

Aquatic Resources Delineation



**161 Oak Rock Road (APN: 222-071-030)
Humboldt County**

Prepared by:

Kyle Wear
Botanical Consultant
kyle_wear@suddenlink.net
(707) 601-1725

Prepared for:

Justin Baldwin
161 Oak Rock Road
Garberville, CA 95542

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1. INTRODUCTION

This report includes the results an aquatic resources delineation conducted at 161 Oak Rock Road (APN: 522-143-002) near Benbow. The purpose of the study was to determine the extent of wetlands and other aquatic resources that will constrain proposed cannabis cultivation on the parcel.

2. DEFINITIONS

Waters of the United States

Waters of the United States are regulated by the Army Corps under the Clean Water Act. Waters of the United States include, but are not limited to, territorial seas, waters used for interstate or foreign commerce and their tributaries, and waters adjacent to the aforementioned, including wetlands.

Army Corps jurisdiction in waters such as creeks and rivers includes the area below the ordinary high water mark, which is the line on the bank established by fluctuations of water that leave physical characteristics such as a distinct line on the bank, shelving, destruction of terrestrial vegetation, and presence of debris.

The Army Corps defines wetlands as:

“... areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.”

Waters of the State

Waters of the state are regulated by the State Water Resources Control Board (Water Board) under the Porter-Cologne Water Quality Control Act. Waters of the state are defined as:

"... any surface water or groundwater, including saline waters, within the boundaries of the state."

Waters of the State includes water in both natural and artificial channels.

The Water Board's definition of a wetland is:

"An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation."

Streamside Management Areas

The Humboldt County General Plan (Humboldt County 2017) recognizes Streamside Management Areas (SMAs) along all streams, which are defined as:

“100 feet, measured as the horizontal distance from the top of bank or edge of riparian drip-line whichever is greater on either side of perennial streams.”

“50 feet, measured as the horizontal distance from the top of bank or edge of riparian drip-line whichever is greater on either side of intermittent streams.”

3. ENVIRONMENTAL SETTING

Project Location

The parcel is located off Sproul Creek Road approximately 4.5 miles southwest of Benbow on the Garberville USGS quadrangle (Section 16, T5S, R3E) (Figure 1).

Soil, Topography, and Hydrology

The soil type mapped in the study areas is Briceland-Tankridge complex, 15 to 50 percent slopes (United States Department of Agriculture, Natural Resource Conservation Service 2019). This soil type is derived from sandstone and mudstone parent material. All the soil components have non-hydric soil ratings.

Most of the study area is on the relatively flat terrace on an otherwise approximately 25% southwest facing slope. The elevation is approximately 1,480 to 1,560 feet above sea level. The study area includes a wetland, spring, and streams that drain into Sproul Creek, a tributary of the South Fork Eel River.

