



December 31, 2015

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Technical Memorandum: 2015 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 2015 on East Contra Costa County Habitat Conservancy (Conservancy) preserve system acquisitions. This memorandum represents the fifth consecutive year Nomad Ecology has conducted this effort which began in 2011 (Nomad 2011; 2012; 2013; 2014). This year's methodology conforms to the previous years' efforts, which included a modification to the definition of riparian land cover and criteria for mapping.

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 new preserves to mitigate for the anticipated impacts.

The primary objective of this effort was to ground truth the original land cover map (Jones and Stokes 2006) in the Plan to ascertain the accuracy of wetland features and streams. 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 are 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) are also used to identify restoration and enhancement opportunities. This letter includes: a summary of Plan goals pertaining to wetlands, mapping methodology, results, and recommendations.

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 7 of the 13 ponds in Subzone 2c to provide 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

Properties Surveyed

In 2015, a survey of wetland features was conducted on a single acquisition, the Viera-Perley property. This property is located in the upper portion of the Marsh Creek Watershed and straddles Morgan Territory Road, bordering Galvin to the south and touching a corner of Schwartz at the southeast.

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. The existing HCP land cover shapefile dated November 2014 was reviewed prior to conducting field work. The November 2014 HCP land cover shapefile included the results of the 2013 mapping conducted by Nomad Ecology.

Field Survey

Nomad senior botanist Heath Bartosh conducted a wetland assessment field work in early spring on March 27, 2015 and made subsequent visits on April 10 and May 8, 2015 to record observations of uncommon landscape features and vegetation types. Botanist and wetland specialist Erin McDermott and botanist Brian Peterson accompanied Mr. Bartosh on April 10, 2015 and revisited the property on June 6, 2015 to map any new streams not previously recorded. Field surveys were conducted on foot as vehicle access to the Viera-Perley property is limited. Surveys targeted 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. 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. 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' (USACE) 1987¹, the revised 2010² Guidelines, and the Clean Water Rule: Definition of "Waters of the United States"³. Results for the wetland assessment are based strictly on results of the field surveys. Incidental data on uncommon landscape features and uncommon vegetation types were also collected when encountered in the field during wetlands mapping.

Data Collection

This section details what data were collected during the field mapping effort in 2015. Definitions of the features are given in the section 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. There was only one wetland feature within the Viera-Perley property and it was characterized as a pond following the definition as defined in the Plan. Wetlands on site (the one pond) were also identified as depressional or riverine, these terms are defined below.

Streams/Creeks and Riparian

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. Tree species present along streams were noted and areas with riparian vegetation were mapped. Riparian vegetation as defined by the Plan does not include riparian oak woodland, however oak woodland on site was mapped as riparian in several locations based on the criteria below that were developed in collaboration with Conservancy staff. Mapping methods for and the definition of riparian oak woodland are provided below under Definitions.

Uncommon Landscape Features and Uncommon Vegetation Types

Native grassland mapping errors and omissions were corrected which included locating and mapping additional native grasslands. Seeps were also identified and mapped. 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

Polygon Features

- native grasslands

Definitions

The definitions of wetland associated land cover types and aquatic features follow the descriptions in Section 3.3.2 of the Plan and are included below. However, only wetland associated land cover types identified on the Viera-Perley property are defined namely, intermittent streams, ephemeral streams, and riparian woodland/scrub.

¹ 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.

² Environmental Laboratory. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region*. ERDC/EL TR-10-3. U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi. May.

³ U.S. Army Corps of Engineers and Environmental Protection Agency. 2015. *Clean Water Rule: Definition of "Waters of the United States"*. Federal Register, vol. 80, no. 24, June 29.

Depressional - Wetlands 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.

Riverine - Wetlands 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 fill the bottom of the channel and are confined to the channel. Riverine seasonal wetlands follow stream channels but are wider than the channel in places where channel depth is shallow and water may crest the banks.

Pond – The Plan (Jones & Stokes 2006) identifies ponds as small perennial or seasonal water bodies dominated by little or no vegetation. However, if vegetation is present it is typically submerged or floating.

