Willits Bypass Project
Mitigation and Monitoring Proposal



Appendices A, G, H, I, J, K, and L

U.S. Highway 101

Mendocino County, near the City of Willits, California

PM 43.1-52.3

01-26200

USACE file no. 1991-194740N

January 2012

Caltrans

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Appendix A Nomenclature of Plant and Animal Species Mentioned in the MMP

Appendix A Nomenclature of Plant and Animal Species Mentioned in the MMP

Table A-1. Plant Species

Common Name	Scientific Name	Status[a]
Alisma-leafed buttercup	*Ranunculus alismifolius*	FACW
American slough-grass	*Beckmannia syzigachne*	OBL
Annual hairgrass	*Deschampsia danthonioides*	FACW
Arroyo willow	*Salix lasiolepis*	FACW
Avens	*Geum macrophyllum*	FACW
Baker's meadowfoam	*Limnanthes bakeri*	OBL
Baltic rush	*Juncus balticus*	OBL
Bedstraw	*Galium* sp.	N/A
Black cottonwood	*Populus balsamifera* ssp. *trichocarpa*	FACW
Blue elderberry	*Sambucus Mexicana*	FAC
Blue oak	*Quercus douglasii*	UPL
Bluegrass	*Poa* sp.	N/A
Blue wildrye	*Elymus glaucus* ssp. *glaucus*	FACU
Bolander's water-starwort	*Callitriche heterophylla* ssp. *bolanderi*	OBL
Box elder	*Acer negundo* var. *californicum*	FACW
Bracted popcornflower	*Plagiobothrys bracteatus*	OBL
Broadleaf cattail	*Typha latifolia*	OBL
Broadleaf water-plantain	*Alisma plantago-aquatica* var. *americana*	OBL
Brown headed rush	*Juncus phaeocephalus*	FACW
Bur-clover	*Medicago polymorpha*	UPL
Buttercup	*Ranunculus* sp.	FACW
California blackberry	*Rubus ursinus (R. vitifolius)*	FACW
California black oak	*Quercus kelloggii*	UPL
California oatgrass	*Danthonia californica*	FACW
California rose	*Rosa californica*	FAC
Camas	*Camasia quamash*	FACW
Chicory	*Cichorium intybus*	UPL
Clematis	*Clematis* sp.	N/A
Clustered dock	*Rumex conglomeratus*	FACW
Coast redwood	*Sequoia sempervirens*	UPL
Cocklebur	*Xanthium strumarium*	FAC
Common dandelion	*Taraxacum officinale*	FACU
Common meadow rue	*Thalictrum polycarpum*	UPL
Common spikerush	*Eleocharis macrostachya*	OBL
Common velvet grass	*Holcus lanatus*	FAC
Cow parsnip	*Heracleum lanatum (H. maximum)*	FACU
Coyote thistle	*Eryngium aristulatum*	OBL
Creeping bentgrass	*Agrostis stolonifera*	FACW
Creeping ryegrass	*Leymus triticoides*	FAC
Curly dock	*Rumex crispus*	FACW
Cutleaf geranium	*Geranium dissectum*	UPL

Table A-1. Continued

Common Name	Scientific Name	Status[a]
Davy's semaphore grass	*Pleuropogon californicus* var. *davyi*	OBL
Dense sedge	*Carex densa*	OBL
Dogwood	*Cornus* sp.	N/A
Douglas' meadowfoam	*Limnanthes douglasii*	OBL
Douglas-fir	*Pseudotsuga menziesii* var. *menziesii*	UPL
Downingia	*Downingia* sp.	N/A
Fescue	*Festuca* sp.	FACU
Field bindweed	*Convolvulus arvensis*	UPL
Field sedge	*Carex praegracilis*	FACW
Filaree	*Erodium* sp.	N/A
Fowl bluegrass	*Poa palustris*	FACW
Fremont cottonwood	*Populus fremontii* ssp. *fremontii*	FACW
Gooseberry	*Ribes* sp.	N/A
Greensheath sedge	*Carex feta*	OBL
Harding grass	*Phalaris aquatic*	FAC
Hawthorn	*Crataegus* sp.	N/A
Hedge nettle	*Stachys rigida*	FACW
Hedgehog dogtail grass	*Cynosurus echinatus*	UPL
Himalayan blackberry	*Rubus armeniacus (R. discolor)*	FACW
Honeysuckle	*Lonicera* sp.	N/A
Italian ryegrass	*Lolium multiflorum*	FAC
Kentucky bluegrass	*Poa pratensis*	FACU
Knotweed	*Polygonum* sp.	N/A
Manzanita	*Arctostaphylos manzanita*	UPL
Meadow barley	*Hordeum brachyantherum* ssp. *brachyantherum*	FACW
Meadow foxtail	*Alopecurus pratensis*	FACW
Mediterranean barley	*Hordeum marinum* ssp. *gussoneanum*	FAC
Medusa-head grass	*Taeniatherum caput-medusae*	UPL
Mountain mint	*Pycnanthemum californicum*	UPL
Navarretia	*Navarretia* sp.	N/A
Nebraska sedge	*Carex nebrascensis*	OBL
North Coast semaphore grass	*Pleuropogon hooverianus*	FACW
Orchard grass	*Dactylis glomerata*	FACU
Oregon ash	*Fraxinus latifolia*	FACW
Oregon white oak	*Quercus garryana*	UPL
Pacific foxtail	*Alopecurus saccatus*	OBL
Pacific madrone	*Arbutus menziesii*	UPL
Pacific ninebark	*Physocarpus capitatus*	FACW
Pennyroyal	*Mentha pulegium*	OBL
Perennial ryegrass	*Lolium perenne*	FAC
Plantain	*Plantago* sp.	N/A
Poison hemlock	*Conium maculatum*	FACW
Poison-oak	*Toxicodendron diversilobum*	UPL
Ponderosa pine	*Pinus ponderosa*	FACU
Purple needlegrass	*Nassella pulchra*	UPL
Purslane speedwell	*Veronica peregrina* ssp. *xalapensis*	OBL

Table A-1. Continued

Common Name	Scientific Name	Status[a]
Rayless goldfields	*Lasthenia glaberrima*	OBL
Red alder	*Alnus rubra*	FACW
Red fescue	*Festuca rubra*	FAC
Red-twig dogwood	*Cornus sericea*	FACW
Red willow	*Salix laevigata*	≥FAC[c]
Reed canary grass	*Phalaris arundinacea*	OBL
Ripgut brome	*Bromus diandrus*	UPL
Rose clover	*Trifolium hirtum*	FACU
Rough bluegrass	*Poa trivialis*	FACW
Rough cat's ear	*Hypochaeris radicata*	UPL
Scouler's willow	*Salix scouleriana*	FAC
Sedge	*Carex* sp.	FACW
Semaphore grass	*Pleuropogon* sp.	N/A
Shamrock	*Trifolium dubium*	FACU
Short-scale sedge	*Carex deweyana* ssp. *leptopoda (C. leptopoda)*	FACW
Slender beak sedge	*Carex athrostachya*	FACW
Slender fescue	*Vulpia octoflora*	UPL
Slender hairgrass	*Deschampsia elongata*	FACW
Rayless goldfields	*Lasthenia glaberrima*	OBL
Soft chess	*Bromus hordeaceus*	FACU
Soft rush	*Juncus effuses*	OBL
Solomon's seal	*Smilacina racemosa*	FAC
Spikerush	*Eleocharis macrostachya*	OBL
Spreading gooseberry	*Ribes divaricatum*	FACW
Spreading rush	*Juncus patens*	FAC
Stipulate popcornflower	*Plagiobothrys stipitatus*	OBL
Straight beaked buttercup	*Ranunculus orthorhynchus*	FACW
Straight-leaf rush	*Juncus orthophyllus*	FACW
Tall fescue	*Festuca arundinacea*	FAC
Teasel	*Dipsacus fullonum*	UPL
Timothy grass	*Phleum alpinum*	FACW
Toad rush	*Juncus bufonius*	FACW
Tufted hairgrass	*Deschampsia cespitosa*	FACW
Tule	*Schoenoplectus acutus (Scirpus acutus)*	OBL
Valley oak	*Quercus lobata*	FAC
Common velvet grass	*Holcus lanatus*	FAC
Vetch	*Vicia sativa*	FACU
Water plantain buttercup	*Ranunculus alismifolius* var. *alismifolius*	FACW
Western buttercup	*Ranunculus occidentalis*	FACW
Western goldenrod	*Euthamia occidentalis*	OBL
White alder	*Alnus rhombifolia*	FACW

Table A-1. Continued

Common Name	Scientific Name	Status[a]
White brodiaea	*Triteleia hyacinthina*	FACW
White clover	*Trifolium repens*	FACU
White snowberry	*Symphoricarpos* sp.	N/A

[a] Indicator Status Definitions:

OBL = Obligate, almost always occurs in wetlands (>99% probability of occurrence)
FACW = Facultative wetland, usually occurs in wetlands (66%–99% probability)
FAC = Facultative, equally likely to occur in wetlands or nonwetlands (34%–66% probability)
FACU = Facultative upland, usually occurs in nonwetlands but occasionally in wetlands (1%–33% probability)
UPL = Obligate upland, almost never occurs in wetlands (<1% probability)
NI = No indicator
N/A = Not applicable; no status because not identified to species level.

Source: Reed 1988.

[b] Not assigned status in Reed (1988), but appears to be at least FAC because its habitat as described in the Jepson Manual includes meadows (Hickman 1993).
[c] Appears to have a status of FAC or wetter based on habitat as described in the Jepson Manual: riverbanks, seepage areas, lake shores, canyons, and ditches (Hickman 1993).

Table A-2. Wildlife Species

Common Name	Scientific Name
American coot	*Fulica americana*
American wigeon	*Anas americana*
Black-tailed deer	*Odocoileus hemionus*
California coastal Chinook salmon	*Oncorhynchus tshawytscha*
Coho salmon	*Oncorhynchus kisutch*
California roach	*Lavinia symmetricus*
Cinnamon teal	*Anas cyanoptera*
Elk	*Cervus canadensis*
Largemouth bass	*Micropterus salmoides*
Mallard	*Anas platyrhynchos*
Northern California steelhead	*Oncorhynchus mykiss*
Northern shoveler	*Anas clypeata*
Sunfish	*Lepomis* sp.
Western pond turtle	*Actinemys marmorata*
Willow flycatcher	*Empidonax traillii*
Wood duck	*Aix sponsa*
Yellow warbler	*Dendroica petechia*
Yellow-breasted chat	*Icteria virens*

Appendix G Assessment of Erosion Sites on Offsite Mitigation Parcels in Little Lake Valley

Willits Bypass Project



Little Lake Valley (Taylor Ranch), Looking South

Technical Memorandum:
Assessment of Erosion Sites
On Offsite Mitigation Parcels in Little Lake Valley

U.S. Highway 101

Mendocino County, near Willits, California

PM 43.31-52.3

01-26200

June 2010

Caltrans
CALIFORNIA DEPARTMENT OF TRANSPORTATION

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Willits Bypass Project

Technical Memorandum:
Assessment of Erosion Sites
On Offsite Mitigation Parcels in Little Lake Valley

U.S. Highway 101

Mendocino County, near Willits, California

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June 2010

STATE OF CALIFORNIA
Department of Transportation

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Chapter 1 Introduction

1.1 Purpose of Technical Memorandum

The California Department of Transportation (Caltrans) submitted a Clean Water Act Section 401 water quality certification request (Caltrans 2010) to the North Coast Regional Water Quality Control Board (RWQCB) on March 1, 2010, for the Willits Bypass Project (project) in Mendocino County, California.

As part of their review of the Section 401 water quality certification request (Caltrans 2010), the RWQCB indicated that they were concerned about sedimentation in Little Lake Valley/Outlet Creek Basin and believed that repairing headcuts in the basin would be important to address sedimentation and that this should be included as part of the project's compensatory mitigation. The RWQCB provided Caltrans with two digital images that were taken by RWQCB staff during a 2005 field visit to the Valley as part of a field review of the offsite mitigation parcels. The images were said to be representative of headcuts that the RWQCB believed to be contributing sediment and causing water quality degradation to streams in the Valley. One digital image was of a headcut on the Lusher offsite mitigation parcel and the second digital image was of a headcut on the Hebrard parcel. The Hebrard parcel is privately held and at this time there are no plans to purchase this parcel as part of project mitigation. As such, the headcut on the Hebrard parcel is beyond the scope of this erosion site assessment (see below). However, recognizing the RWQCB's interest in this particular headcut, efforts were made to observe the headcut from adjacent parcels under Caltrans ownership. These qualitative observations are presented in Chapter 3, Results, in a separate section of the chapter but are not included further in this assessment.

In response to the RWQCB's concern about sedimentation, Caltrans conducted an assessment of existing erosion sites **at the offsite mitigation parcels** in May 2010. This erosion site assessment:

- documents existing erosion point (e.g., headcuts) and linear (e.g., eroding banks) features found on upland and instream areas (each erosion feature is mapped and documented with a unique identification number);
- evaluates existing erosion features in terms of contribution of sediment to swales and creeks, effects on adjacent sensitive resources, and ease of constructability/access;
- recommends five erosion features that could be addressed to satisfy the RWQCB's concerns regarding sedimentation and water quality in Outlet Creek Basin; and
- provides typical cross-sections that show techniques to address the recommended erosion sites to be repaired.

This technical memorandum summarizes the May 2010 erosion assessment. The technical memorandum is organized into the following chapters:

- Chapter 1, “Introduction.”
- Chapter 2, “Methods.”
- Chapter 3, “Results.”
- Chapter 4, “Summary and Recommendations.”
- Chapter 5, “References.”
- Chapter 6, “List of Preparers.”
- Appendix A, “Digital Images of Erosion Sites, By Parcel.”

Chapter 2 Methods

2.1 Assessment Dates and Team Qualifications

The erosion site assessment of offsite mitigation parcels occurred over a 5-day period on May 3 through May 7, 2010. During this period, the 35 offsite mitigation parcels were surveyed, covering approximately 2,000 acres. Table 2-1 lists the offsite mitigation parcel, its' Assessor's Parcel Number (APN), and when the parcel was surveyed during the erosion site assessment.

Table 2-1. Erosion Site Assessment Dates for Offsite Mitigation Parcels

Property Owner	APN	Size (acres)	Date Surveyed
Arkelian	103-230-04	9.96	5-3-10
Benbow	007-010-04	36.16	5-5-10
	007-020-03	33.54	5-5-10 and 5-6-10
	108-020-06	46.53	5-5-10
	108-030-07	54.74	5-5-10
	108-040-13	40.96	5-5-10
Brooke	108-020-03	9.20	5-4-10
	108-030-01	16.90	5-4-10
	038-020-11	11.89	5-4-10
	038-040-09	14.99	5-4-10
Ford	108-010-05	76.57	5-5-10
	108-010-06	144.77	5-3-10 and 5-4-10
	108-020-04	151.61	5-3-10 and 5-4-10
	108-030-02	50.99	5-3-10 and 5-4-10
	108-030-05	80.39	5-3-10
Frost	108-070-04	46.53	5-4-10
Goss	103-230-02	10.08	5-3-10
Huff	037-240-RW	12.65	5-6-10
Lusher	038-060-08	18.65	5-3-10 and 5-4-10
	108-030-04	66.17	5-3-10
	108-030-03	23.88	5-3-10 and 5-4-10
MGC Plasma North	103-230-06	18.22	5-3-10
MGC Plasma Middle	103-250-14	27.04	5-3-10
MGC Plasma South	103-250-16	66.27	5-3-10
Nance	108-050-06	73.90	5-5-10
Niesen	108-040-02	27.43	5-4-10
Taylor	037-221-68	161.29	5-7-10
	037-240-41	144.15	5-6-10
Watson	037-221-30	115.59	5-6-10
Wildlands	108-070-08	64.06	5-5-10
	108-070-09	121.87	5-4-10
	108-060-01	63.39	5-5-10
	108-060-02	106.81	5-4-10
	108-020-07	7.77	5-5-10
	108-030-08	8.00	5-5-10

The survey team consisted of a geomorphologist with expertise in channel, floodplain, and wetland restoration and erosion site assessment, and a fish biologist with similar qualifications and extensive knowledge on Outlet Creek Basin hydrology and physical geography of the offsite mitigation parcels. In order to ensure the greatest possible consistency of survey methods and the most accurate documentation, survey team members collected data together at the beginning of the survey period as part of field calibration efforts. After field calibration of methods was complete, the survey team usually split up and covered separate areas, as appropriate.

2.2 Assessment Methods and Definitions

Prior to beginning the erosion site assessment field work, aerial photographs were reviewed for evidence of headcuts and other erosion features at the offsite mitigation parcels. In addition, Appendix C of the project's Mitigation and Monitoring Proposal (MMP; Caltrans 2010) was reviewed for information on existing sensitive biological resources (e.g., special-status plants and jurisdictional wetlands) at the offsite mitigation parcels.

Each offsite mitigation parcel was surveyed via a walking survey. Each offsite mitigation parcel was evaluated by the survey team, with an emphasis on identifying erosion sites on channels or other areas of concentrated flow (e.g., swales and drainages). The concentrated flow could be perennial, intermittent, or ephemeral. If no channels or other areas of concentrated flow were present, the survey team walked separate diagonal transects on the parcel in order to cover its entirety. The emphasis on channels and other areas of concentrated flow was a result of the digital images provided by the RWQCB, where the headcuts of concern are located on channels. Erosion features not associated with concentrated flow conditions (e.g., stand-alone rotational slumps and eroding upland cattle trails) were not documented.