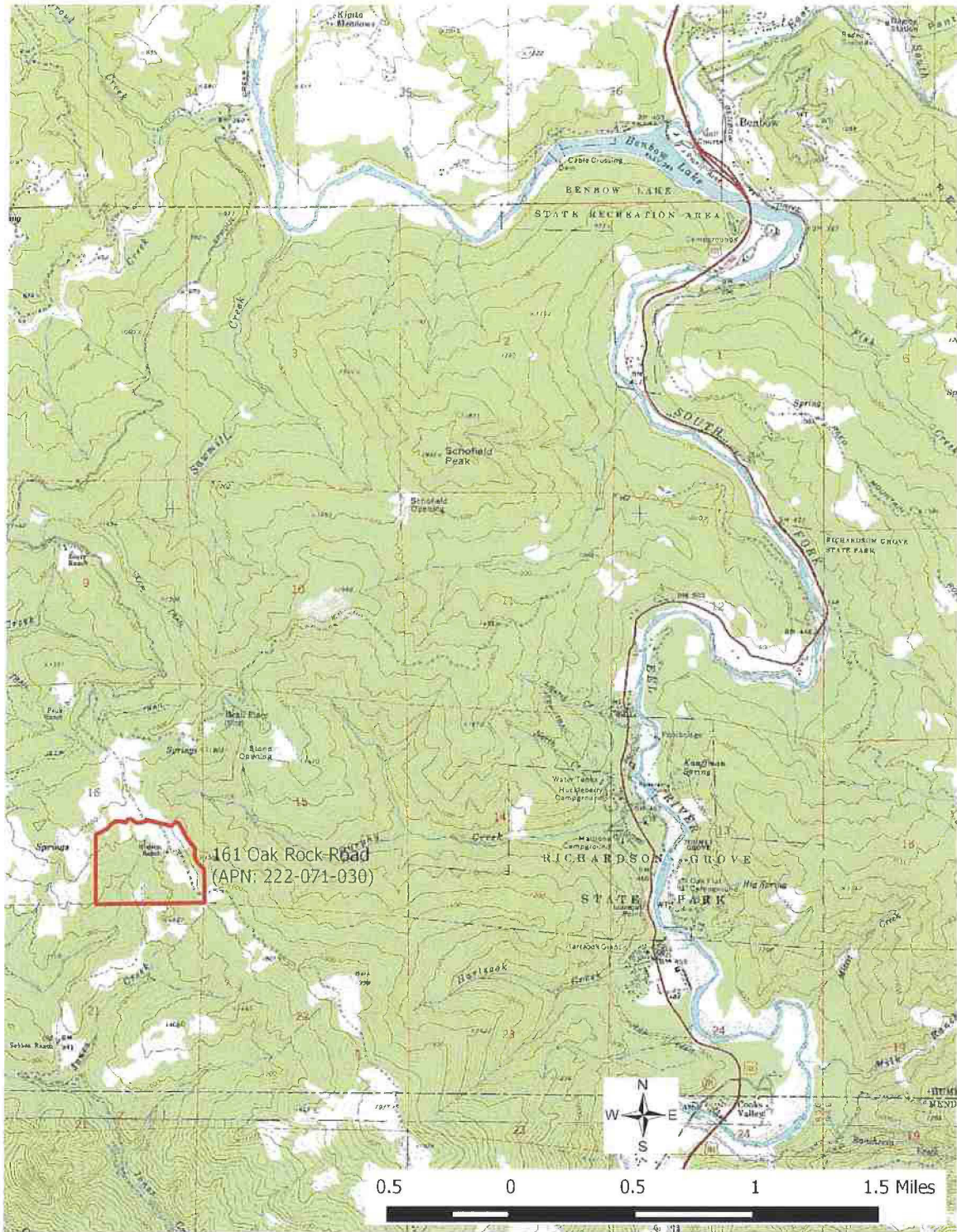
4. METHODS

Wetlands

The delineation was conducted on October 11, 2019 by Kyle Wear, M.A. Mr. Wear has over 20 years of experience conducting floristic surveys and other botanical work in northern California and over ten years of experience conducting wetland delineations. Mr. Wear is also trained in wetland delineation by the Wetland Training Institute.

Federal, State, and County wetland delineation methods follow the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual Western Mountains, Valleys, and Coast Region (Version 2.0)* (Army Corps 2010). A positive wetland determination is made when all three wetland parameters (hydrophytic vegetation, hydric, soil, and wetland hydrology) are present. Two representative sample plots were evaluated for hydrophytic vegetation, hydric, soil, and wetland hydrology. One of the sample plots was in the wetland and one was in the adjacent upland habitat. Wetland determination data forms are provided in Appendix A.

Figure 1. Location Map.