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.

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

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 (*Quercus* sp.), California bay (*Umbellularia californica*), and buckeye (*Aesculus californica*) trees are not considered riparian vegetation, even though they border creeks on acquisition properties such as Barron and Irish Canyon.

Based on discussions with Conservancy staff, oak woodland (which includes oaks, California bay, California buckeye and other native tree species as defined in the Plan) that occurs along streams, was included in the riparian woodland/scrub designation as of 2014. Including oak woodland that occurs along streams as riparian land cover is appropriate as it provides ecological functions including regulating stream temperatures and providing important cover, watering, and refugia for wildlife, especially in the east part of the inventory area where there is less tree cover.

Oak woodland was considered to be riparian woodland when it met the following parameters:

- woodlands located on intermittent or perennial streams with significant oak cover;
- the cover comprises primarily of evergreen oak species, valley oak (*Quercus lobata*), or buckeye;
- at least a portion of the tree canopy shades the creek channel;
- at least 150 linear feet of creek is shaded by continuous canopy and no more than 50 feet of grassland or shrubland gaps are present;
- a single tree does not constitute riparian woodland.

Mapping

A GIS shapefile of new and revised land cover types was created by interpreting digital color aerial photography and annotated field maps to delineate and improve boundaries around land cover types, through a “heads-up” digitizing process. Boundaries of wetland features were heads-up digitized as polygons at a scale of 1:600. The base imagery used was Contra Costa County’s 2009 and 2014 high resolution imagery. Supplementary imagery used includes 2009 NAIP 1-meter resolution for Contra Costa County and imagery served through Google Earth, Microsoft Bing, and online map servers provided by ESRI’s ArcGIS Online service. A point shapefile was created that includes springs and seeps and a water tank. A polygon shapefile was created that contained wetland features and 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.

RESULTS

The total number of polygons and acreage of each land cover type as a result of the 2015 land cover type 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 November 2014), updated land cover, and the overall net change as a result of this mapping effort. A Map depicting changes in land cover designations of the Viera-Perley property in Attachment A.

Table 2. 2015 Wetland, Riparian, and Unique Elements Data Summary

LAND COVER TYPES	EXISTING HCP LAND COVER SHAPEFILE		REVISED LAND COVER SHAPEFILE		
	NO. OF POLYGONS	ACREAGE	NO. OF FEATURES	ACREAGE	CHANGE (IN ACRES)
pond ^w	1	0.19	1	0.19	0.00
native grassland	0	0.00	7	7.13	+7.13
Riparian (riparian oak woodland)	0	0	6	25.98	+25.98
All Land Cover Types	1	0.19	13	33.11	+33.11
All wetland ^w types	1	0.19	1	0.19	+0.00

^w Denotes a wetland land cover type.

Wetlands

Pond

Based on the results of the 2015 wetlands assessment of the Viera-Perley property no additional wetland features were mapped therefore wetland acreage within the property did not change.

A single wetland feature, a pond, had been previously identified on the property. This pond is located on the western parcel along a tributary to Marsh Creek, therefore it is considered riverine. No changes to the original mapping were necessary as it appeared to be mapped accurately. At the time of the site visits this

pond was dry and did not appear to have held water during the 2014/2015 rainy season. It is shallow, approximately two to three feet deep, so it does not have as much water holding capacity compared to stock ponds typical of the area. It is unknown if this pond was deeper in the past and has silted in over time. Vegetation occupying the bottom of the pond was similar to the non-native grassland under the adjacent oak woodland understory.

Riparian

Riparian Oak Woodland

The 2015 wetland assessment resulted in an increase in Riparian Oak Woodland. Although there are scattered individual western sycamores (*Platanus racemosa*) along Marsh Creek this riparian vegetation is dominated by valley oak and is therefore mapped as Riparian Oak Woodland.

During the 2015 mapping effort a total of 13 polygons of this land cover type were added totaling 25.98 acres. These riparian woodlands comprise interior live oak (*Quercus wislizeni* var. *wislizeni*), coast live oak (*Quercus agrifolia* var. *agrifolia*), and a small amount California buckeye. Mature trees with a closed canopy form these woodlands. A larger portion of Riparian Oak Woodland is mapped on the western parcel due to the larger linear feet of stream there.