The three main erosion features usually found in areas of concentrated flow and that have the potential to contribute an excessive amount of sediment are eroding banks and eroding gullies, and headcuts. In riverine (and to a lesser extent, wetland) environments where no other significant land use practices that destabilize and introduce sediment to the surrounding topography occur, eroding banks and gullies are generally thought to be the principal source of excessive sedimentation locally (Hooke 1980; Lawler 1992, 1995; Lawler et al. 1997; Rosgen 1996). Much of Little Lake Valley has been used for livestock grazing. Livestock grazing in riverine environments can also lead to bank erosion as a result of trampled ground that becomes compacted enough to prohibit the establishment of vegetation but not so much as to prohibit the contribution of soil particles to the water column from high velocity flows (Myers and Swanson 1993). Bank erosion of streams running through Little Lake Valley likely delivers much of the fine sediment in the Outlet Creek Basin (LeDoux-Bloom and Downie 2008). Headcuts can also provide excessive sediment contribution, although the contribution of excess sediment is more pronounced in high-gradient gully systems than in low-gradient valleys such as Little Lake Valley (Knighton 1998; Patton and Schumm 1981; Schumm 1977).

Other erosion features, such as depressional wetlands, potholes, scour areas, and slumps (herein referred to as "other point features") that were observed during the erosion site assessment with

the potential to increase sedimentation to either the surrounding channels (both named and unnamed) and wetlands were also documented.

Figure 2-1 shows the data collection form that was used in the field to document pertinent information for each erosion site.

The following definitions for erosion sites are used in this technical memorandum:

- Depressional wetland: see definition for pothole below.
- Eroding bank: a streambank that is currently experiencing or has experienced significant bank retreat (i.e., the net linear recession of the streambank); usually, adequate bank-stabilizing vegetation or other cover is not present on the eroding bank.
- Eroding gully: a gully (i.e., small-scale drainage) that is experiencing either continuous or discontinuous erosion as evidenced by incision, localized slumping, or other erosion features.
- Headcut: the upslope limit of a gully or channel system, characterized by a steep wall which is cut back (i.e., mostly vertical) and migrating upslope (i.e., experiencing headward migration) as further erosion occurs.
- Headward migration: the lengthening of a gully or channel from erosion at its head, accomplished by concentrated water flow from rainwash, gullying, and/or slumping.
- Knickpoint: a break or interruption of slope in the longitudinal profile (i.e., channel bed) of a channel.
- Pothole: a depressional feature that has steep banks and is less than 15 feet in length and less than 10 feet in width.
- Scour area: an area on a gully or channel that is being deepened or widened as a result of concentrated flow, but that is not experiencing headward migration.
- Slump: an erosion feature at the head of an eroding gully that is more gravitationally-induced than scour-induced, but that has a definable headcut at its head.

2.3 Data Collection

Upon identification of an eroding bank, eroding gully, headcut, or other point feature, the following information was documented on a data collection form:

- Topographic position (whether or not the feature was located in a lowland channel or on an upland surface);
- Type of erosion site (e.g., headcut, eroding bank, eroding gully, depressional wetland, pothole, scour area, or slump);
- Vertical distance to the deepest portion at the base of the erosion site on the downstream or downslope end (called the “drop”; this variable is only applicable to headcuts, potholes, scour areas, and slumps);

- Average width of the erosion site (this variable measures the average width of the affected area downstream or downslope of the erosion site, and is only applicable to headcuts and other point features);
- Length of the erosion site (the total length of either the eroding bank or eroding gully, or the total length of the affected area downstream or downslope of a headcut, depressional wetland, pothole, scour area, or slump); and
- Ancillary notes describing the location, severity, and digital photograph number(s) of the erosion site.

Each erosion site was given a unique identification label. The erosion site was labeled based on its parcel owner, APN, and the order in which it was identified on that particular parcel. For example, Benbow 007-020-03_1 is the first documented erosion site on the Benbow APN 007-020-03 parcel. The location of each erosion site was hand-mapped on aerial photographs and precision-mapped with a sub-meter GPS, and photo-documented in the upstream and downstream direction, as applicable.

J Peters and J Kozlowski 5-3-10 | ***PARCEL: MGC Plasma North*** | ***APN: 103-230-06***

Category I: Vegetated areas where anadromous fish are known to occur (e.g., Haehl, Baechtel, Broaddus, Mill, Upp, Davis, Outlet).

Category II: Vegetated areas along tribs of Category I riparian corridors w/in 1000 ft u/s of confluence of Category I stream (e.g., Fulweiter).

Category III: Vegetated areas along tribs of Category I riparian corridors more than 1000 ft u/s of confluence of Category I stream (e.g., upper Fulweiter).

Perennial: flows year round

Intermittent: flow for only certain times of the year and receive water from both surface and gw

Ephemeral: channels are above water table year round and only receive water from surface runoff

Equipment:
measuring tape data forms
stadia rods maps
GPS
digital camera

SITE	INSTREAM / UPLAND	TYPE	DROP (ft)	AVE WIDTH (FT)	LENGTH (ft)	NOTES
1	IN	headcut	0.90	3.25	14.00	heacut on main drainage ditch on western end of parcel (photos 1-3)

Figure 2-1
Example Data Collection Form

Chapter 3 Results

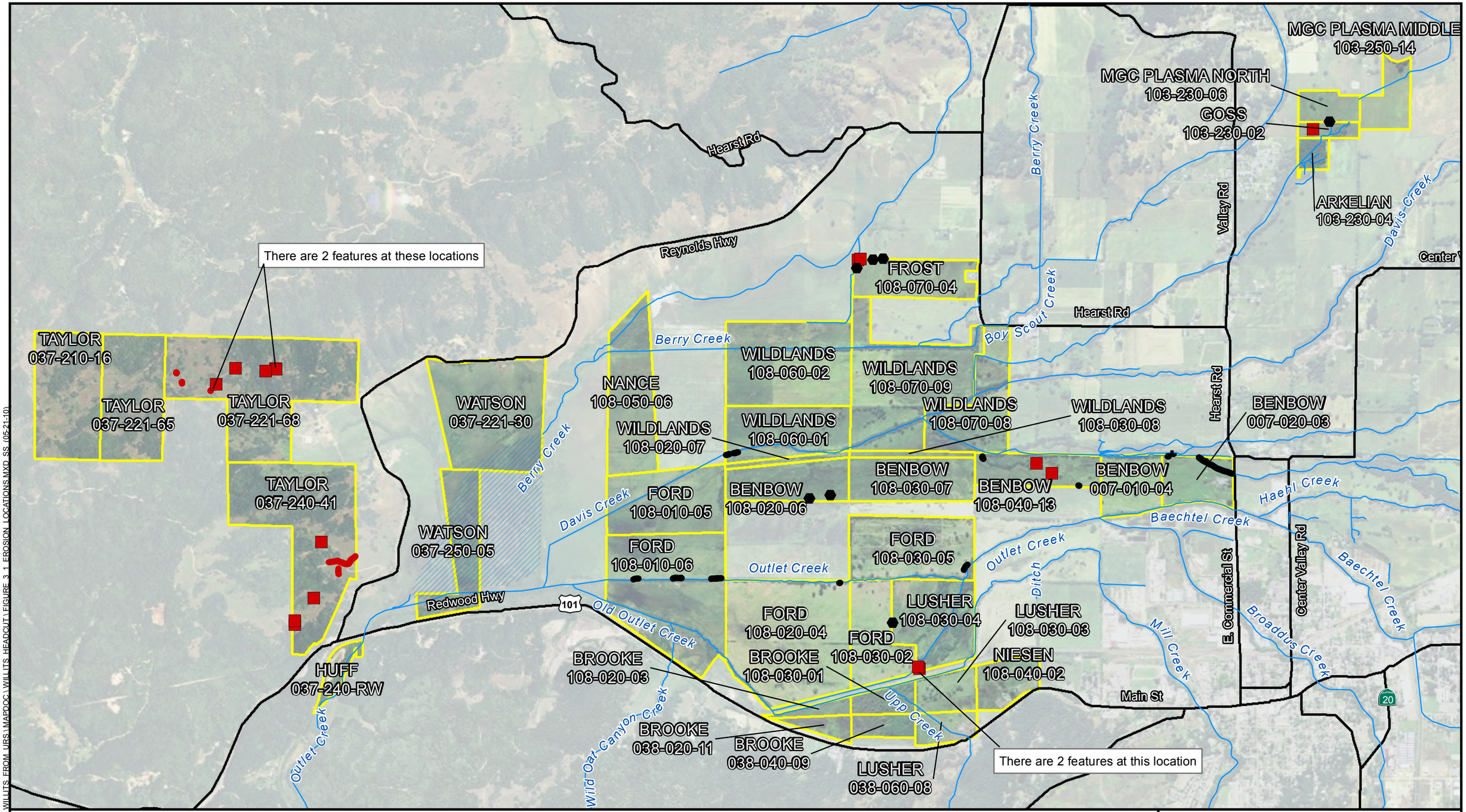
This chapter presents the results of the May 2010 erosion site assessment, by offsite mitigation parcel. Offsite mitigation parcels without erosion sites are not discussed herein.

Table 3-1 summarizes the relevant information that was collected for each erosion site at the offsite mitigation parcels, as applicable (Chapter 2). Figure 3-1 illustrates the location of each erosion site. As shown in Table 3-1 and on Figure 3-1, there are a total of 40 erosion sites on the offsite mitigation parcels: 11 eroding banks, 6 eroding gullies (5 with headcuts at their origin), 16 headcuts, and 7 other point features. On those offsite mitigation parcels located on the Little Lake Valley floor, most eroding bank sites are located on Outlet Creek and Davis Creek, and most headcuts and other point features are located in areas of concentrated flow with a slight increase in local gradient. On those offsite mitigation parcels located on the Outlet Creek Basin slopes (i.e., Taylor Ranch), almost all erosion sites are associated with culverts along Goat Rocks Road on the northern Taylor parcel (APN 037-221-68), and the PG&E access road on the southern Taylor parcel (APN 037-240-41).

Appendix A includes representative digital images of each erosion site, presented by parcel.

Table 3-1. Erosion Sites, by Offsite Mitigation Parcel

Parcel[a]	Identification Number	Instream/ Upland	Type	Drop (ft)	Average Width (ft)	Length (ft)	Notes
Benbow	108-020-06_1	Instream	Headcut	0.5	3.5	11.0	Very small headcut along drainage that flows north along western boundary of parcel
	108-020-06_2	Instream	Headcut	0.6	1.0	6.0	Small headcut on small tributary just upstream from larger channel that drains wetland
Benbow	108-040-13_1	Instream	Eroding bank	n/a	n/a	64.0	On left bank; scalloped; Category III abandoned channel; banks 2-3' high
	108-040-13_2	Upland	Pothole	2.5	5.0	12.0	Depressional pothole adjacent to swale; south and tributary to Category III abandoned channel
	108-040-13_3	Upland	Headcut	3.4	3.0	27.0	Large headcut on swale tributary to main swale that eventually connects to Category III abandoned channel
	108-040-13_4	Instream	Eroding bank	n/a	n/a	20.0	On left bank; scalloped; one of the main swales on parcel; at western end of parcel; banks ~ 2' high
Benbow	007-020-03_1	Instream	Eroding bank	n/a	n/a	30.0	Eroding berm/levee between two Category III channels; erosion primarily occurs at confluence
	007-020-03_2	Instream	Eroding bank	n/a	n/a	820.0	Incised gully that crosses southern boundary of parcel; erosion primarily on right bank; erosion locations extend south across to road but not accessible at time of survey
Ford	108-010-06_1	Instream	Eroding bank	n/a	n/a	110.0	Unstable, mostly unvegetated right bank associated with riffle convergence flow (i.e., outer bend cutbank); banks 6' tall from toe
	108-010-06_2	Instream	Eroding bank	n/a	n/a	180.0	Unstable, mostly unvegetated right bank associated with riffle convergence flow (i.e., outer bend cutbank); banks 6' tall from toe
	108-010-06_3	Instream	Eroding bank	n/a	n/a	180.0	Unstable, mostly unvegetated right bank associated with riffle convergence flow (i.e., outer bend cutbank); banks 6' tall from toe
	108-020-04_1	Instream	Eroding bank	n/a	n/a	35.0	On LB; scalloped erosional feature; nearly vertical in places; trampled by cattle; banks ~ 6-8' high into left bank levee
	108-030-05_1	Instream	Eroding bank	n/a	n/a	20.0	Rotational slump on right bank; main stem Outlet Creek; banks ~ 4-6' high; on southern boundary of parcel
Frost[b]	108-070-04_1	Instream	Headcut	3.5	12.0	75.0	Headcut leading off parcel to east at top of unstable Category III channel
	108-070-04_2	Instream	Headcut	4.0	7.0	20.0	Headcut in center of unstable Category III channel
	108-070-04_3	Upland	Headcut	1.5	3.0	20.0	Headcut on upland adjacent to first tributary to Category III channel
	108-070-04_4	Upland	Headcut	1.2	3.0	18.0	Headcut at top of second tributary to Category III channel



Legend

- Streams
- Major Road
- Offsite Mitigation Parcel

Headcut and Other Point Feature Locations

- Instream
- Upland

Eroding Gully/Bank Location

- Instream
- Upland

0 0.5 1 Miles

Data Sources
Aerials - ArcGIS Online (NAIP 2005)
Parcels - Caltrans (10/5/2009)
Stream - URS (2008)
Erosion Sites - ICF (2010)

N

Figure 3-1

Willits Bypass Project
Erosion Site Locations
On Offsite Mitigation Parcels

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Parcel[a]	Identification Number	Instream/ Upland	Type	Drop (ft)	Average Width (ft)	Length (ft)	Notes
	108-070-04_5	Instream	Headcut	1.4	8.0	68.0	Headcut in center of unstable Category III channel; close to first tributary
Goss	103-230-02_1	Upland	Headcut	0.70	3.0	7.0	Headcut at confluence of east to west swale with main drainage ditch on western end of parcel
Lusher	108-030-04_1	Instream	Depressional wetland	n/a	15.0	200.0	Large depressional wetland with slumping banks on swale in middle of Lusher parcel; not a true headcut because it is not progressing upstream
	108-030-04_2	Upland	Headcut	2.5	4.0	25.0	Large headcut on small swale to Old Outlet Creek near railroad crossing
	108-030-04_3	Upland	Headcut	1.2	6.0	22.6	Large headcut on small swale to Old Outlet Creek near railroad crossing
MGC Plasma North	103-230-06_1	Instream	Headcut	0.9	3.5	14.0	Headcut on main drainage ditch on western end of parcel
Taylor[c]	037-221-68_1	Upland	Headcut	3.5	5.5	13.5	Headcut upslope of Goat Rocks Road
	037-221-68_2	Upland	Scour area	3.5	4.0	14.5	Scour area downslope of road
	037-221-68_3	Upland	Scour area	2.3	2.0	3.3	Scour area downslope of road; associated with culvert; no headcut upslope
	037-221-68_4	Upland	Headcut	1.2	2.0	20.0	Small headcut on swale along upslope of road
	037-221-68_5	Upland	Scour area	1.3	3.0	5.0	Scour area downslope of road; associated with culvert; headcut (037-221-68_6) is upslope
	037-221-68_6	Upland	Headcut/eroding gully	3.0	2.5	60.0	Headcut at top of eroding gully upslope of 037-221-68_5
	037-221-68_7	Upland	Headcut/eroding gully	2.7	1.8	15.8	On same eroding gully as 037-221-68_6; a double headcut adjacent to road
	037-221-68_8	Upland	Headcut/eroding gully	3.2	7.0	6.0	Headcut on eroding gully in open area way from road
	037-221-68_9	Upland	Headcut/eroding gully	1.3	3.0	19.0	Headcut at edge of small livestock pond
	037-240-41_1	Upland	Eroding gully	n/a	n/a	680.0	Long incised gully adjacent to and most likely initiated by access road; eroding in areas but bedrock acts as grade control throughout
	037-240-41_2	Upland	Eroding gully/headcut	1.5	5.0	106.0	Incised eroding gully leading to headcut; deeper soil and not as much bedrock as 037-240-41_1
	037-240-41_3	Upland	Slump/headcut	2.0	18.0	36.0	Rotational slump with small headcut on downslope of road
	037-240-41_4	Upland	Headcut	1.6	2.0	5.5	Minor headcut on rocked gully on upslope of road
	037-240-41_5	Upland	Slump/headcut	4.0	7.0	32.0	Slump/headcut at start of swale

Parcel[a]	Identification Number	Instream/ Upland	Type	Drop (ft)	Average Width (ft)	Length (ft)	Notes
	037-240-41_6	Upland	Headcut	1.3	2.0	6.0	Small headcut on small east-facing swale; associated with cattle trail where flow collects and concentrates; entire swale downstream has pockets of moderate erosion
Wildlands	108-060-01_1	Instream	Eroding bank	n/a	n/a	90.0	Erosion on both banks; vertical banks lacking adequate vegetation cover; some slumping; extends to parcel boundary; banks 4-6' high
	108-060-01_2	Instream	Eroding bank	n/a	n/a	105.0	Erosion on both banks; vertical banks lacking adequate vegetation cover; some slumping; banks 4-8' high

[a] Overview map showing all eroding sites described in this table is provided in Figure 3-1.
[b] All five erosion sites on the Frost parcel are collectively referred to as the Frost Complex (Figure 3-2).
[c] Taylor sites 037-221-68_1 through 037-221-68_7 are collectively referred to as the Taylor Complex (Figure 3-3).

3.1 Little Lake Valley

3.1.1 Benbow 108-020-06

The Benbow 108-020-06 parcel has two erosion sites (Table 3-1, Figure 3-1, Appendix A). Both of these sites (108-020-06_1 and 108-020-06_2) are instream headcuts that occur on swales in the southwest corner of the parcel (Figure 3-1). Both have very small drops and any associated sediment derived from these headcuts is minimal and is spread out and deposited in the existing wetland complex to the north.

The areas of and adjacent to each headcut are well-vegetated wet meadow with sandy loam soils (Gielow sandy loam, 0 to 5 percent slopes). Concentrated flows from the swales upstream, combined with direct trampling by livestock, have likely initiated these headcuts; however, both headcuts appear relatively stable.