Hydrophytic Vegetation

The presence of hydrophytic vegetation is determined by the wetland indicator status of each plant species present using the *Western Mountains Valleys and Coast 2016 Regional Wetland Plant List* (Army Corps 2016). The indicator status of plants is based on the estimated probability of the species occurring in wetlands. The indicator status categories are:

Obligate Wetland Plants (OBL)	Almost always occur in wetlands	>99% frequency
Facultative Wetland Plants (FACW)	Usually occur in wetlands	67%-99%
Facultative Plants (FAC)	Equally occur wetlands and non-wetlands	33%-67%
Facultative Upland Plants (FACU)	Sometimes occur in wetlands	1%-33%
Obligate Upland Plants (UPL)	Rarely occur in wetlands	<1%

If more than 50% of the dominant plants across all vegetation strata (i.e. trees, shrubs, herbs) are OBL, FACW, or FAC, the vegetation is considered to be hydrophytic. Dominance of plants within the plots is determined using the "50/20" rule. This method involves estimating absolute cover of each plant in each vegetation stratum. Dominant plants include the plants with the highest cover that collectively or individually account for 50% of the total vegetation cover. Additional plants are considered dominant if their cover is at least 20%.

Hydric Soil

Indicators of hydric soil include, but are not limited to, a strong hydrogen sulfide (rotten egg) odor, redox concentrations, depleted matrix, and high organic matter content. Soil colors are determined by using a standard Munsell soil color chart (Gretag Macbeth 2000).

Wetland Hydrology

Indicators of wetland hydrology include, but are not limited to, surface water, high water table, soil saturation, sediment deposits, soil cracks, and oxidized root channels along living roots.

Other Aquatic Resources

Other aquatic resources include streams, rivers, ponds, lakes, and other waterbodies with a bed, bank, and an ordinary highwater mark and any adjacent riparian habitat.

5. RESULTS AND DISCUSSION

Aquatic resources identified in the study area include a seasonal wetland, a spring, a shallow well, two ephemeral streams, one intermittent stream, and a rain catchment pond (Figure 2). Representative photos are provided in Appendix B.

Seasonal Wetland

The study area includes approximately 13,955 square feet of seasonal emergent wetland. The hydrophytic vegetation includes spreading rush (*Juncus patens* [FACW]), pennyroyal (*Menta pelugium* [OBL]), tall fescue (*Festuca arundinacea* [FAC]), and velvet grass (*Holcus lanatus* [FAC]). The soil meets hydric soil indicator F3 (Redox Dark Surface). The soil color was 10yr 2/2 with distinct and prominent 7.5yr 5/6 redox concentrations. The delineation was conducted

Figure 2. Aquatic Resources Map.



2018 NAIP Image

- | | |
|---------------------|----------------------------|
| Seasonal Wetland | Rain Catchment Pond |
| Spring | Sample Point |
| Intermittent Stream | Pond Overflow |
| Ephemeral Stream | Culvert |
| Well | Study Area |
| 50-Foot Setback | Potential Cultivation Area |
| 100-Foot Setback | |



75 0 75 150 Feet



during the normally dry time of year and no primary indicators of wetland hydrology were present. The wetland does meet secondary hydrology indicator D5 (FAC Neutral Test). Ephemeral streams flow into and out of the wetland. Water is delivered from the upstream to the relatively flat terrace where there is saturation for sufficient frequency and duration during the winter and spring to produce hydrophytic vegetation and hydric soil before it drains to the lower stream. The wetland is likely also influenced by groundwater.

Intermittent Stream and Spring

There is a small spring at the headwaters of an intermittent stream in the study area. The spring had flowing surface water at the time of the study, but the water quickly percolated and was not flowing down the stream channel. The stream eventually drains into Sproul Creek. There is no riparian vegetation associated with these features.

Ephemeral Streams

Ephemeral streams flow into and out of the wetland as described above.

Shallow Well

There is a shallow well that has also been described as a spring. However, surface water does not appear to flow from the feature. Water is collected below the surface and is currently used for domestic purposes. There is also no hydrophytic vegetation or hydric soil that would indicate surface water or near-surface groundwater. There is upland vegetation around the well that includes a canopy of Douglas-fir (*Pseudotsuga menziesii* [FACU]) and tanoak (*Notholithocarpus densiflorus* var. *densiflorus* [UPL]). Herbaceous plants include sword fern (*Polystichum munitum* [FACU]), woodland madia (*Anisocarpus madioides* [UPL]), and goldback fern (*Pentagramma triangularis* ssp. *triangularis* [UPL]).

