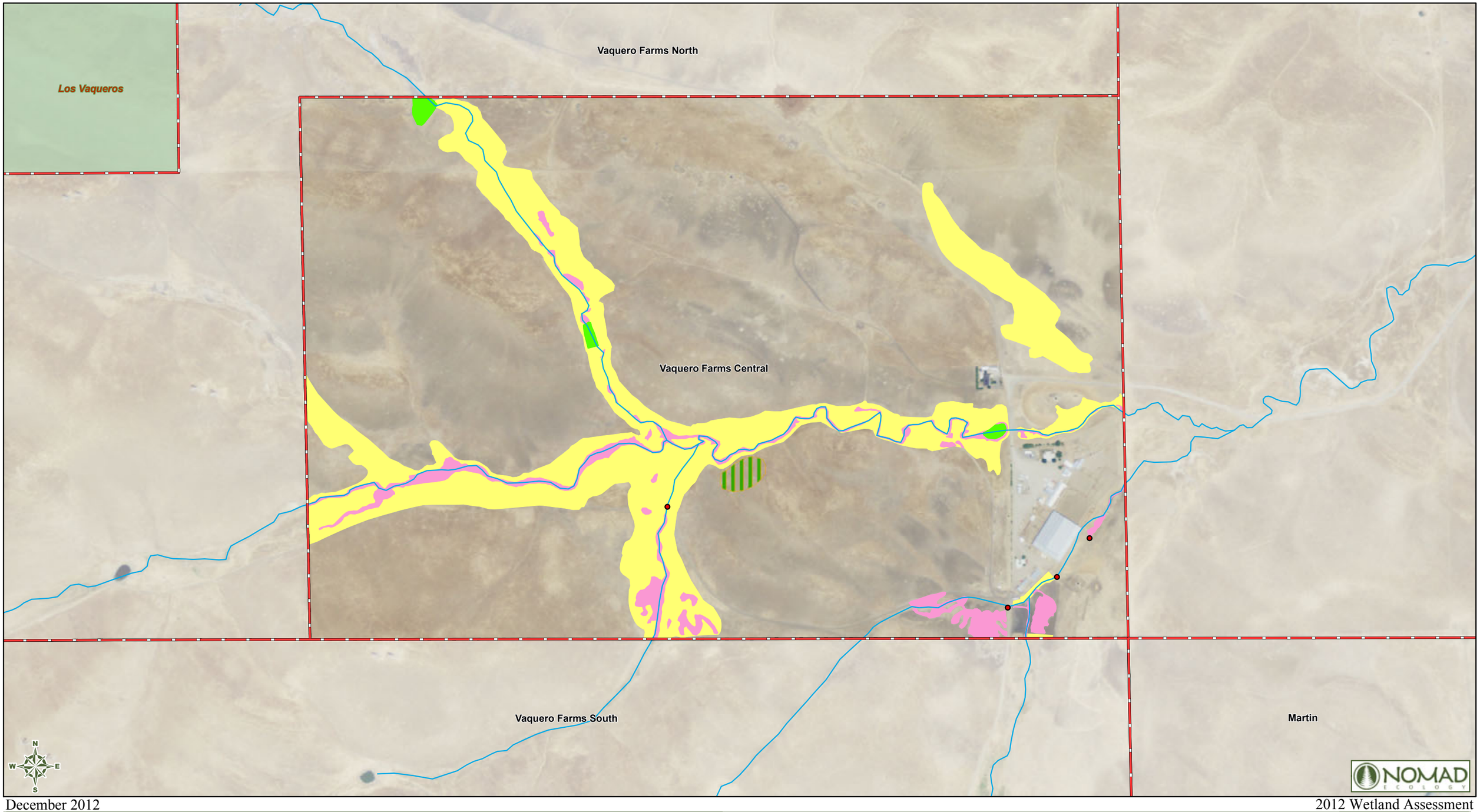
0 250 500

Feet

Sheet 6 of 8

Sources: NAIP 2009; Contra Costa County Projection: NAD 83 UTM Zone 10 North.

Contra Costa County, California



December 2012

2012 Wetland Assessment

Legend

Acqusition Parcels	Refined Land Cover Features	Permanent Wetland	Native Grassland*	Other Features*
Public Land and Easements	Wetlands, Alkali Grassland, and Riparian	Pond	Creeping Wildrye	Spring/Seep
Creeks	Alkali Grassland	Riparian	One-Sided Bluegrass	Spring Box
Additional Creeks Mapped	Alkali Wetland	Seasonal Wetland	Purple Needlegrass	Water Tank
				Culvert

*Theses features were mapped when encountered during wetland land cover mapping and were a secondary goal of this project. Not all map sheets contain all of these features.