3.1.2 Benbow 108-040-13

The Benbow 108-040-13 parcel has four erosion sites (Table 3-1, Figure 3-1, Appendix A). There are two instream eroding bank sites (108-040-13_1 and 108-040-13_4) and two upland sites (108-040-13_2 and 108-040-13_3). Erosion site 108-040-13_1 is located in the northeast corner of the parcel and 108-040-13_4 is located in the southwest corner of the parcel (Figure 3-1). These two eroding bank sites have streambanks that range from 2 to 3 feet high, and although they are noticeably vertical in nature, the soil that binds the banks together is relatively compact and stable. The pothole feature (108-040-13_2), located in the center of the parcel (Figure 3-1), is isolated (i.e., not on a noticeable swale) and is not undergoing headward migration. The headcut (108-040-13_3), also located in the center of the parcel (Figure 3-1), is one of the largest observed during the course of the assessment and is discussed further in Chapter 4.

Any associated sediment derived from these erosion sites enters the Category III abandoned/discontinuous channel that runs along the eastern edge of the parcel. This watercourse appears to have once been connected to Davis Creek, but no longer has an active hydrologic connection to the creek. As such, potential sedimentation from these sites essentially enters an active sediment sink (the Category III abandoned/discontinuous channel). Furthermore, the potential contribution of sediment from 108-040-13_1 and 108-040-13_4 appears to be minimal, while dislodged sediment from 108-040-13_2 most likely never exits the pothole.

The areas of and adjacent to each erosion site are well-vegetated wet meadow, swale, and/or riparian woodland with clay loam soils (Cole clay loam, 0 to 2 percent slopes). Concentrated flows from the swales upstream, combined with direct trampling by livestock, have likely initiated these erosion features; however, all erosion sites except 108-040-13_2 appear relatively stable.

3.1.3 Benbow 007-020-03

The Benbow 007-020-03 parcel has two erosion sites (Table 3-1, Figure 3-1, Appendix A). Both of these sites (007-020-03_1 and 007-020-03_2) are instream eroding banks located along the eastern edge of the parcel (Figure 3-1). Erosion site 007-020-03_1 consists of an eroding berm/levee at the confluence of two Category III channels. Erosion site 007-020-03_2 is an incised gully with pockets of bank erosion that crosses the southern boundary of the parcel. Similar to the erosion sites in Benbow 108-040-13, potential sedimentation from these sites essentially enters the same active sediment sink as described above.

The area of and adjacent to 007-020-03_1 is well-vegetated valley oak riparian woodland with loam soils (Feliz loam, 0 to 2 percent slopes). The area of and adjacent to 007-020-03_2 is fairly well-vegetated upland grazing land with clay loam soils (Cole clay loam, 0 to 2 percent slopes). Channel flows from upstream, combined with direct trampling by livestock, have likely initiated these erosion features; however, both features appear relatively stable.

3.1.4 Ford 108-010-06

The Ford 108-010-06 parcel has three erosion sites (Table 3-1, Figure 3-1, Appendix A). Each of these sites (108-010-06_1, 108-010-06_2, and 108-010-06_3) is an instream eroding bank that occurs on Outlet Creek in the center of the parcel (Figure 3-1). All three sites are remarkably similar in nature in that they have unstable, mostly unvegetated right (i.e., east) cutbanks created by convergence flow on the riffle/gravel bar complex on the opposite side of the cutbank. The banks are approximately 6 feet tall from the toe of the bank. Each eroding bank site represents the largest contributors of sediment from streambanks observed during the course of the assessment and all three sites are discussed further in Chapter 4.

The erosion sites are located in Oregon ash riparian woodland. The areas adjacent to each erosion site on the east and west are well-vegetated wet meadow with soils that have been altered through levee construction. Channel flows from upstream, combined with direct trampling by livestock, have likely initiated these erosion features. All three erosion sites appear unstable, as evidenced by active slumping (Appendix A-9).

3.1.5 Ford 108-020-04

The Ford 108-020-04 parcel has one erosion site (Table 3-1, Figure 3-1, Appendix A). The site (108-020-04_1) is an instream eroding bank that occurs on Outlet Creek in the southeast corner of the parcel (Figure 3-1). The eroding bank is located on the left (i.e., west) bank, is scalloped, near vertical in places, with banks approximately 6 to 8 feet high from the toe. This site is not one of the larger contributors of sediment observed, and appears to have somewhat stabilized, based on the fair amount of vegetative growth on and adjacent to the bank.

The erosion site itself is located in well-vegetated mixed riparian woodland with fluvaquent soils (Fluvaquents, 0 to 1 percent slopes). The areas adjacent to the erosion site on the east and west

are well-vegetated wet meadow with similar soils. Channel flows from upstream, combined with direct trampling by livestock, have likely initiated this erosion feature.

3.1.6 Ford 108-030-05

The Ford 108-030-05 parcel has one erosion site (Table 3-1, Figure 3-1, Appendix A). The site (108-030-05_1) is an instream eroding bank that occurs on Outlet Creek on the southern boundary of the parcel (Figure 3-1). The eroding bank is located on the right (i.e., east) bank, is a slumped erosion feature, and is near vertical in places with banks approximately 4 to 6 feet high from the toe. This site is not one of the larger contributors of sediment observed, and appears to have stabilized based on the good amount of vegetative growth on and adjacent to the bank.

The erosion site itself is located in well-vegetated valley oak riparian woodland with Fluvaquent soils (Fluvaquents, 0 to 1 percent slopes). The areas adjacent to the erosion site on the east and west are well-vegetated wet meadow with sandy loam soils (Gielow sandy loam, 0 to 5 percent slopes). Channel flows from upstream, combined with direct trampling by livestock, have likely initiated this erosion feature.

3.1.7 Frost 108-070-04

The Frost 108-070-04 parcel has five erosion sites (Table 3-1, Figure 4-2, Appendix A), collectively referred to as the "Frost Complex" (Figure 3-2). There are three instream headcut sites (108-070-04_1, 108-070-04_2, and 108-070-04_5) and two upland headcut sites (108-070-04_3 and 108-070-04_4), each located in the northeast corner of the parcel (Figures 3-1 and 3-2). These are some one of the larger headcuts observed during the course of the assessment and are discussed further in Chapter 4.

Any associated sediment derived from these erosion sites enters an unnamed tributary that eventually connects to Berry Creek (under high flows). As such, potential sedimentation from these sites essentially enters an active channel. The potential contribution of sediment from each site (especially 108-070-04_1) appears to be significant.

The areas of and adjacent to each erosion site are located in a sparsely-vegetated, Oregon ash riparian woodland with Haplaquept soils (Haplaquepts, 0 to 1 percent slopes). Concentrated flows from the swales upstream, combined with direct trampling by livestock, have likely initiated these erosion features. All five erosion sites appear unstable.

3.1.8 Goss 103-230-02

The Goss 103-230-02 parcel has one erosion site (Table 3-1, Figure 3-1, Appendix A). This site (103-230-02_1) is an upland headcut that occurs at the confluence of an east-to west-swale with the main drainage ditch on the western end of parcel (Figure 3-1). It has a very small drop and no associated sediment derived from this headcut was observed on the parcel.

The areas of and adjacent to the erosion site is well-vegetated valley oak riparian woodland with sandy loam soils (Gielow sandy loam, 0 to 5 percent slopes). Concentrated flows from the swales upstream, combined with direct trampling by livestock, has likely initiated this headcut; however, the headcut appears relatively stable.

3.1.9 Lusher 108-030-04

The Lusher 108-030-04 parcel has three erosion sites (Table 3-1, Figure 3-1, Appendix A). There is one instream depressional wetland site (108-030-04_1) and two instream headcut sites (108-030-04_2 and 108-030-04_3), each located on the northern boundary of the parcel (Figure 3-1). The depressional wetland is located on a swale and has slumping banks; however, it does not have a headcut associated with it and is not undergoing headward migration in either direction. The instream headcuts, however, are two of the larger headcuts observed during the erosion site assessment and are discussed further in Chapter 4.

Any associated sediment derived from 108-030-04_1 is self-contained within the depressional wetland. Any associated sediment derived from 108-030-04_2 and 108-030-04_3 enter a swale that eventually connects to Old Outlet Creek (under high flows). As such, potential sedimentation from these sites essentially enters an active channel, and appears to be significant.

Erosion site 108-030-04_1 is located in well-vegetated Oregon ash riparian woodland with sandy loam soils (Gielow sandy loam, 0 to 5 percent slopes). The areas adjacent to 108-030-04_1 on the east and west are well-vegetated wet meadow with similar soils. Erosion site 108-030-04_2 and 108-030-04_3 are located in well-vegetated mixed riparian woodland, with Fluvaquent soils (Fluvaquents, 0 to 1 percent slopes). The areas adjacent to 108-030-04_2 and 108-030-04_3 on all sides are a mixture of well-vegetated oak woodland grassland, Oregon ash riparian woodland, mixed riparian woodland, and wet meadow (all with similar soils).

Direct trampling by livestock has likely initiated 108-030-04_1; however, it appears to be stable. Concentrated flows from the swale upstream, combined with direct trampling by livestock, have likely initiated 108-030-04_2 and 108-030-04_3. These erosion sites appear unstable.

3.1.10 MGC Plasma North 103-230-06

The MGC Plasma North 103-230-06 parcel has one erosion site (Table 3-1, Figure 3-1, Appendix A). This site (103-230-06_1) is an instream headcut that occurs on the main drainage ditch on western end of parcel (Figure 3-1). It has a very small drop and any associated sediment derived from this headcut is minimal and gets spread out and deposited in the local wetland complex to the north.

The areas of and adjacent to each erosion site are well-vegetated wet meadow with clay soils (Clear Lake clay, 0 to 2 percent slopes). Concentrated flows from the swales upstream, combined with direct trampling by livestock, has likely initiated this headcut; however, the headcut appears relatively stable.

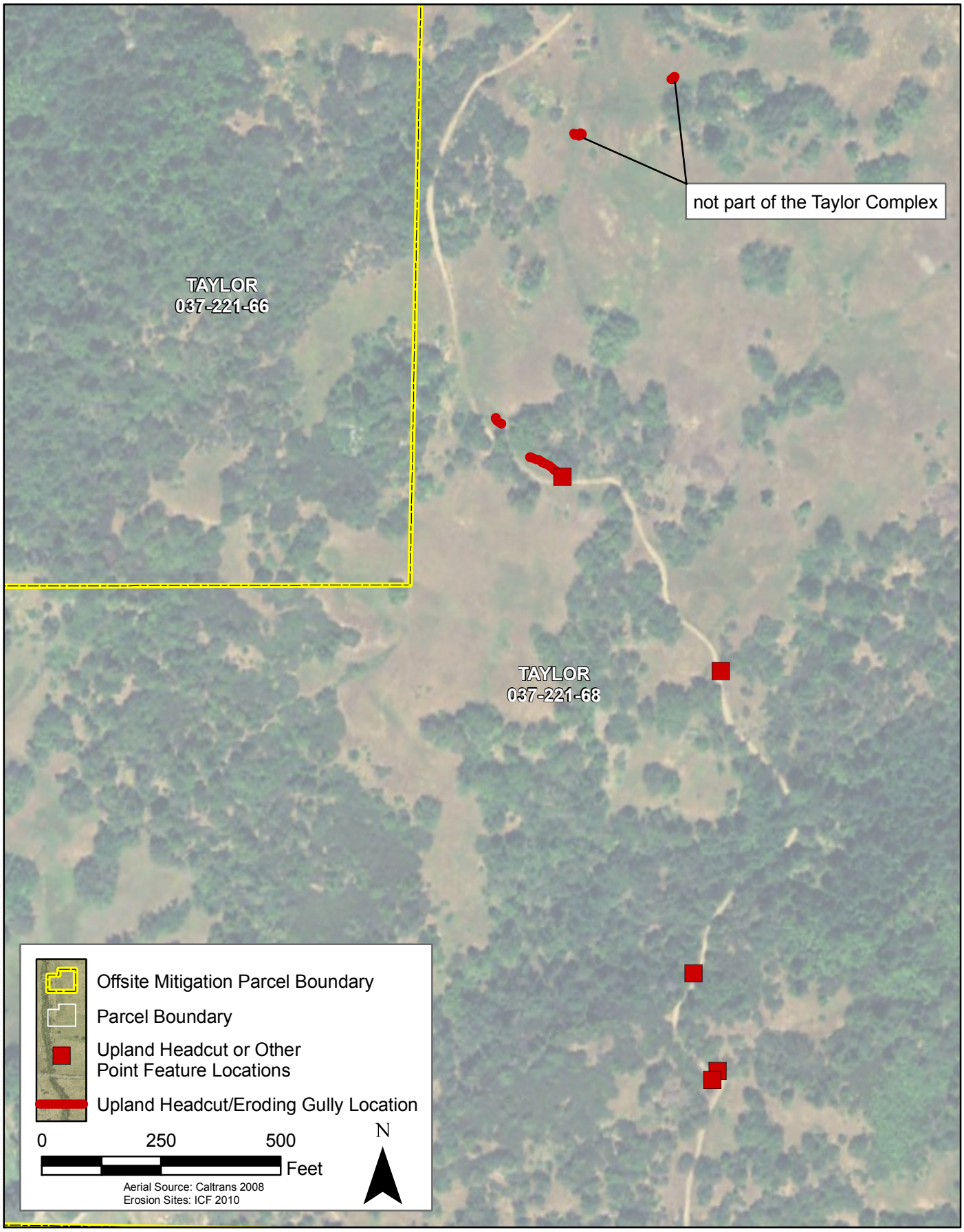


Figure 3-2
Taylor (APN 037-221-68) Complex
Erosion Site Locations

3.1.11 Wildlands 108-060-01

The Wildlands 108-060-01 parcel has two erosion sites (Table 3-1, Figure 3-1, Appendix A). Both of these sites (108-060-01_1 and 108-060-01_2) are instream eroding banks that occur on Davis Creek on the northern boundary of the parcel (Figure 3-1). Both sites are similar in that they have partially unstable banks on each side, with a noticeable absence of vegetation. They are not associated with the convergence of flow from a gravel bar as evidenced on the Ford 108-010-06 parcel; rather, the lower banks appear to be scoured from high flows. The banks range from 4 to 8 feet high from the toe. These sites are not of critical concern as they will be addressed with riparian planting mitigation actions.

The erosion sites themselves are located in sparsely-vegetated willow riparian scrub. The areas adjacent to each erosion site on the east and west are well-vegetated wet meadow with sandy loam soils (Gielow sandy loam, 0 to 5 percent slopes). Channel flows from upstream, combined with direct trampling by livestock, have likely initiated these erosion features.

3.2 Outlet Creek Basin Slopes

3.2.1 Taylor 037-221-68

The Taylor 037-221-68 parcel has nine erosion sites (Table 3-1, Figure 3-1, Appendix A), the first seven of which are collectively referred to as the "Taylor Complex" (Figure 3-2). All erosion sites are located in upland and are typified by headcuts, scour areas, and/or eroding gullies with headcuts. All erosion sites are located in the north-central portion of the parcel (Figures 3-1 and 3-2). Since the cause of all erosion sites within the Taylor Complex is the presence of the access road with its associated culvert crossings (and to a lesser extent direct trampling by livestock), the Taylor Complex (as well 037-221-68_8 and 037-221-68_9) are discussed further in Chapter 4.

Any associated sediment derived from these erosion sites enters unnamed tributaries that eventually connect to the lowlands (i.e., Little Lake Valley) below. However, all observed erosion sites are high up in the watershed and contribute a relatively small fraction of sediment to downstream receiving channels. Furthermore, any sediment that is eroded and transported most likely gets deposited and stored in the high-gradient unnamed tributaries as a sediment source and is only transported further downstream in slugs during large storm events. Finally, if the sediment is carried to the Valley floor, it would end up in an unnamed alluvial fan channel that eventually drains onto the Watson parcels. However, approximately one mile separates the Taylor 037-221-68 parcel and the Watson parcels and presumably much of the sediment load from upstream sources gets deposited in this reach of the alluvial fan channel as it is a low-gradient "response" reach, adjusting its channel bed to both water and delivered sediment. This channel on the Watson parcel does not have a noticeable hydrologic connection to any named channel, such as Berry Creek; rather, its terminus is a large existing wetland complex (on the eastern portion of Watson 037-221-30 and the western portion of Watson 037-250-05).

The areas of and adjacent to each erosion site are located in a moderately-vegetated upland forest setting with thin soils (Hopland-Witherell-Squawrock Complex, 30 to 50 percent slopes; Yorkville- Squawrock-Witherell Complex, 30 to 50 percent slopes).

3.2.2 Taylor 037-240-41

The Taylor 037-240-41 parcel has six erosion sites (Table 3-1, Figure 3-1, Appendix A). All erosion sites are located in upland and are typified by headcuts, slumps with headcuts, eroding gullies, and/or eroding gullies with headcuts. All erosion sites are generally located in the western portion of the parcel (Figure 3-1). Erosion site 037-240-41_1 is a long incised gully, approximately 680 feet in length (on the parcel), adjacent to and most likely initiated by the local access road. It is eroding in areas but the underlying bedrock acts as grade control throughout its length and it not an immediate erosion concern. Erosion site 037-240-41_2 is also a long incised gully approximately 106 feet in length (on the parcel), that has a headcut at its upper end. However, similar to 037-240-41_1, the underlying bedrock acts as grade control throughout its length and it not an immediate erosion concern.

The remaining four erosion sites consist of headcuts and/or slumps with headcuts. Three are associated with a PG&E access road and could be addressed in a similar manner to those discussed in Chapter 4 for the Taylor Complex. The fourth erosion site, 037-240-41_6, consists of a small headcut on a small east-facing swale. It is associated with a livestock trail where flow collects and concentrates, and the entire swale downstream has pockets of moderate erosion that are not considered significant due to the local bedrock control.

As with the Taylor 037-221-68 parcel, any associated sediment derived from these erosion sites enters unnamed tributaries that eventually connect to the lowlands (i.e., Little Lake Valley) below. Lowland sedimentation is not a significant concern for the same reasons described above. However, the receiving channels and wetlands in the lowlands are closer to Outlet Creek than the receiving channels associated with the Taylor 037-221-68 parcel.