Rain Catchment Pond

The pond catches rainwater and likely some overland flow. There is no watercourse flowing into the pond. The pond overflow connects with the nearby intermittent stream. The pond was constructed between 2006 and 2009. There is no obvious stream channel in the 2006 Google Earth image at the location of the pond. Geological and archeological studies of the site have also found no evidence that there was a stream channel before the pond was constructed. The geologist indicated that area was prairie or grassland prior to construction of the pond. The Cultural Resources Investigation includes a 1948 aerial photo showing the area as a fenced orchard.

Upland

The upland habitat in the study area includes forests dominated by Douglas-fir (FACU), tanoak (UPL), and oaks (*Quercus* spp. [FACU/UPL]). The more open habitat includes stands of coyote brush (*Baccharis pilularis* [UPL]) and grassland dominated by non-native grasses including harding grass (*Phalaris aquatica* [FACU]) and sweet vernal grass (*Anthoxanthum odoratum* [FACU]).

Setbacks

The application was filed in 2016. Thus, the setbacks shown in Figure 2 are consistent with the Water Board 2015 Regional Order (R1-2015-0023) and the Humboldt County General Plan (Humboldt County 2017) or are the more conservative of the two.

6. REFERENCES

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GretagMacbeth. 2000. *Munsell Soil Color Charts*. New Winsdor, NY

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U.S. Army Corps of Engineers (Army Corps) 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual. Western Mountains, Valleys, and Coast Region (Version 2.0)*, ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EI TR-10-3. Vicksburg, MS. Army Corps of Engineer Research and Development Center.
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APPENDIX A

Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN: 222-071-030 City/County: Humboldt Sampling Date: 10-11-19
 Applicant/Owner: Baldwin State: CA Sampling Point: 1
 Investigator(s): R. Wear Section, Township, Range: 16, T5S, R3E
 Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 2%
 Subregion (LRR): A Lat: E 428845.2 Long: N 4429907.5 Datum: NAD83
 Soil Map Unit Name: Briceland-tantridge NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A)
2. _____				Total Number of Dominant Species Across All Strata: <u>4</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
4. _____				
_____ = Total Cover				
Sampling/Shrub Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. _____				Total % Cover of: _____ Multiply by: _____
2. _____				OBL species _____ x 1 = _____
3. _____				FACW species _____ x 2 = _____
4. _____				FAC species _____ x 3 = _____
5. _____				FACU species _____ x 4 = _____
_____ = Total Cover				UPL species _____ x 5 = _____
				Column Totals: _____ (A) _____ (B)
				Prevalence Index = B/A = _____
Herb Stratum (Plot size: <u>10'-radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. <u>Juncus patens</u>	<u>30</u>	<u>Y</u>	<u>FACW</u>	<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation
2. <u>Mentha patens</u>	<u>20</u>	<u>Y</u>	<u>OBSL</u>	<input checked="" type="checkbox"/> 2 - Dominance Test is >50%
3. <u>Holcus lanatus</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>	<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹
4. <u>Leskea ar. distachya</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>	<input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
5. <u>Anthoxanthum odoratum</u>	<u>10</u>	<u>N</u>	<u>FACU</u>	<input type="checkbox"/> 5 - Wetland Non-Vascular Plants ¹
6. _____				<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
7. _____				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
8. _____				
9. _____				
10. _____				
11. _____				
<u>100</u> = Total Cover				
Woody Vine Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present?
1. _____				Yes <input checked="" type="checkbox"/> No _____
2. _____				
_____ = Total Cover				
% Bare Ground in Herb Stratum _____ = Total Cover				
Remarks:				