Unique Landscape Features

Native Grassland

Native grassland stands were mapped when they were encountered during the wetland mapping field work. During the 2015 assessment seven polygons (7.13 acres) were mapped representing large and dense patches of Native Grassland classified as purple needlegrass (*Stipa pulchra*) grassland. The Viera-Perley property supports the largest and most well developed stands of purple needlegrass grassland the Conservancy has acquired in the Morgan Territory area of Acquisition Zone 4. Interestingly, the contiguous grasslands on the Galvin property to the north do not support the same abundance of this native grassland type. This is possibly due to the abundant thatch and grazing practices on the Galvin property in comparison to Viera-Perley.

Seeps/Springs

Seeps and springs were mapped when they were encountered during the wetland mapping field work. Only two seeps/springs were mapped as point features in the 2015 assessment of Viera-Perley property. Because of the prolonged drought it is possible that other seeps are present on the property but appeared dry and not obvious. The seeps observed on this property had standing water up to two inches deep.

SUMMARY

The results of the 2015 wetlands assessment have increased land cover type acreage preserved based on HCP conservation goals for wetlands and riparian features within the inventory area. Table 3 summarizes the estimated preservation acreage required for as wetland and riparian 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 wetland and riparian land cover types and alkali grassland.

Table 3. Wetland and Riparian Preservation Requirement Status

SELECT LAND COVER TYPES	ESTIMATED PRESERVATION REQUIREMENT (ACRES)	ACQUISITION PROPERTIES PRESERVATION TOTAL ¹ (ACRES)	ESTIMATED ACREAGE NEEDED	SUGGESTED ADDITIONAL ACQUISITION PROPERTY TARGETS
Permanent wetland	75	11 ²	64	Low fields east of Brentwood, Oakley, and Knightsen
Seasonal wetland	168	21 ²	147	Lone Tree Valley, Horse Valley, Deer Valley and parts of Briones Valley
Alkali wetland	93	37 ²	56	Areas south of Discovery Bay and east of Byron Highway; around Knightsen.
Ponds	16	14	2	-----
Alkali Grassland	900	240	660	Areas south of Discovery Bay and east of Byron Highway, around Knightsen.
Riparian woodland/scrub	70	58 ³	12	Corridors along Marsh Creek, upstream from Round Valley

¹For all Acquisition Properties included in the Conservancy shapefile (dated November 2014) and calculated using the HCP Land Cover shapefile (dated January 2014).

²Includes riverine and depressional features.

³Acreage added from Viera-Perley (25.98 acres) is Oak Woodland Riparian.

RECOMMENDATIONS

Due to the known occurrence of the invasive grass species barbed goat grass (*Aegilops triuncialis*) on the Galvin property to the north and the presence of large and intact stands of purple needlegrass on the Viera-Perley property we recommend regular weed monitoring to ensure barbed goat grass does not become established on Viera-Perley.

Since Riparian Oak Woodland was only added to the Plan as a riparian land cover type in 2014 it is likely that conservation goals for riparian have already been met on previous acquisitions. Fulfilling the conservation goals for riparian could be achieved by mapping Riparian Oak Woodland on acquisition properties made prior to 2014, where they were not previously evaluated.

Sincerely,



Heath A. Bartosh
Principal
Senior Botanist & Rare Plant Specialist
Nomad Ecology, LLC

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.
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ATTACHMENTS

- Attachment A: Mapped Features (1 Sheet)

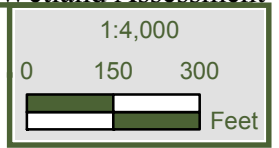


December 2015

2015 Wetland Assessment

Legend		
Acquisition Parcels	Creeks	Pond
Public Land and Easements	Spring/Seep	Native Grassland
	Water Tank	Riparian

Attachment A
Results of 2015 Wetland Mapping
on the Viera-Perley Property
 East Contra Costa County
 Habitat Conservancy



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