The areas of and adjacent to each erosion site are located in a moderately-vegetated upland forest setting with thin soils (Shortyork-Yorkville- Witherell Complex, 15 to 30 percent slopes; Casabonne-Wohly loams, 30 to 50 percent slopes; Yorkville-Yorktree-Squawrock Complex, 30 to 50 percent slopes).

3.3 Erosion Potential on Offsite Mitigation Parcels

3.3.1 Literature Review

Prior to development if this technical memorandum, a complete review of the *Outlet Creek Basin Assessment Report* (LeDoux-Bloom and Downie 2008) was performed to gage the overall stability of Little Lake Valley/Outlet Creek Basin. Little Lake Valley is situated in the Southern Subbasin of the Outlet Creek Basin (it is also in the Lower Davis Creek CalWater 2.2a Planning Watershed).

Based on the *Outlet Creek Basin Assessment Report* (LeDoux-Bloom and Downie 2008), identified watershed issues that are relevant to erosion and stability on the offsite mitigation parcels include the following:

- The six dams in the Southern Subbasin[1] collect early winter rain which decreases or eliminates the stream flow at that time of year. From a geomorphic perspective, these dams act as sediment traps, limiting the transport of gravels. The channels below dams often become incised, straighter, and typically experience more bank erosion than systems that are not downstream of dams (Knighton 1998; Thorne et al. 1996).
- Channel volume has been reduced because of sediment deposition.
- Realignment of portions of Outlet Creek and other tributaries has exacerbated channel incision and bank erosion.
- Poorly maintained and undersized Mendocino County residential roads and road culverts have created sedimentation.
- Wildlife and livestock grazing in riparian areas have caused streambank erosion.

Based on the *Outlet Creek Basin Assessment Report* (LeDoux-Bloom and Downie 2008), findings that are relevant to erosion and stability in the offsite mitigation parcels include the following:

- Fine sediment deposits in low gradient reaches contribute to shallow pool depth and small spawning substrate (and can lead to an increase in flooding through loss of channel capacity, which in turn exacerbates bank erosion).
- Embeddedness levels are unsuitable in many streams (which signals fine-sediment deposition from bank and near-bank processes).
- The six dams have significantly decreased downstream gravel recruitment.

Other pertinent issues in the *Outlet Creek Basin Assessment Report* (LeDoux-Bloom and Downie 2008) include the idea that the geology of the highlands in the Southern Subbasin is very soft and highly erodible. Fine sediment is consistently contributed from Little Lake Valley downstream and into the Eel River. Additionally, high precipitation and high peak flows have created flashy instream conditions and increased fine sediment delivery. High erosion potential combined with flashy instream conditions on banks covered by shallow rooted and annual species has created easily eroded stream banks.

3.3.2 Observed Erosion Potential

Eleven eroding bank sites were identified on the offsite mitigation parcels during the erosion site assessment in Little Lake Valley (an area that encompasses approximately 1,700 acres). Of these

[1] These include Lake Emily Dam (on Willits Creek with a surface area of 275 acre-feet [af]); Ada Rose Dam (on Willits Creek with a surface area of 138 af); Boy Scout Camp Dam (on Boy Scout Creek with a surface area of 800 af); Pine Mountain Dam (on Moore Creek with a surface area of 45 af); Morris Dam (on Davis Creek with a surface area of 620 af); and Centennial Dam (on Davis Creek with a surface area of 512 af).

eleven eroding bank sites, only three are significant contributors of sediment. As will be discussed in Chapter 4, only Ford 108-010-06_1, 108-010-06_2, and 108-010-06_3 were observed to have the potential to significantly increase sedimentation to downstream channels.

Most of the channels and streams in Little Lake Valley are incised as a result of artificial straightening and limited access to their floodplains from levee and berm construction. However, most of the channels and streams have adequate vegetation cover and the observed small amount of eroding banks in proportion to the total linear feet of streams in the offsite mitigation parcels does not point to any large-scale channel instability within the offsite mitigation parcels.

Twelve headcuts were identified on the offsite mitigation parcels during the erosion site assessment Little Lake Valley. Of these twelve headcuts, five occur together as the Frost Complex, three are located on various Benbow parcels, two are located on the Lusher parcel, and the remaining two are located on the Goss and MGC Plasma North parcels, respectively. As will be discussed in Chapter 4, only the Frost Complex, Lusher 108-030-04_2 and 108-030-04_3, and Benbow 108-040-13_3 were observed to have the potential to significantly increase sedimentation to either the surrounding wetlands or channels.

Prior to the relocation and dredging of stream channels in the 1900s, Little Lake Valley functioned as a large, shallow lake and wetland until late spring or early summer, depending upon the amount of rainfall of that given year. The resultant topography of the offsite mitigation parcels observed during this study is a low-gradient, mostly stable landscape. Even though sedimentation has been identified as a major concern (LeDoux-Bloom and Downie 2008), the headcuts and other point features generally associated with a subtle rise in topography do not signify a landscape in a degradation phase. In fact, no mention of the term “headcut” exists in the *Outlet Creek Basin Assessment Report* (LeDoux-Bloom and Downie 2008).

However, this erosion site assessment was performed once and represents a snapshot of stability. It is entirely plausible that base level changes downstream in the Outlet Creek watershed could potentially affect the headward migration of the observed eroding banks, headcuts, and other point features, as well as create additional erosion features in the future. Furthermore, continued grazing practices (especially close to and within riparian habitat) could also lead to further channel instability (Myers and Swanson 1993).

3.4 Qualitative Observations for Hebrard 103-030-01

The RWQCB provided Caltrans with a digital image of two headcuts that the RWQCB believed to be contributing sediment and causing water quality degradation to streams in Little Lake Valley. During the erosion site assessment, these two headcuts were observed: one is located on one of the Lusher offsite mitigation parcels while the other is located on the Hebrard parcel. The Hebrard parcel is privately held and at this time there are no plans to purchase this parcel as part of project mitigation. As such, the headcut on the Hebrard parcel is beyond the scope of this erosion site assessment. However, recognizing the RWQCB’s interest in this particular headcut, efforts were made to observe the headcut from the adjacent Benbow 007-010-04 parcel under

Caltrans ownership. Qualitative observations of the headcut on the Hebrard parcel are presented below but are not discussed further in this assessment.

The Hebrard 103-030-01 parcel has one known erosion site. This site appears to be an instream headcut that occurs on the tributary to the channel that runs along the eastern edge of Benbow 007-010-04. This headcut was one of the largest observed during the course of the assessment. Similar to the erosion sites on Benbow 108-040-13 and 007-020-03, potential sedimentation from this headcut essentially enters the same active sediment sink as described above for the Benbow 108-040-13 and 007-020-03 parcels.

The area surrounding the erosion site is well-vegetated valley oak riparian woodland with loam soils (Feliz loam, 0 to 2 percent slopes). Channel flows, combined with direct trampling by livestock, have likely initiated this erosion feature. This erosion site appears highly unstable, as evidenced by the incision downstream of the headcut.

Chapter 4 Summary and Recommendations

This chapter summarizes the results of the erosion site assessment, and provides recommendations for five erosion features that could be addressed to satisfy the RWQCB's concerns regarding sedimentation and water quality in Outlet Creek Basin based primarily on data collected during the field assessment, as presented in Chapter 3.

4.1 Summary of Erosion Sites

The survey team walked each of the offsite mitigation parcels and recorded the location of each erosion site using GPS units and aerial photograph base maps (Chapter 2, Methods) for a variety of environmental indicators related to erosion features (Chapter 3, Results). Surveys took place in May 2010. Various types of erosion features with the potential to significantly increase sedimentation in Little Lake Valley were identified. The following list summarizes these erosion features and their significance:

- Depressional wetland: One depressional wetland (Lusher 108-030-04_1) was identified and this feature appears stable due to the lack of headward migration.
- Eroding bank: Eleven discrete portions of streambank that are currently experiencing or have experienced significant bank retreat were identified. Of these eleven sites, three appear to be the most significant sediment contributors: Ford 108-010-06_1, 108-010-06_2, and 108-010-06_3.
- Eroding gully: Six gullies experiencing either continuous or discontinuous erosion as evidenced by incision, localized slumping, or other erosion features were identified. All erosion sites are located on the Taylor 037-221-68 and 037-240-41 parcels.
- Headcut: A total of 16 headcuts were identified. Of the 16 headcuts, four appear to be significant sediment contributors: Frost Complex, Lusher 108-030-04_2 and 108-030-04_3, and Benbow 108-040-13_3.
- Pothole: One pothole (Benbow 108-040-13_2) was identified and this feature appears stable due to the lack of headward migration.
- Scour area: Three scour areas where a gully is being deepened or widened as a result of concentrated flow on the downslope end of a culvert were identified. All erosion sites are located on the Taylor 037-221-68 parcel.
- Slump: Two slumps at the head of an eroding gully (with headcuts) were identified on the Taylor 037-240-41 parcel.

4.2 Prioritization of Restoration Opportunities

Erosion features on the offsite mitigation parcels that are contributing excessive sediment and causing water quality degradation to channels and streams in Little Lake Valley have been prioritized for restoration as follows:

- The erosion feature contributes significantly to water quality degradation, as related to the contribution of excessive sediment from erosion of native soil.
- The erosion feature can be restored without impacts to existing sensitive biological resources, including special-status plants and jurisdictional wetlands.
- The erosion feature can be restored in coordination with planned mitigation actions.
- The erosion feature can be restored using restoration approaches that are very constructable (ease of constructability and access to the feature is direct).
- The erosion feature's restoration will create a synergy, as related to combining site-specific restoration opportunities to create a major effect at a cumulative level.

4.2.1 Restoration Sites

Priority status is given to particular erosion sites because restoration actions at these sites can immediately address many of the priority items above. The following are considered to be the top five priority erosion sites:

1. Ford 108-010-06_1, 108-010-06_2, and 108-010-06_3 (Figure 4-1; these individual eroding bank sites are grouped together because of their close proximity and their identical nature)
2. Frost 108-070-04 Complex (Figure 4-2; there are five headcut sites located in the northeast corner of the parcel: three are instream headcut sites [108-070-04_1, 108-070-04_2, and 108-070-04_5] and two are upland headcut sites [108-070-04_3 and 108-070-04_4])
3. Lusher 108-030-04_2 (Figure 4-3; headcut)
4. Lusher 108-030-04_3 (Figure 4-3; headcut)
5. Benbow 108-040-13_3 (Figure 4-4; headcut)

The potential restoration actions and designs presented below are conceptual do not represent the only restoration approach for the erosion sites. Rather, they are presented as typical and generalized treatment examples for the types of erosion sites identified during the surveys. Prior to restoration planning, each erosion site should be re-visited and various site-specific treatment alternatives should be developed.

4.2.1.1 Ford 108-010-06_1, 108-010-06_~~1~~2, and 108-010-06_3

Problem/Need Statement

All three erosion sites (Figure 4-1) are contributing excessive sediment and causing water quality degradation in Outlet Creek. Lawler (1992) groups unstable banks into three categories:

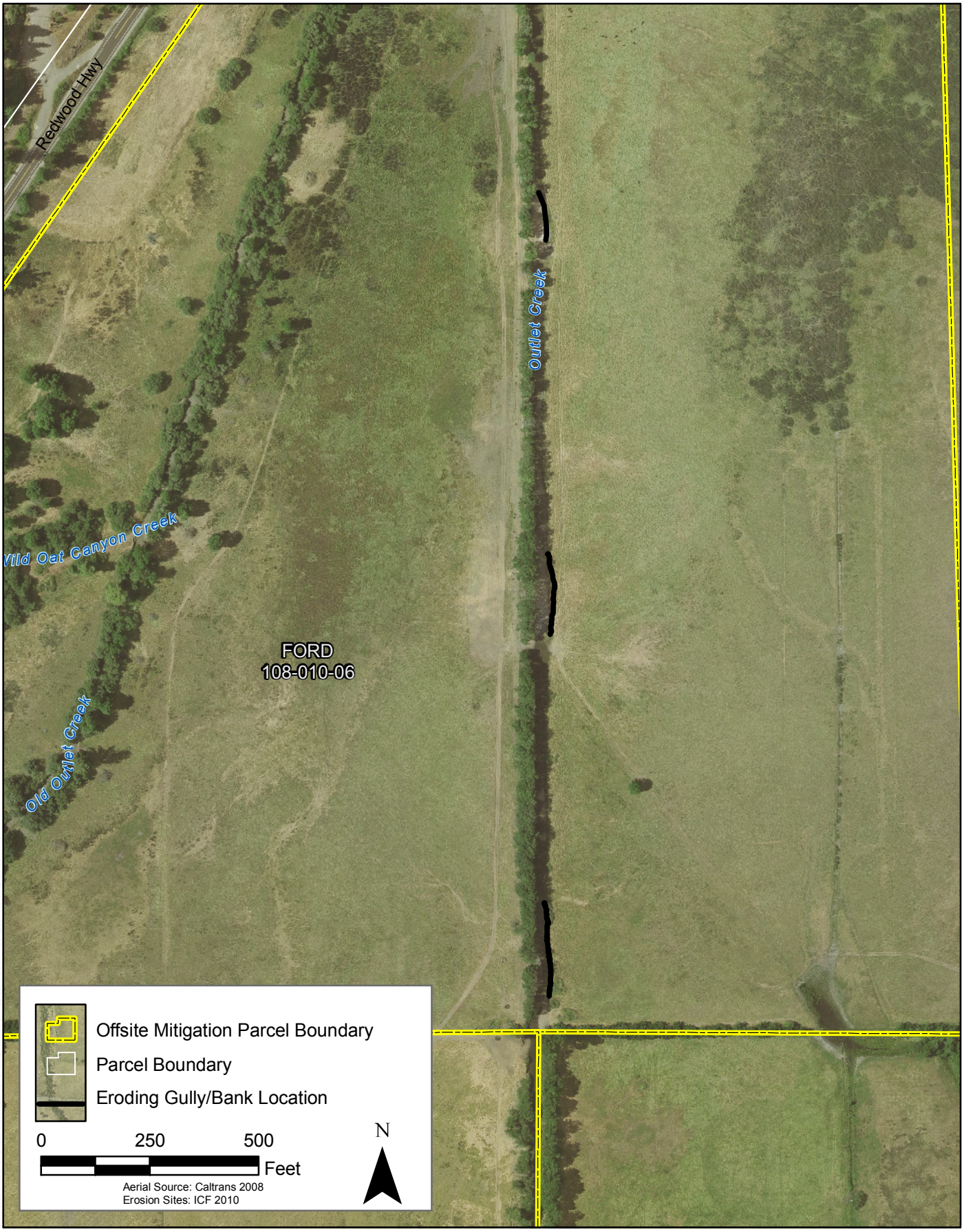


Figure 4-1
Ford (APN 108-010-06)
Erosion Site Locations

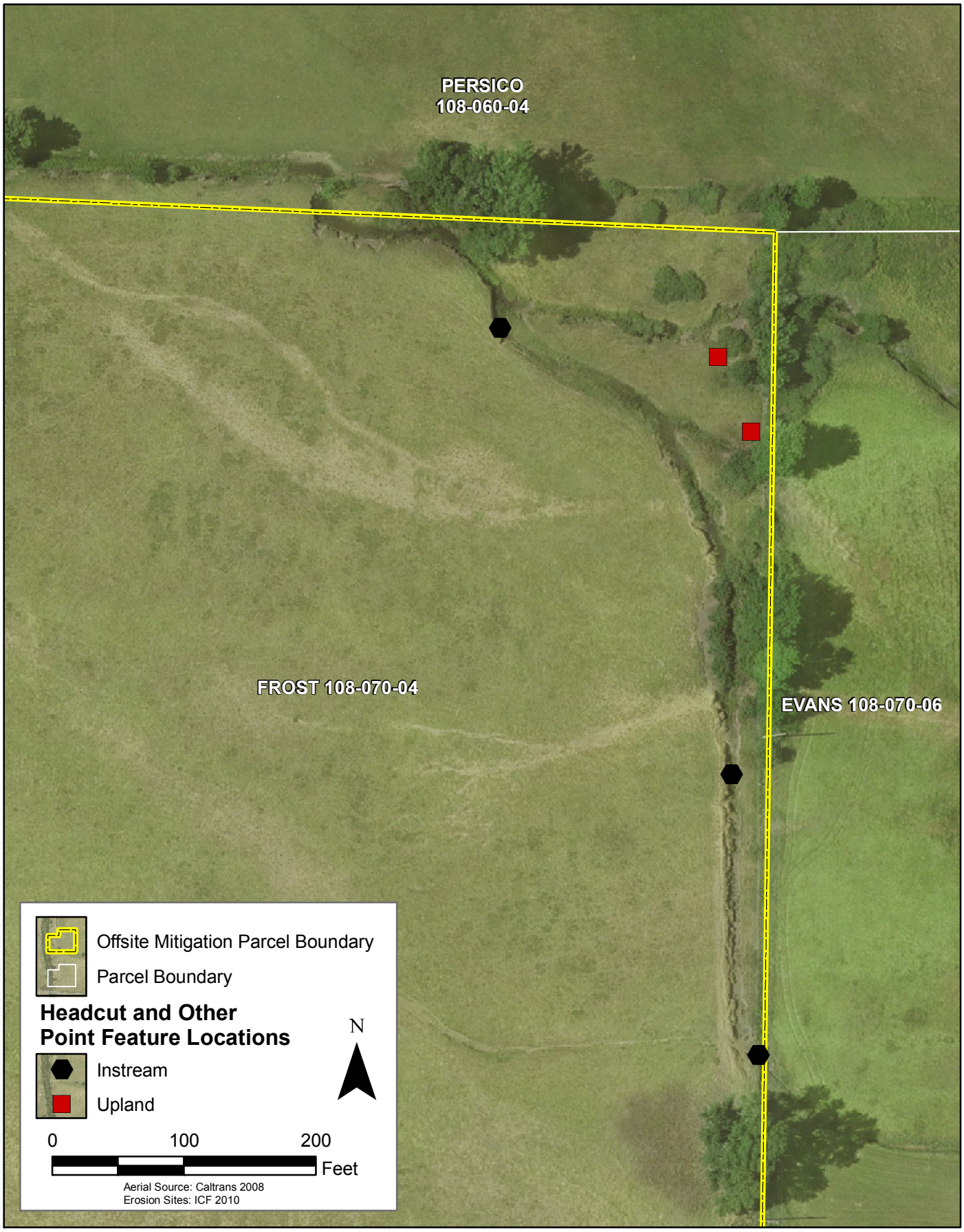


Figure 4-2
Frost (APN 108-070-04) Complex
Erosion Site Locations

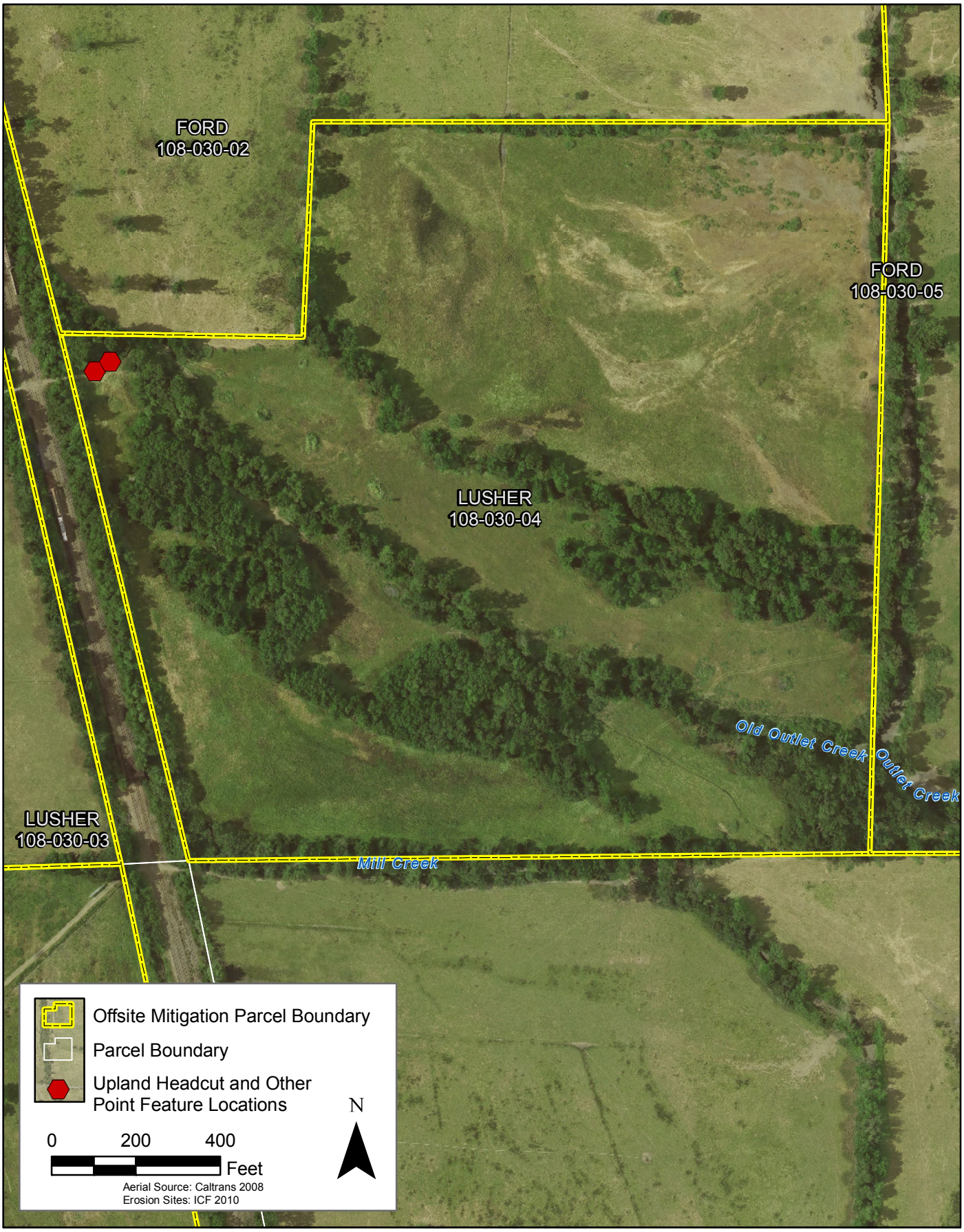


Figure 4-3
Lusher (APN 108-030-04)
Erosion Site Locations

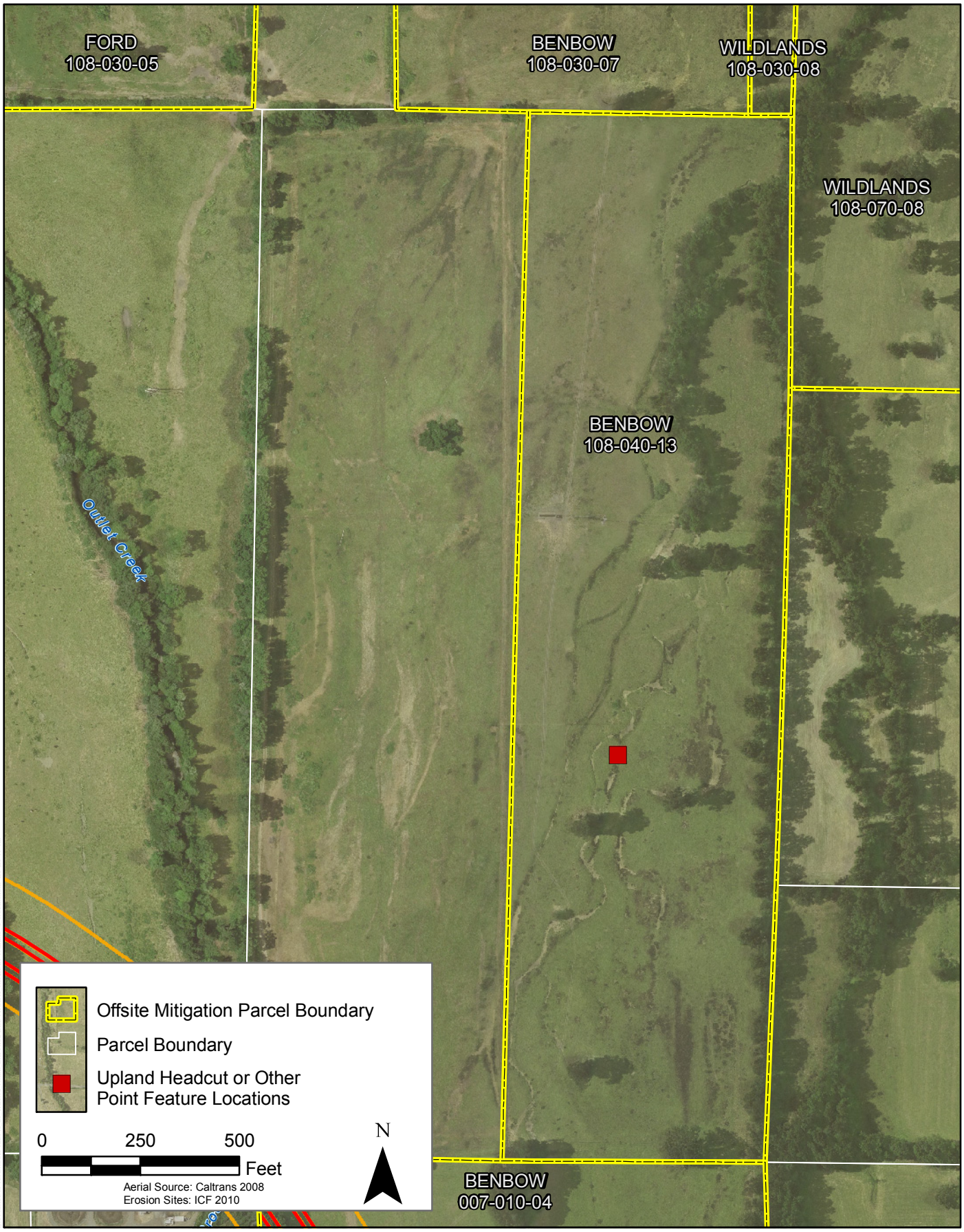


Figure 4-4
Benbow (APN 108-040-13)
Erosion Site Locations

weakening, fluvial erosion, and mass-failure processes. Weakening processes erode or prepare banks for further erosion (e.g., storm events that dislodge individual particles on the banks). Fluvial erosion processes (i.e., erosion by water) are related to the energy of flow (i.e., boundary shear stress). Mass-failure processes cause gravitational collapse of all or part of the bank. Weakening, fluvial, and mass-failure processes are acting together at these sites on the Ford 108-010-06 parcel.

All three erosion sites are remarkably similar in that they have unstable, mostly unvegetated right (i.e., east) cutbanks created by convergence flow on the riffle/gravel bar complex on the opposite side of the cutbank. The banks are approximately 6 feet tall from the toe of the bank. Channel flows from upstream, combined with direct trampling by livestock, have likely initiated these erosion features. All three erosion sites appear unstable, as evidenced by active slumping (Appendix A-9).

Impacts to Existing Sensitive Biological Resources

The floodplain adjacent to each erosion site is considered potential habitat for Baker's Meadowfoam, with known occurrences further away from Outlet Creek (Caltrans 2010a). However, no Baker's Meadowfoam was observed on the streambanks/levees adjacent to the creek. Nonetheless, potential construction staging areas and access routes would need to avoid Baker's Meadowfoam plants. Wet meadow and mixed marsh are the existing jurisdictional wetlands adjacent to the creek. Standard Best Management Practices (BMPs) would reduce temporary construction impacts to a less-than-significant level.

Desired Condition and Construction Methods

Bank stabilization can be divided into two main categories: biotechnical stabilization and hardscaping. Biotechnical stabilization involves the use of natural materials (e.g., vegetation and large woody material) to stabilize banks. Often, these natural materials are placed on the unstable bank once the bank has been re-graded to a less steep slope that will decrease the likelihood of erosion due to mass failure. Hardscaping involves the use of rip-rap, concrete, gabions, and other hard materials for stabilizing banks. These methods are not as environmentally sensitive as biotechnical stabilization methods and typically are only used when biotechnical stabilization methods are not feasible.

Construction methods for bank stabilization are site-specific. Methods may include:

- revegetation of the stream bank (biotechnical)
- re-grading of the stream bank followed by revegetation (biotechnical)
- stabilizing the bottom (i.e., toe) of the stream bank with natural materials (biotechnical) or hard materials (hardscaping)
- stabilizing the entire stream bank with hardscape (hardscaping)

Figure 4-5 illustrates a typical eroding bank treatment that could be applied to these erosion sites. In brief, the east bank could be re-graded to produce a gentler vegetated slope, and a low riparian bench could be constructed to dissipate the energy of high flows. The contact point between the toe of the east bank and the low riparian bench could be secured and stabilized using a rootwad

bundle. This rootwad bundle would also hypothetically promote localized scour, which is a normal and beneficial component of a cutbank area.

Access, Scheduling, and Cost

The easiest access to these erosion sites is from the north and east along Highway 101. Bank stabilization activities should occur during late summer or early fall when water levels in the creek are at their lowest. Cost associated with bank stabilization is approximately $500 per linear foot. However, cost varies significantly because of accessibility, the type of bank material, and the specific methods of construction.

4.2.1.2 Frost Complex (108-070-04_1, 108-070-04_2, 108-070-04_3, 108-070-04_4, and 108-070-04_5)

Problem/Need Statement

All five erosion sites in the Frost Complex (Figure 4-2) are contributing excessive sediment and causing local water quality degradation. Sediment from these erosion sites enters an unnamed tributary that eventually connects to Berry Creek (under high flows). As such, sediment from these sites enters an active channel. The potential contribution of sediment from each site (especially 108-070-04_1) appears to be significant. Concentrated flows from the swales upstream, combined with direct trampling by livestock, have likely initiated these erosion features. All five erosion sites appear unstable.

Additionally, the headcuts have led to deepened incised pools in their respective downstream directions. This incision is detrimental for the following reasons:

- Channel incision leads to a deepened channel. A deepened channel limits channel-floodplain interaction, thereby increasing such variables as unit stream power (Brizga and Finlayson 1990). This increase in unit stream power further increases the instability of the streambanks locally (and is possibly responsible for the erosion observed at Benbow 007-020-03_1), as all the energy of the streamflow is contained within the bed and banks of the channel and does not have the opportunity to dissipate onto the floodplain. Limited channel-floodplain interaction also restricts ecological interactions between the channel and the floodplain (Doyle et al. 2000).
- The incised nature of this reach increases the flashy response of hydrologic events, where winter precipitation events dominate geomorphic effectiveness (Wolman 1988).
- Channel habitat units, such as pool-riffle sequences, are rare in incised channels such as the unnamed Category III stream that the erosion sites are located on, and those that do exist do so for only limited time intervals (Shields et al. 1998).
- The increased depth of flow associated with incision, combined with an increased flashy regime, results in bed armoring and a decreased frequency of bed mobilization (Doyle et al. 2000).
- Eroded material from unstable streambanks is added to the channel bed of the creek (often in the form of sandy, lateral bars), decreasing channel capacity and exacerbating flooding.

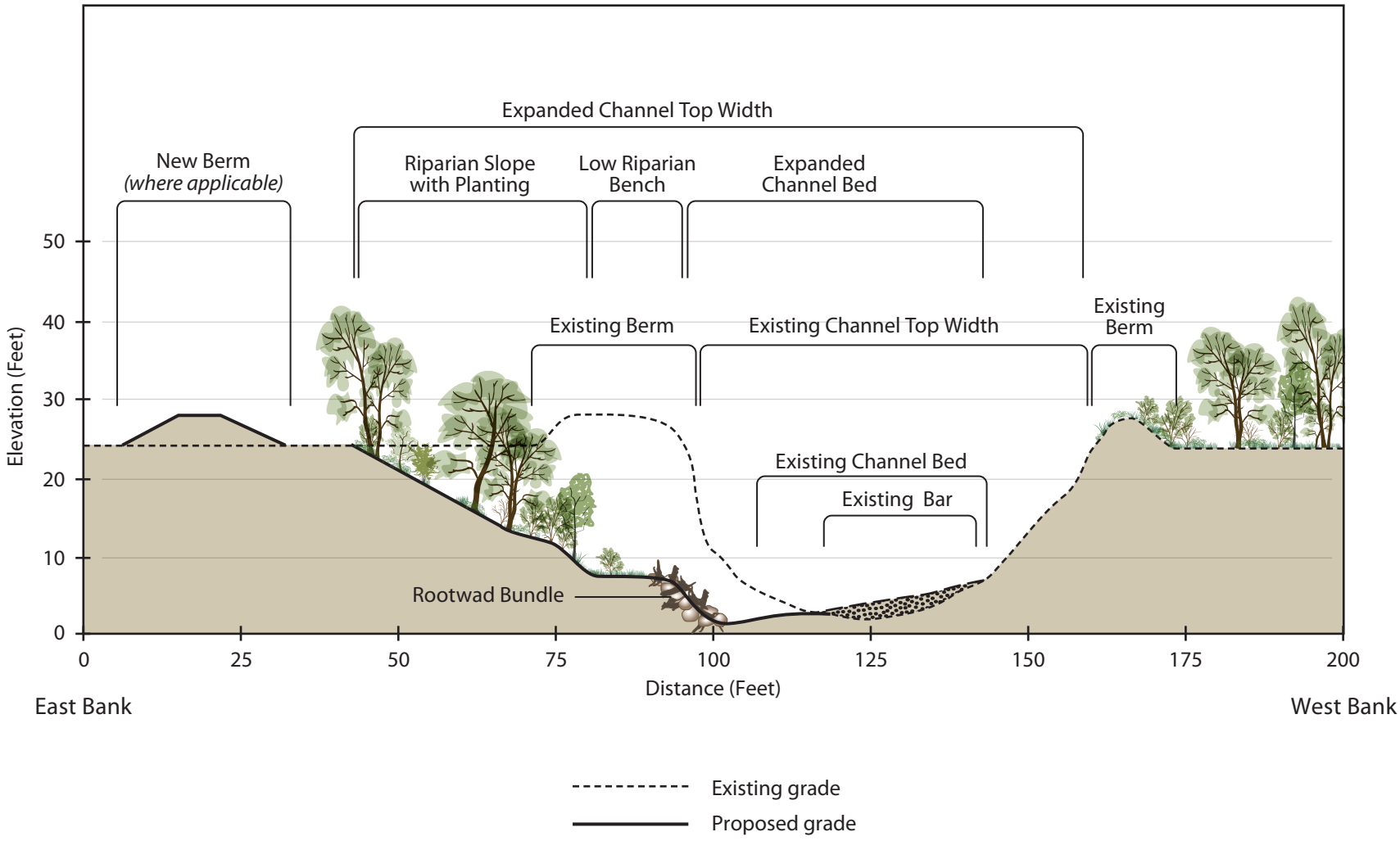


Figure 4-5
Typical Eroding Bank Treatment

Impacts to Existing Sensitive Biological Resources

No special-status plants (i.e., (Baker's Meadowfoam and North Coast semaphore grass) have been observed on or adjacent to the erosion sites (Caltrans 2010a). The erosion sites are located in the vicinity of a sparsely-vegetated, Oregon ash riparian woodland. Some loss of these riparian species could be expected due to restoration activities and appropriate mitigation strategies would need to be developed to offset these impacts. Standard BMPs would reduce temporary construction impacts to a less-than-significant level.