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10y r 2/2	90	7.5 y r 5/6	10	C	M	cl	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input checked="" type="checkbox"/> Redox Dark Surface (F6)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Salt Crust (B11)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Aquatic Invertebrates (B13)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input checked="" type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	

Field Observations:

Surface Water Present? Yes No Depth (inches): _____

Water Table Present? Yes No Depth (inches): _____

Saturation Present? (Includes capillary fringe) Yes No Depth (inches): _____

Wetland Hydrology Present? Yes No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Wetland is on terrace with ephemeral stream flowing in and out indicating wet season hydrology

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: APN: 222-071-030 City/County: Humboldt Sampling Date: 10-11-19
 Applicant/Owner: Baldwin State: CA Sampling Point: 2
 Investigator(s): K. Weg Section, Township, Range: 16, T55, R2E
 Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 2
 Subregion (LRR): A Lat: E 4285716 Long: N 442990.5 Datum: _____
 Soil Map Unit Name: Briceland-Tankridge NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/> Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A)
2. _____				Total Number of Dominant Species Across All Strata: <u>1</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0%</u> (A/B)
4. _____				Prevalence Index worksheet:
= Total Cover				
Sapling/Shrub Stratum (Plot size: <u>70' - radius</u>)				OBL species _____ x 1 = _____
1. <u>Saccharis pilularis</u>	<u>20</u>	<u>Y</u>	<u>UPL</u>	FACW species _____ x 2 = _____
2. _____				FAC species _____ x 3 = _____
3. _____				FACU species _____ x 4 = _____
4. _____				UPL species _____ x 5 = _____
5. _____				Column Totals: _____ (A) _____ (B)
= Total Cover				Prevalence Index = B/A = _____
Herb Stratum (Plot size: <u>10' radius</u>)				Hydrophytic Vegetation Indicators:
1. <u>Phalaris aquatica</u>	<u>70</u>	<u>Y</u>	<u>FACW</u>	___ 1 - Rapid Test for Hydrophytic Vegetation
2. <u>Aira caryophylla</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	___ 2 - Dominance Test is >50%
3. <u>Veronica lasiolepis</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	___ 3 - Prevalence Index is ≤3.0 ¹
4. <u>Anthoxanthum odoratum</u>	<u>10</u>	<u>N</u>	<u>FACU</u>	___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
5. _____				___ 5 - Wetland Non-Vascular Plants ¹
6. _____				___ Problematic Hydrophytic Vegetation ¹ (Explain)
7. _____				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
8. _____				
9. _____				
10. _____				
11. _____				
= Total Cover				Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>
Woody Vine Stratum (Plot size: _____)				
1. _____				
2. _____				
= Total Cover				
% Bare Ground in Herb Stratum _____				
Remarks:				