Attachment A

Mapped Features of the Vaquero Farms Central Property

Acquisition Wetland Assessment
East Contra Costa County
Habitat Conservancy

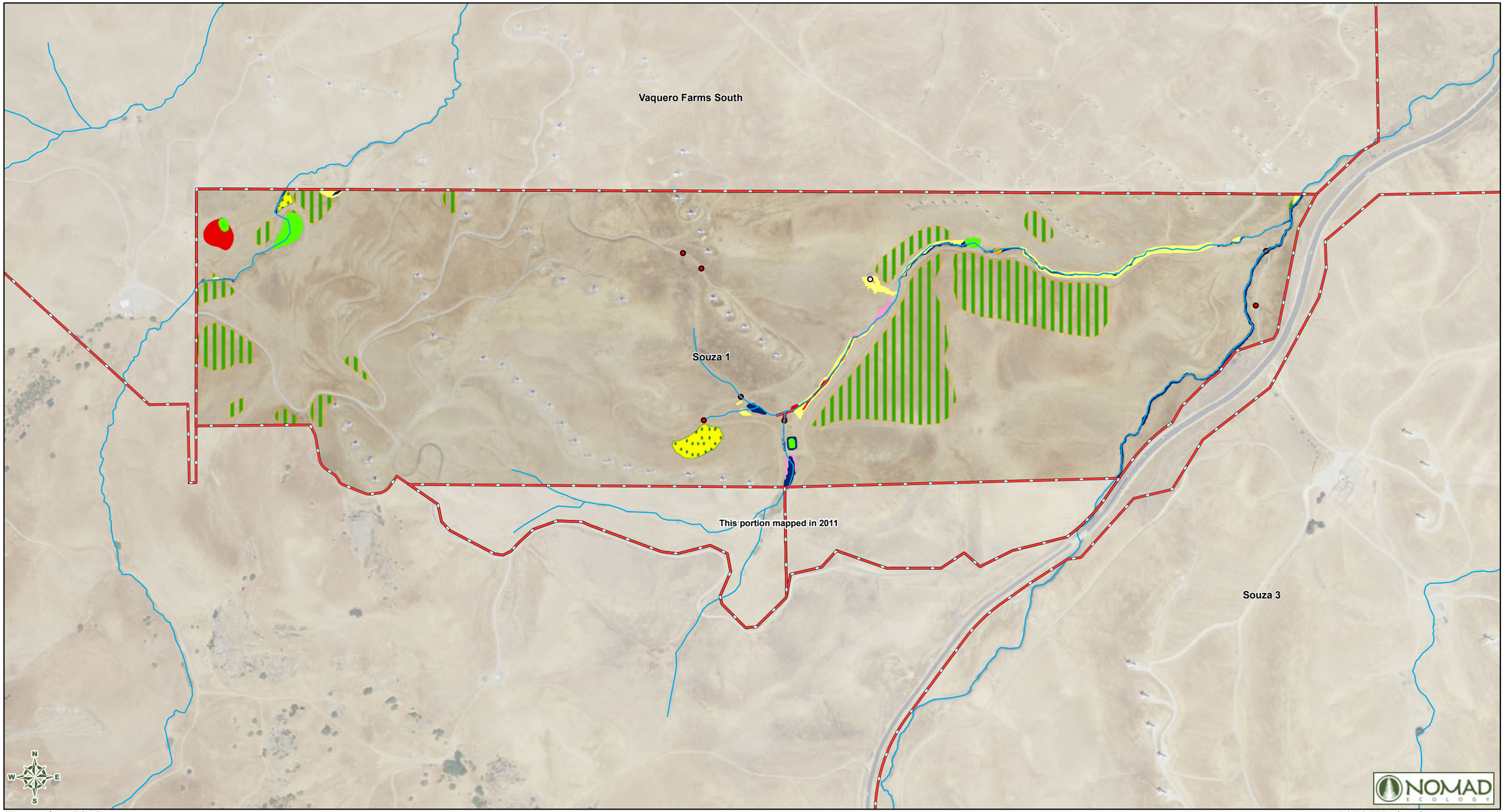
East Contra Costa County Habitat Conservancy

1:6,000
0 250 500
Feet

Sheet 7 of

Sources: NAIP 2009; Contra Costa County Projection: NAD 83 UTM Zone 10 North.

Contra Costa County, California



December 2012

2012 Wetland Assessment

Legend

Acqusition Parcels
Public Land and Easements
Creeks
Additional Creeks Mapped

Refined Land Cover Features
Wetlands, Alkali Grassland, and Riparian
Alkali Grassland
Alkali Wetland

Permanent Wetland
Pond
Riparian
Seasonal Wetland

Native Grassland*
Creeping Wildrye
One-Sided Bluegrass
Purple Needlegrass

Other Features*
Spring/Seep
Spring Box
Water Tank
Culvert

*Theses features were mapped when encountered during wetland land cover mapping and were a secondary goal of this project. Not all map sheets contain all of these features.

Attachment A

Mapped Features of the Souza 1 Property

Acquisition Wetland Assessment
East Contra Costa County
Habitat Conservancy

East Contra Costa County Habitat Conservancy

1:9,600
0 400 800
Feet

Sheet 8 of 8

Sources: NAIP 2009; Contra Costa County Projection: NAD 83 UTM Zone 10 North.

Contra Costa County, California