Desired Condition and Construction Methods

Similar to bank stabilization, headcut stabilization can be divided into two main categories: biotechnical stabilization and hardscaping. Biotechnical stabilization involves the use of natural materials (e.g., vegetation, keyed-in logs, and sod plugs) to stabilize headcuts. Often, these natural materials are placed in the headcut itself or downstream of the headcut to promote stability. Hardscaping involves the use of constructed step-pool structures for stabilizing headcuts. This hardscaping is generally as environmentally sensitive as biotechnical stabilization methods and is typically employed when channels and gullies have similar channel bottom and bank substrates to that of the step-pool structures (i.e., gravels and cobbles).

Construction methods for headcut stabilization are site-specific. Methods may include:

- Re-grading (i.e., laying back) and re-vegetating the headcut in the upstream direction and placing native soil and/or sod plugs in the downstream direction (biotechnical, referred to as the "Soil Fill Placement Method")
- Filling the downslope area of the headcut with native soil and/or sod plugs and incorporating (i.e., keying in) logs into the body of the headcut itself (biotechnical, referred to as the "Log Step-Pool Design")
- Placing native soil and incorporating step-pool structures in the downstream direction (biotechnical/hardscaping, referred to as the "Rock Step-Pool Design")

Figure 4-6 illustrates a typical headcut treatment that could be applied to these erosion sites ("Rock Step-Pool Design"). In brief, the area downstream of the headcut could be filled with native soil and rock step-pool structures could be incorporated throughout the length of the affected area. The rock step-pool structures would mimic a natural step-pool in an undisturbed environment, and the erosive force of the water in the swale, channel, or gully would be readily dissipated. Furthermore, the undercutting action that leads to headward migration in a typical headcut would be minimized due to the stepped nature of the design.

Figure 4-6 shows three separate rock step-pool structures. However, the amount of rock step-pool structures depends on the drop of the headcut and the average width and total length of the affected area. For the headcuts in the Frost Complex, the lengths of the affected areas (the entrenched pools at the base of the headcuts) range from approximately 20 to 75 feet. Accordingly, and depending on the drop of the headcut, more rock step-pool structures would be required for longer affect areas. As a general rule, rock step-pool structures are employed every 5 to 7 channel widths as measured in a non-disturbed portion of the stream upstream or downstream of the headcut. For example, if the width of the channel in an area not affected by

the headcut is 3 feet, then rock-step pools should be incorporated every 15 to 21 feet downstream of the headcut.

Access, Scheduling, and Cost

The easiest access to these erosion sites is from the south along Hearst Road. Headcut stabilization activities should occur during later summer or early fall when water levels in the channels are at their lowest or the channels are dry. Cost associated with headcut stabilization is approximately $100 per linear foot. However, cost varies because of accessibility, the types of material used, and the specific methods of construction.

4.2.1.3 Lusher 108-030-04_2

Problem/Need Statement

The Lusher 108-030-04_2 erosion site (Figure 4-3) is contributing excessive sediment and causing local water quality degradation. Sediment from 108-030-04_2 enters an unnamed tributary that eventually connects to Old Outlet Creek (under high flows). As such, sediment from this site enters an active channel. Concentrated flows from the swale upstream, combined with direct trampling by livestock, have likely initiated 108-030-04_2. This erosion site appears unstable.

Impacts to Existing Sensitive Biological Resources

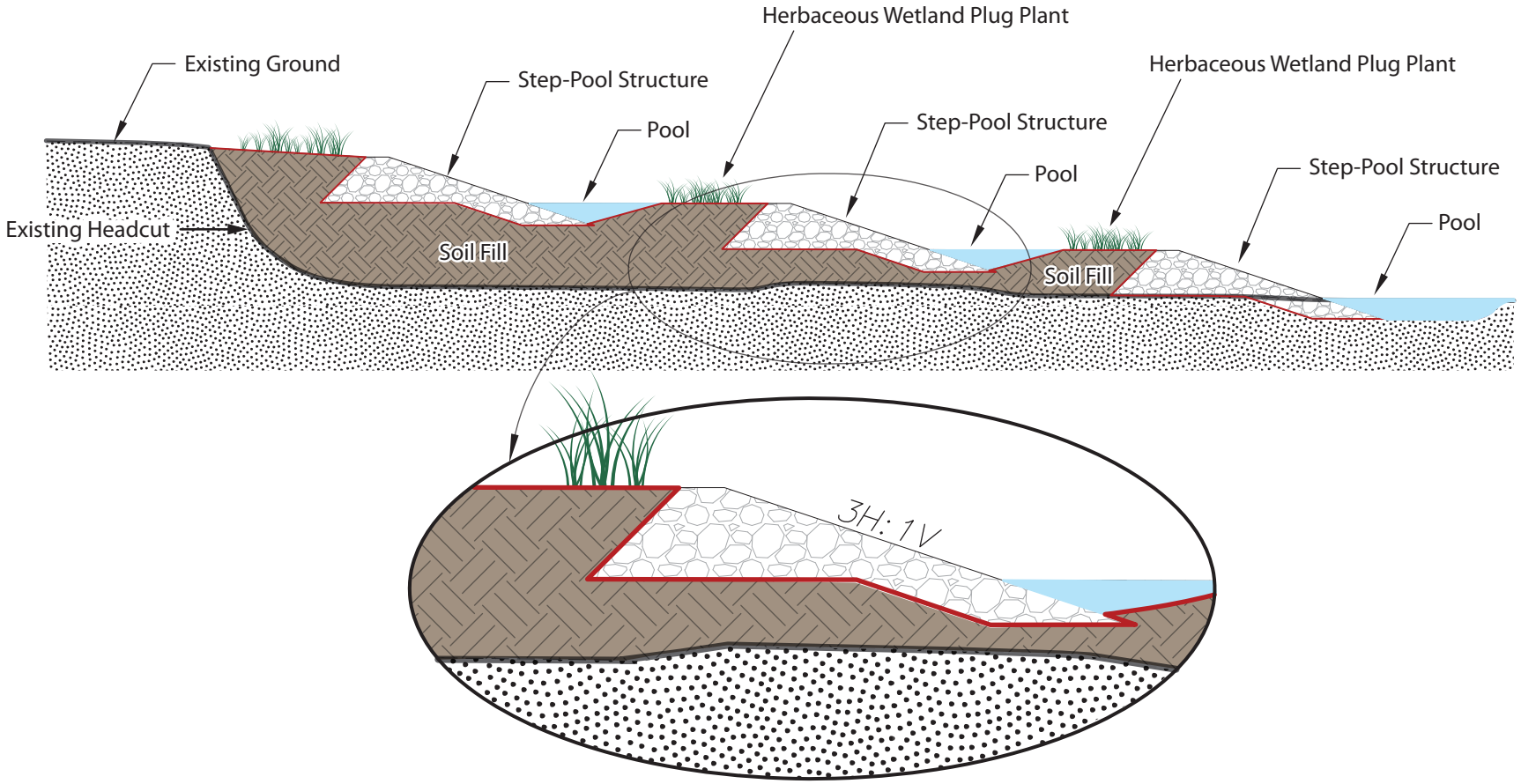
No special-status plants (i.e., (Baker's Meadowfoam and North Coast semaphore grass) have been observed on or adjacent to the erosion site (Caltrans 2010a). Erosion site 108-030-04_2 is located in well-vegetated mixed riparian woodland, and the areas around the site are a mixture of well-vegetated oak woodland grassland, Oregon ash riparian woodland, mixed riparian woodland, and wet meadow. No significant loss or disruption to these habitats is expected because of the isolated location and accessibility of the site. Standard BMPs would reduce temporary construction impacts to a less-than-significant level.

Desired Condition and Construction Methods

Construction methods for headcut stabilization at Lusher 108-030-04_2 are similar to those described above for the Frost Complex headcuts. A Rock Step-Pool Design would be appropriate for this site. Figure 4-6 shows three separate rock step-pool structures. For Lusher 108-030-04_2, one or two rock step-pool structures would be required based on the headcut and surrounding channel dimensions.

Access, Scheduling, and Cost

The easiest access to this erosion site is from the west along Highway 101, where an access road leads to the old railroad crossing between Old Outlet Creek and Mill Creek. The erosion site is few hundred feet away from the railroad tracks. Headcut stabilization activities should occur during the late summer or early fall when water levels in the channels are at their lowest or the channels are dry. Cost associated with headcut stabilization is approximately $100 per linear foot. However, cost varies because of accessibility, the types of material used, and the specific methods of construction.



Notes:

1. Depth of headcut and slope are not to scale. Rock step pools will be designed using this method and adjusted based on site specific conditions.
2. Rock fill and soil to be gathered from adjacent upland areas.
3. Soil fill will be seeded and planted.

NOT TO SCALE

Figure 4-6
Typical Headcut Treatment

4.2.1.4 Lusher 108-030-04_3

Problem/Need Statement

The Lusher 108-030-04_3 erosion site (Figure 4-3) is contributing excessive sediment and causing local water quality degradation. Sediment from 108-030-04_3 enters an unnamed tributary that eventually connects to Old Outlet Creek (under high flows). As such, sediment from this site enters an active channel. Concentrated flows from the swale upstream, combined with direct trampling by livestock, have likely initiated 108-030-04_3. This erosion site appears unstable.

Impacts to Existing Sensitive Biological Resources

No special-status plants (i.e., (Baker's Meadowfoam and North Coast semaphore grass) have been observed on or adjacent to the erosion site (Caltrans 2010a). Erosion site 108-030-04_3 is located in well-vegetated mixed riparian woodland, and the areas around the site are a mixture of well-vegetated oak woodland grassland, Oregon ash riparian woodland, mixed riparian woodland, and wet meadow. No significant loss or disruption to these habitats is expected due to the isolated location and accessibility of the site. Standard BMPs would reduce temporary construction impacts to a less-than-significant level.

Desired Condition and Construction Methods

Construction methods for headcut stabilization at Lusher 108-030-04_3 are similar to those described above for the Lusher 108-030-04_2 site. A Rock Step-Pool Design would be appropriate for this site. Figure 4-6 shows three separate rock step-pool structures. For Lusher 108-030-04_3, one or two rock step-pool structures would be required based on the headcut and surrounding channel dimensions.

Access, Scheduling, and Cost

The easiest access to this erosion site is from the west along Highway 101, where an access road leads to the old railroad crossing between Old Outlet Creek and Mill Creek. The erosion site is few hundred feet away from the railroad tracks. Headcut stabilization activities should occur during the late summer or early fall when water levels in the channels are at their lowest or the channels are dry. Cost associated with headcut stabilization is approximately $100 per linear foot. However, cost varies because of accessibility, the types of material used, and the specific methods of construction.

4.2.1.5 Benbow 108-040-13_3

Problem/Need Statement

The Benbow108-040-13_3 erosion site (Figure 4-6) is contributing excessive sediment and causing local water quality degradation. However, sediment derived this site enters a Category III abandoned/discontinuous channel that runs along the eastern edge of the parcel. This watercourse appears to have once been connected to Davis Creek, but no longer has an active hydrologic connection to it. As such, sedimentation from this site enters an active sediment sink (the Category III abandoned/discontinuous channel).

Nonetheless, the potential contribution of sediment from this site appears to be significant, as this is the largest headcut observed on any of the offsite mitigation parcels during the surveys. Concentrated flows from the swales upstream, combined with direct trampling by livestock, have likely initiated this erosion feature. This erosion site appears unstable.

Impacts to Existing Sensitive Biological Resources

The area adjacent to the site is considered potential habitat for Baker's Meadowfoam, with one known occurrence to the northeast (Caltrans 2010a). However, no Baker's Meadowfoam was observed on the site itself, and no North Coast Semaphore grass is known to exist in the vicinity of the site. Nonetheless, potential construction staging areas and access routes would need to avoid any Baker's Meadowfoam plants. Wet meadow and swale are the existing jurisdictional wetlands adjacent to the site. Standard BMPs would reduce temporary construction impacts to a less-than-significant level.

Desired Condition and Construction Methods

Construction methods for headcut stabilization at Benbow108-040-13_3 are similar to those described above for the headcuts in the Frost Complex. A Rock Step-Pool Design would be appropriate for this site. Figure 4-6 shows thee separate rock step-pool structures. For Benbow108-040-13_3, two rock step-pool structures would be required based on the headcut and surrounding channel dimensions.

Access, Scheduling, and Cost

The easiest access to this erosion site is from the south along Hearst Road. Headcut stabilization activities should occur during the late summer or early fall when the channel is dry. Cost associated with headcut stabilization is approximately $100 per linear foot. However, cost varies because of accessibility, the types of material used, and the specific methods of construction.

4.2.2 Restoration Sites on the Taylor Parcels

Although not identified by the assessment as a priority for restoration, erosion sites on the Taylor parcels provide a unique opportunity to limit sedimentation from an upland environment and could be undertaken as part of general maintenance efforts based on the simplicity of the restoration methods required to address the erosion sites.

4.2.2.1 Taylor Complex 037-221-68_1 through 037-221-68_7

The seven erosion sites that comprise the Taylor Complex (Figure 3-2) are spaced at regular intervals along Goat Rocks Road. Culverts on either side of the road have created headcuts upslope of the road, and scour areas downslope of the road. The headcuts could easily be addressed using the same treatments for headcuts previously described but at a smaller scale (use of hand tools and local materials such as small boulders located near the erosion sites). For the scour areas, appropriate dissipation of energy with placement of rocks and/or extending the culvert length and reconfiguring the outlet of the culvert to meet the channel bed on the downslope would eliminate or reduce the erosive power of the water in the culvert.

The areas of and adjacent to each erosion site are located in a moderately-vegetated upland forest setting. However, all work would occur in the vicinity of Goat Rocks Road and standard BMPs would reduce temporary construction impacts to a less-than-significant level. Access to these erosion sites is from Goat Rocks Road on the southern end of the parcel (right off the Reynolds Highway). Site stabilization activities should occur during the summer and fall when water levels in the channels, gully, and culverts are at their lowest. Cost associated with site stabilization is approximately $1,000 per site if only headcut repair and boulder placement were to occur. The cost would increase if culvert extension/reconfiguration were to occur. Restoration activities on the Taylor Complex could be performed by local landowners with minimal need for agency permitting.

4.2.2.2 Taylor 037-221-68_8 and 037-221-68_9

The Taylor 037-221-68_8 erosion site consists of a headcut on an eroding gully in an open area near Goat Rocks Road. The headcut could be addressed using the same treatments for the headcuts previously described. However, the eroding gully would benefit from the incorporation of grade control structures at specific intervals throughout its length, and the banks should be re-graded and planted with native vegetation. The Taylor 037-221-68_9 erosion site consists of a headcut at the edge of small livestock pond. The headcut could be addressed using the same treatments for the headcuts described above; however, it is recommended that an approximately 3 foot high berm be constructed around the livestock pond so that once the headcut is repaired, it would not have further opportunity to compromise the stability of the pond outlet and surrounding areas.

The areas of and adjacent to each of these two erosion site are located in a sparsely-vegetated upland forest setting. The sites are close to Goat Rocks Road and standard BMPs would reduce temporary construction impacts to a less-than-significant level. Access to these erosion sites is from Goat Rocks Road on the southern end of the parcel (right off the Reynolds Highway). Site stabilization activities should occur during the summer and fall when water levels in the gully and the livestock pond are at their lowest. Cost associated with site stabilization for Taylor 037-221-68_8 is approximately $100 per linear foot for the headcut. Cost associated with the eroding gully is approximately $500 per linear foot plus approximately $1,000 per grade control structure. Cost associated with site stabilization for Taylor 037-221-68_9 is approximately $100 per linear foot, plus approximately $1,000 to build the berm. However, cost varies because of accessibility, the types of material used, and the specific methods of construction.

4.2.2.3 Taylor 037-240-41

The same methods previously described could also be used to address the two slump and headcut and two headcut erosion sites on the Taylor 037-240-41 parcel associated with the PG&E access road. The areas of and adjacent to each of these four erosion sites are located in a sparsely-vegetated upland forest setting. The sites are all on the PG&E access road and standard BMPs would reduce temporary construction impacts to a less-than-significant level. Access to these erosion sites is from the main access road on the Taylor 037-240-41 parcel (right off the Reynolds Highway). Site stabilization activities should occur during the summer and fall when water levels at their lowest. Cost associated with site stabilization is approximately $100 per

linear foot. However, cost varies because of accessibility, the types of material used, and the specific methods of construction.