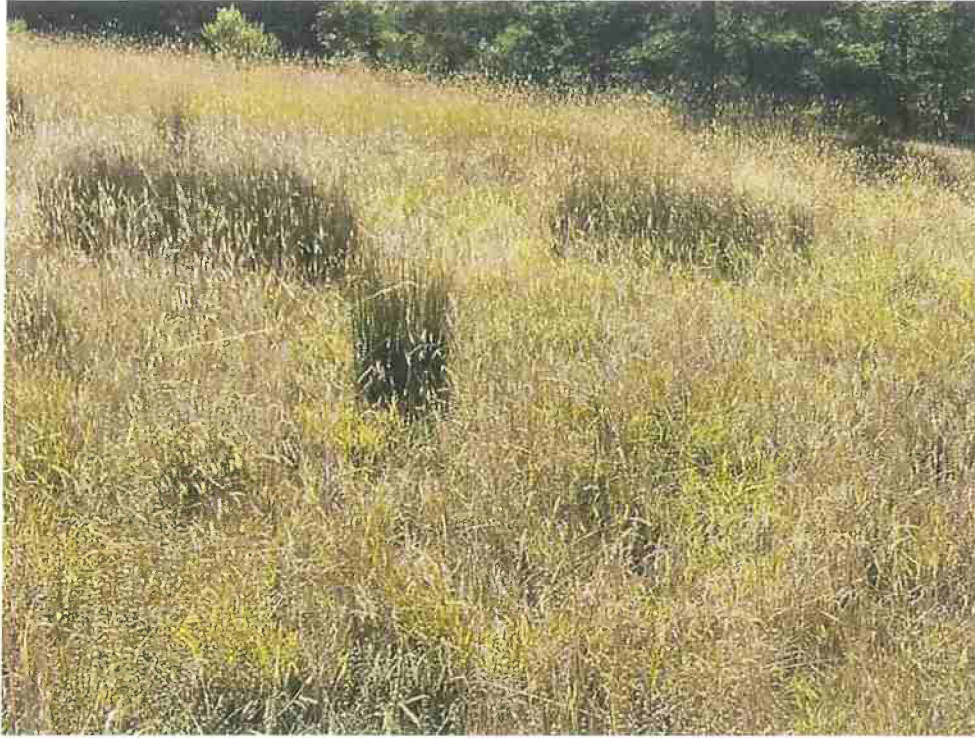


Photo 1. Seasonal wetland with spreading rush and pennyroyal.



Photo 2. Upland with coyote brush and non-native grasses.



Photo 3. Water tank at shallow well.



Photo 4. Well infrastructure collecting sub-surface water.



Photo 5. Dry pond.

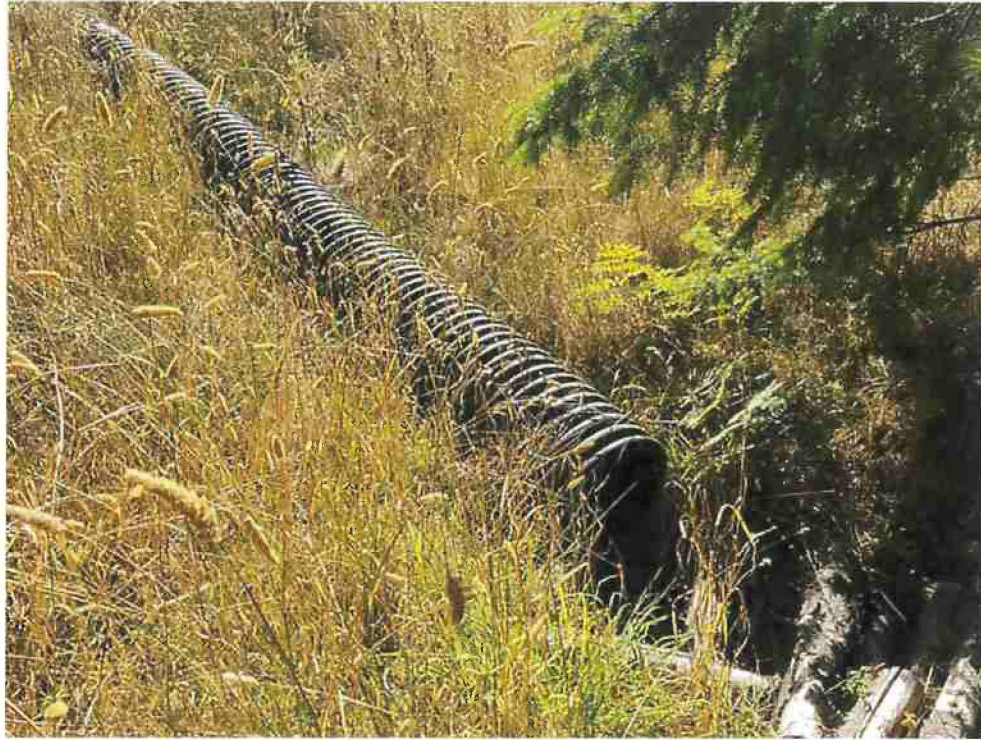


Photo 6. Pond overflow.



Photo 7. Pond overflow and spring at headwaters of intermittent stream.



Photo 8. Old pipe in spring from past water use.