Chapter 5 References

5.1 Printed References

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Dan Schiff	GIS Analyst
John Durnan	Graphic Artist
Darle Tilly	Technical Editor
Corrine Ortega	Publications Specialist

Appendix A Digital Images of Erosion Sites, By Parcel

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Appendix A-1. Benbow 108-020-06_1

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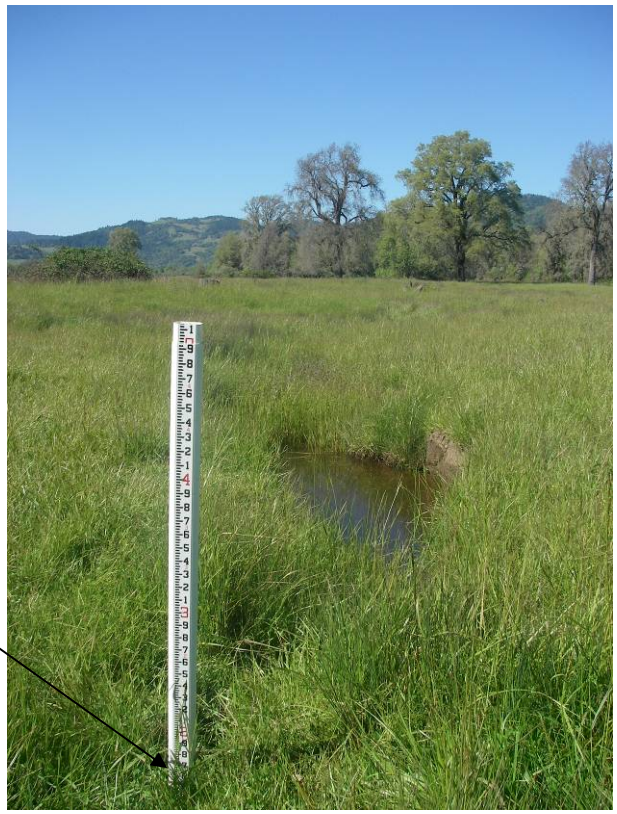
Appendix A-3. Benbow 108-040-13_1


pothole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Appendix A-6. Benbow 108-040-13_4



Appendix A-7. Benbow 007-020-03_I





Appendix A-8. Benbow 007-020-03_2




active
slumping





Appendix A-10. Ford 108-010-06_2





Appendix A-11. Ford 108-010-06_3



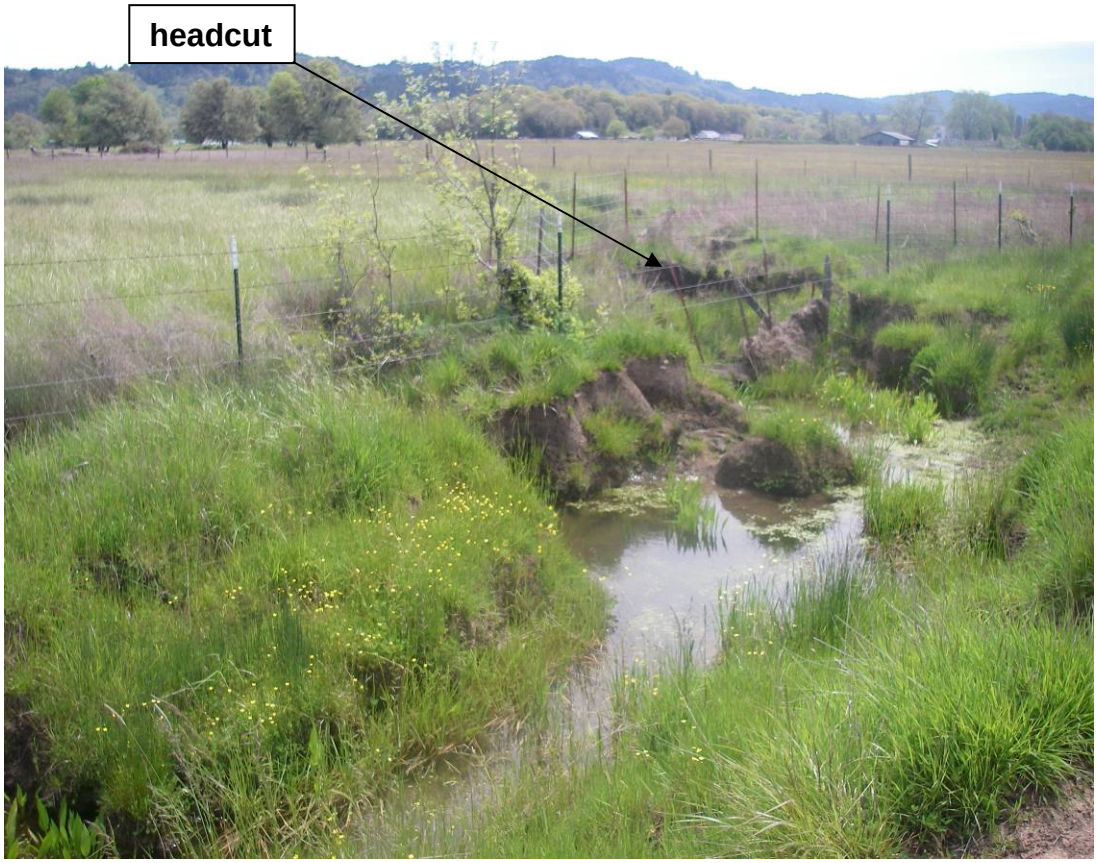


Appendix A-12. Ford 108-020-04_1





Appendix A-13. Ford 108-030-05_1





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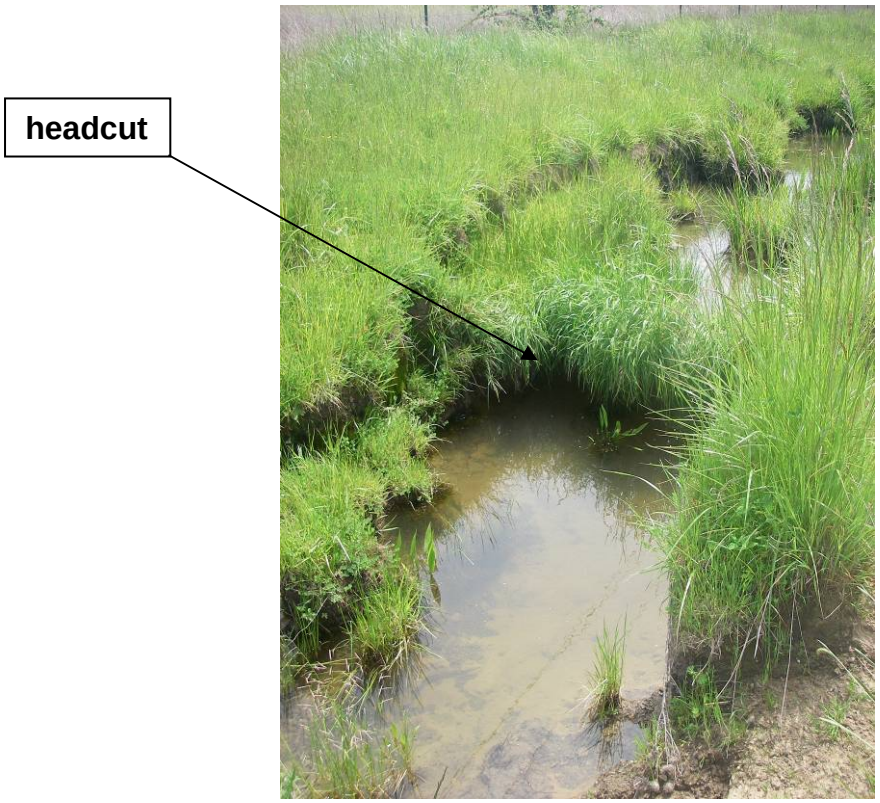
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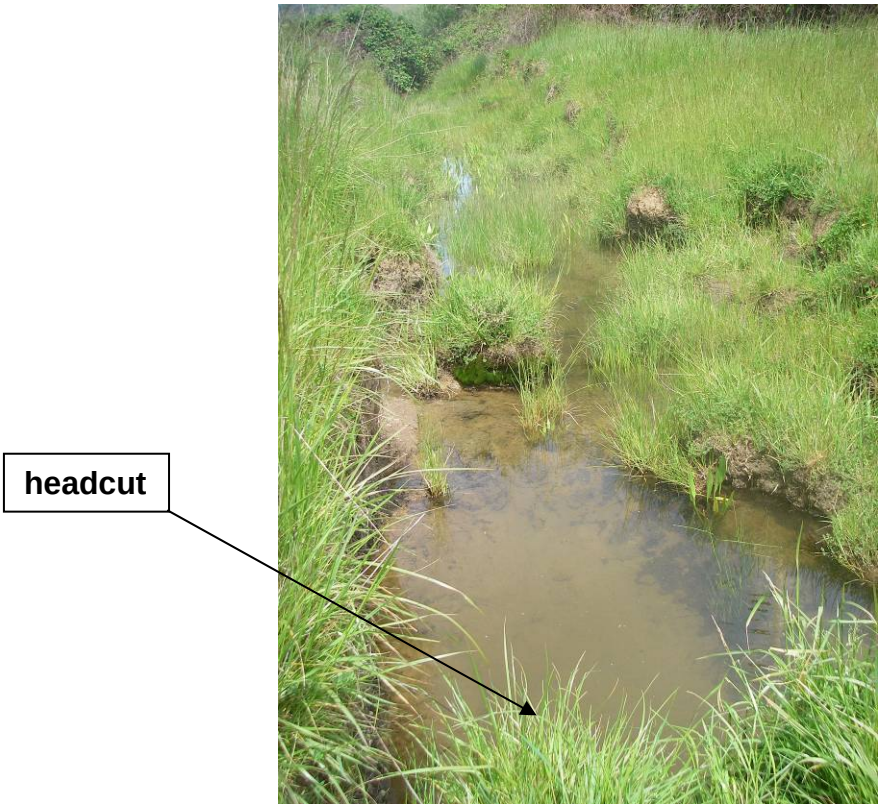
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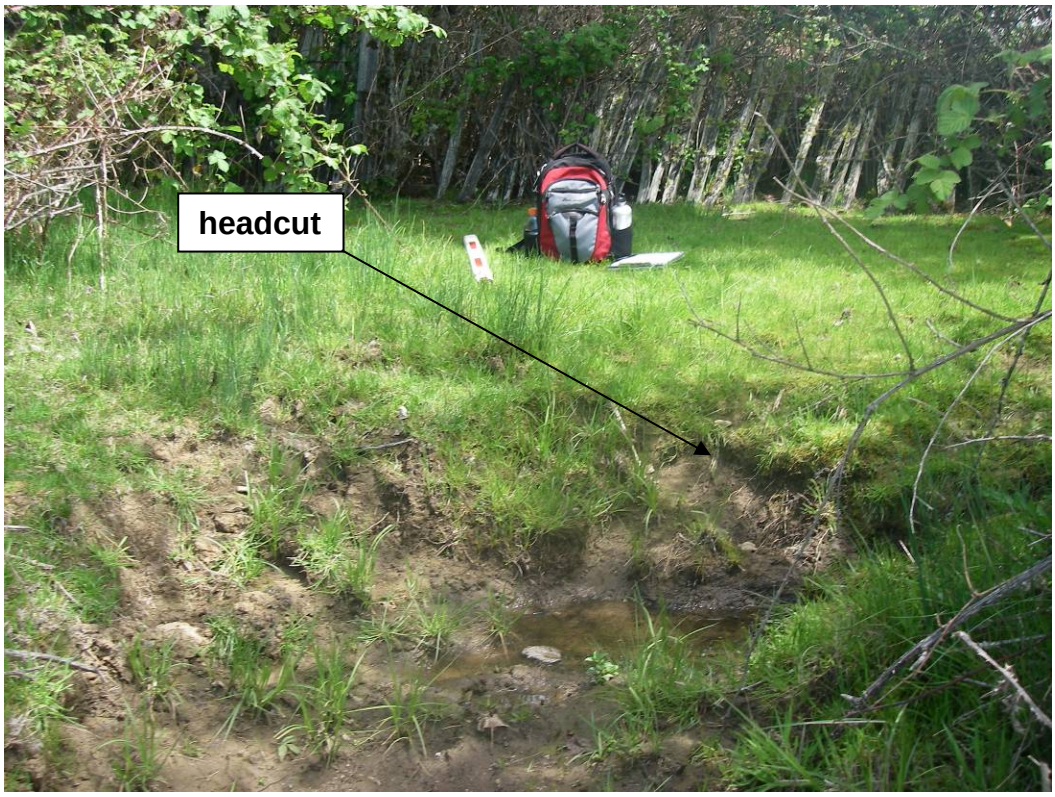
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Appendix A-17. Frost 108-070-04_4





Appendix A-18. Frost 108-070-04_5


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Appendix A-21. Lusher 108-030-04_1





Appendix A-22. Lusher 108-030-04_2


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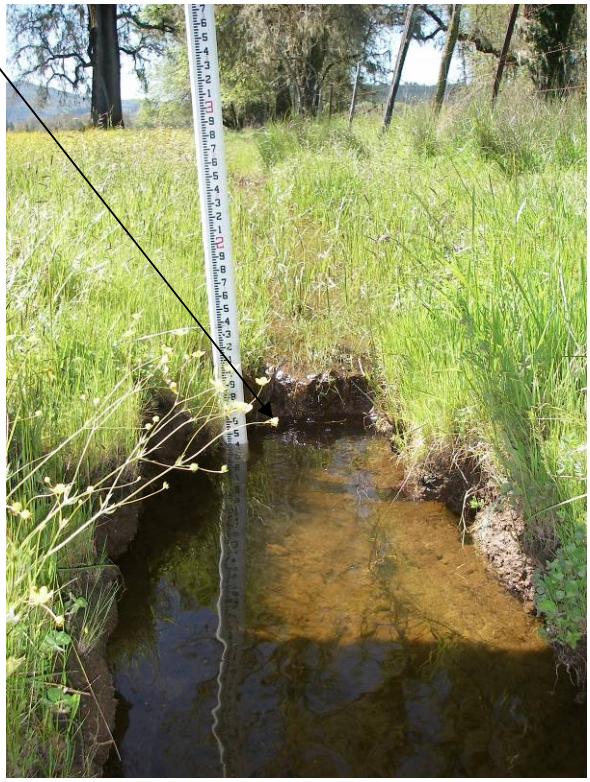


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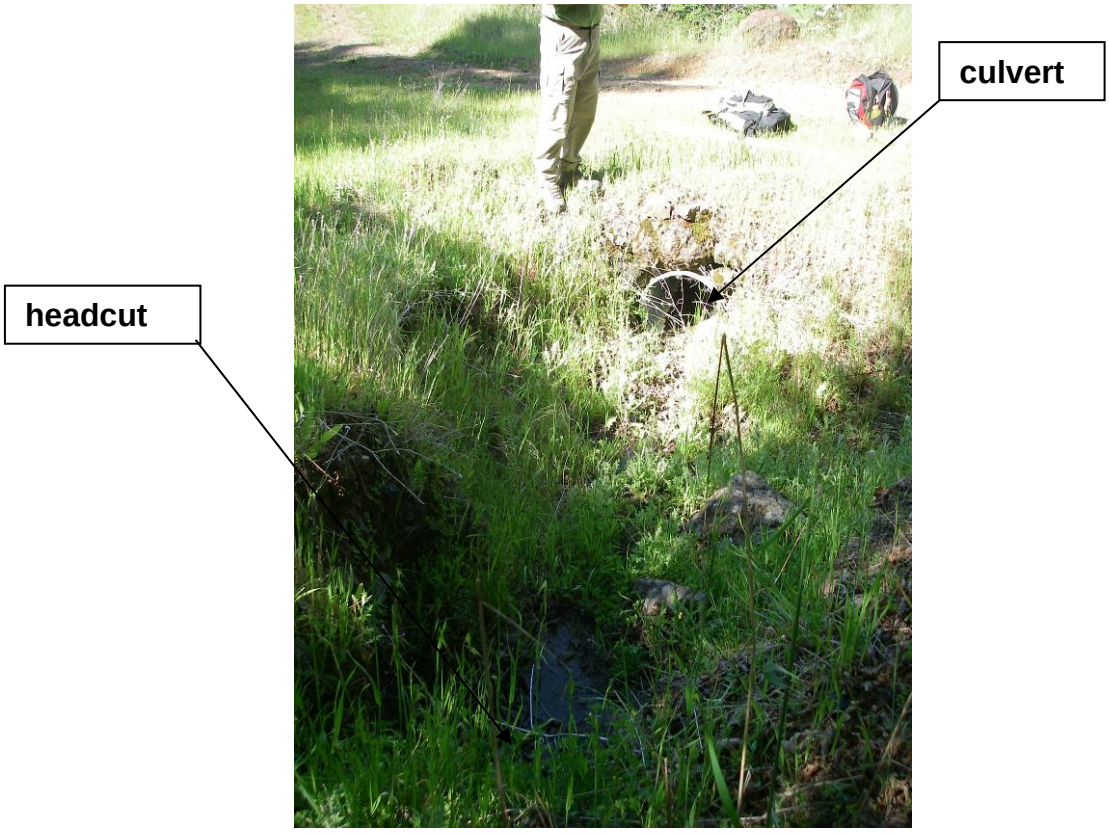
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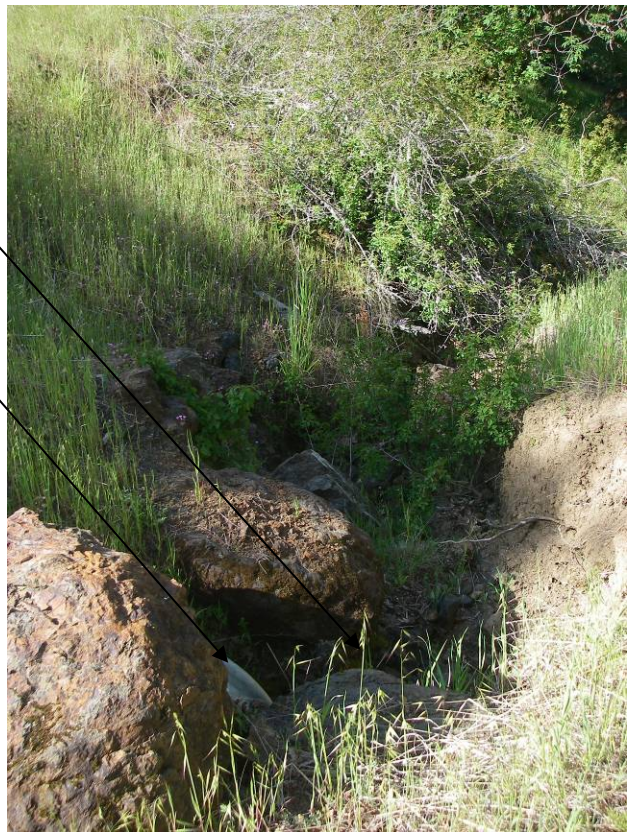
culvert
scour area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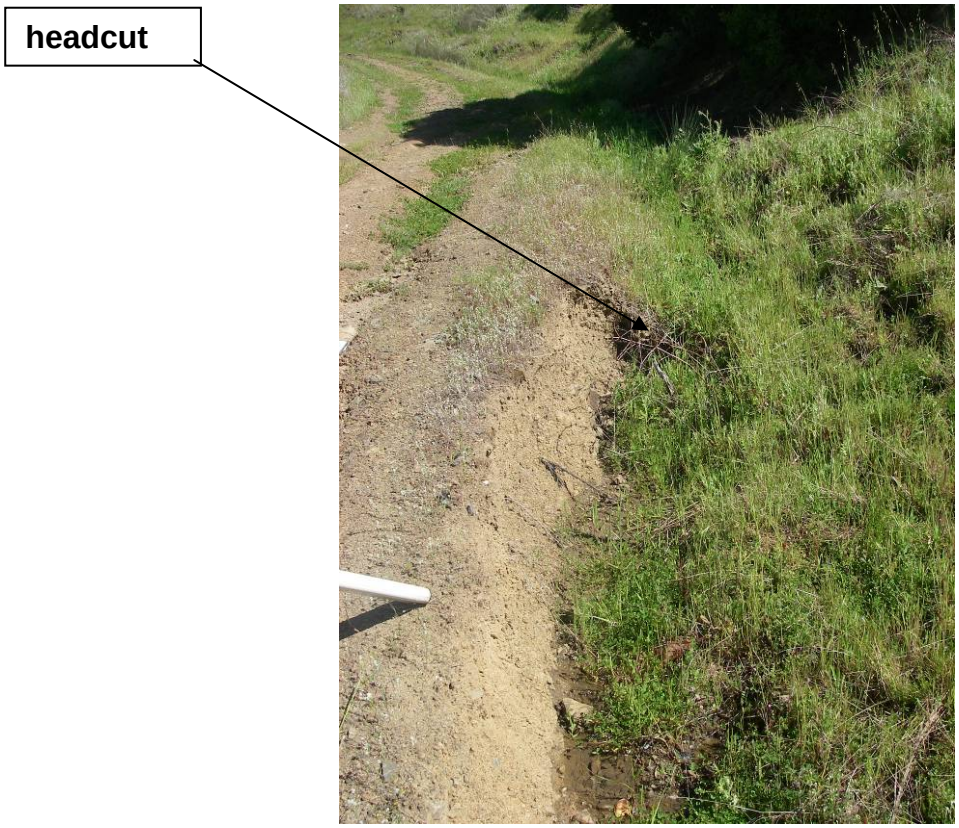




Appendix A-27. Taylor 037-221-68_4

culvert

scour area

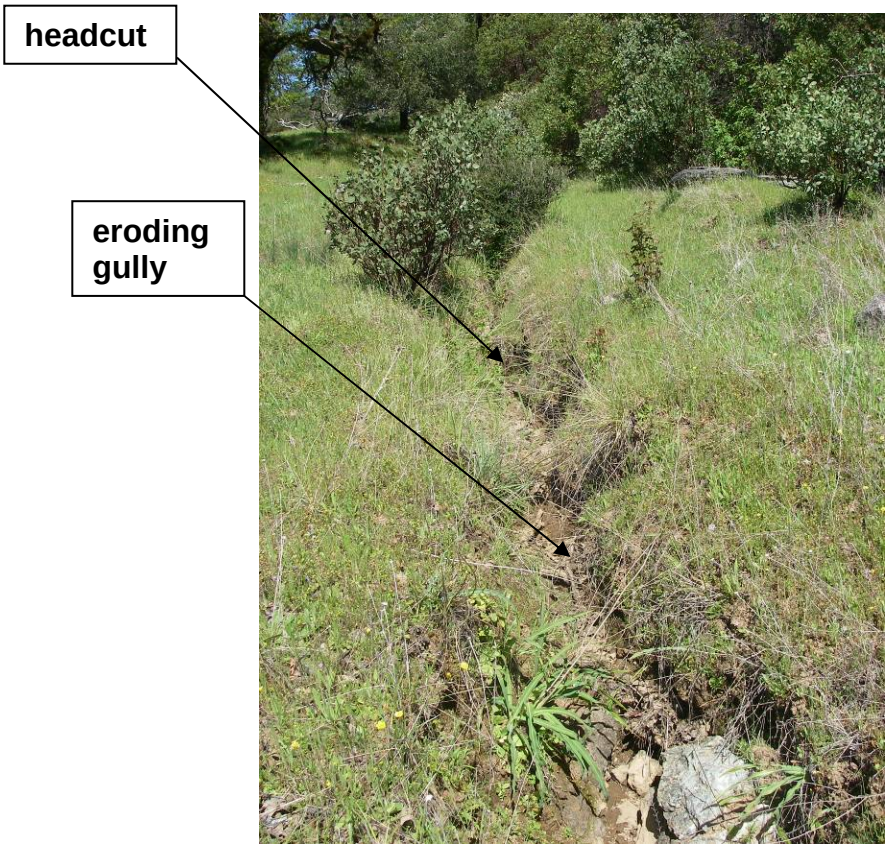


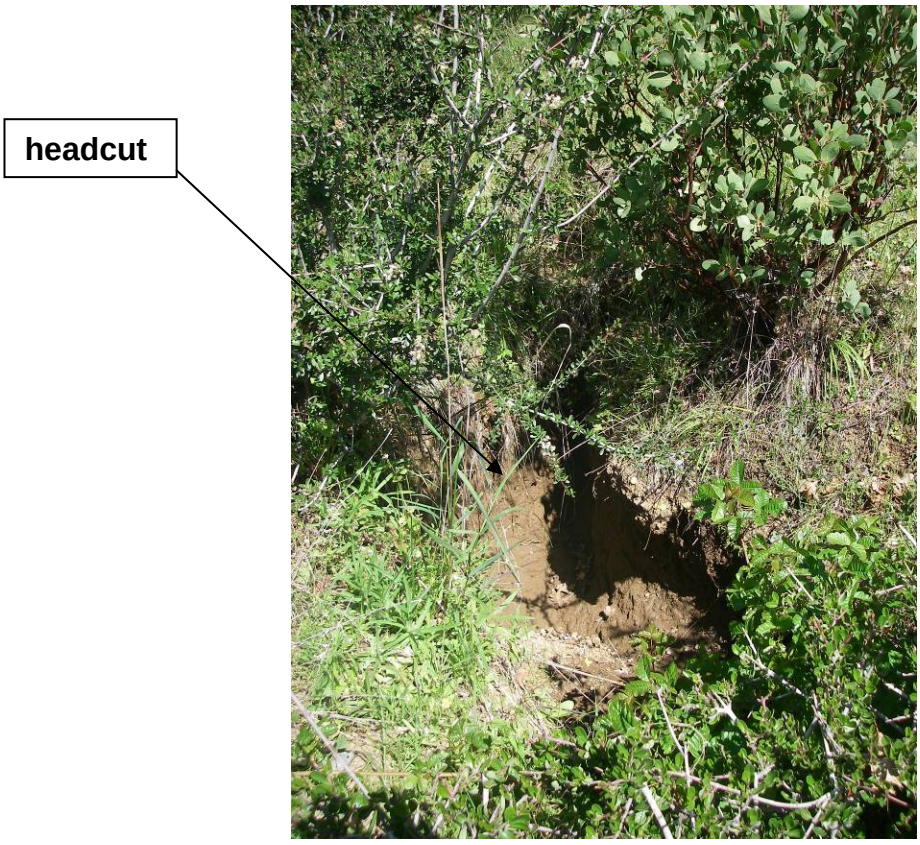
scour area

culvert



Appendix A-28. Taylor 037-221-68_5





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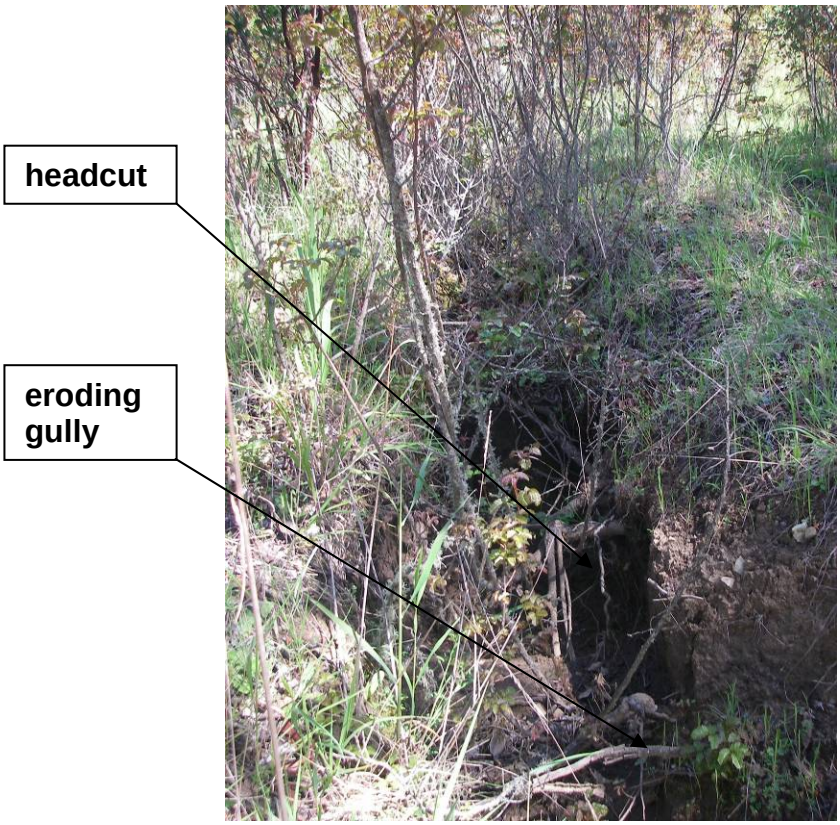
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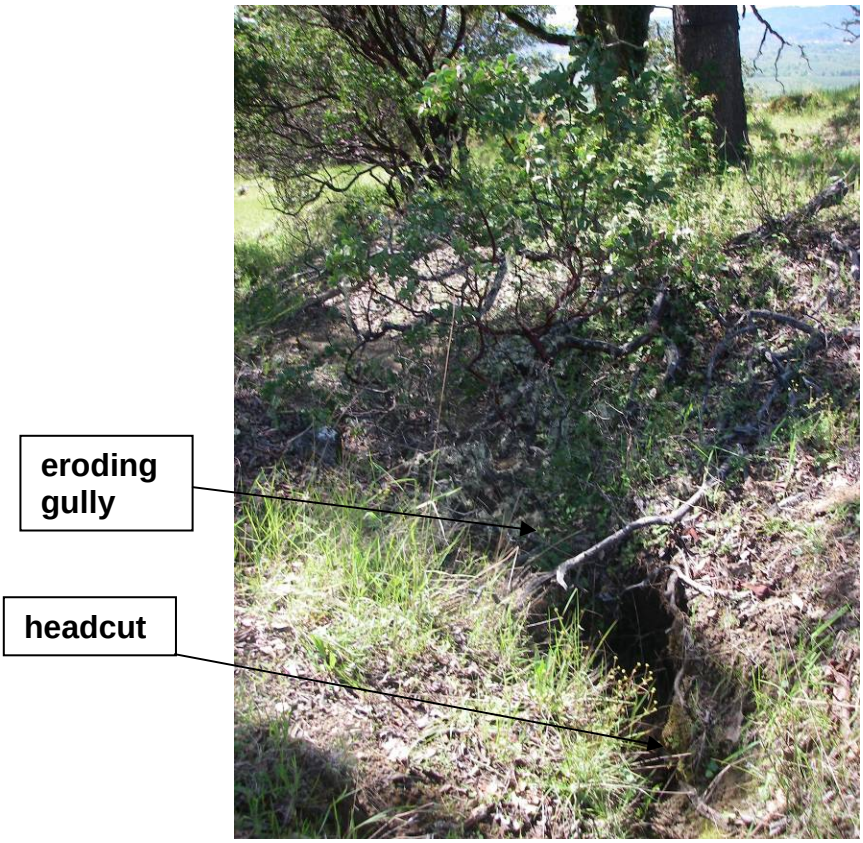
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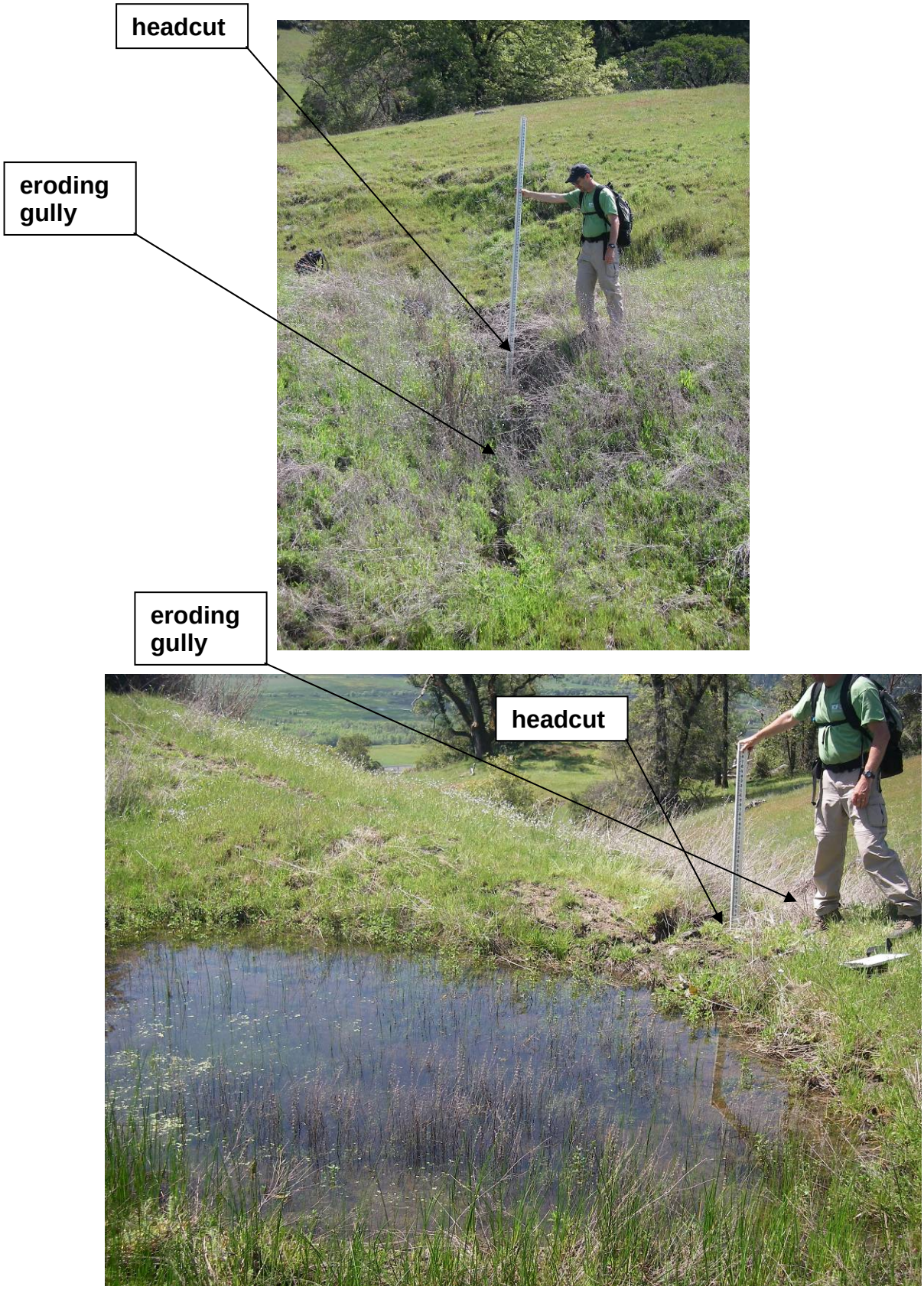

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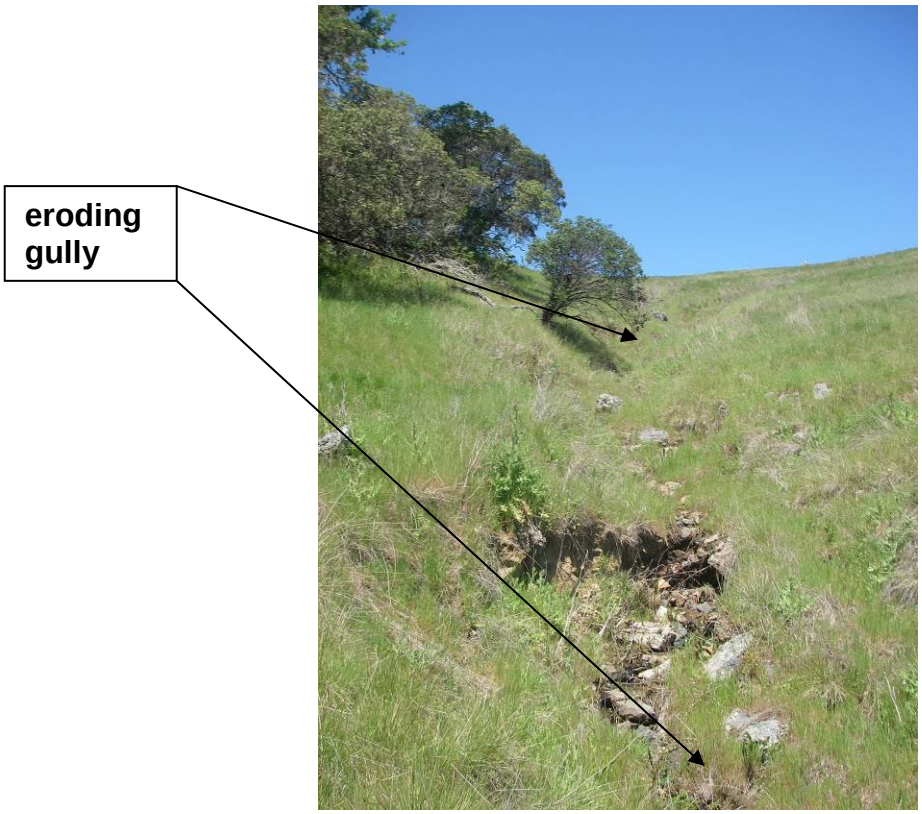
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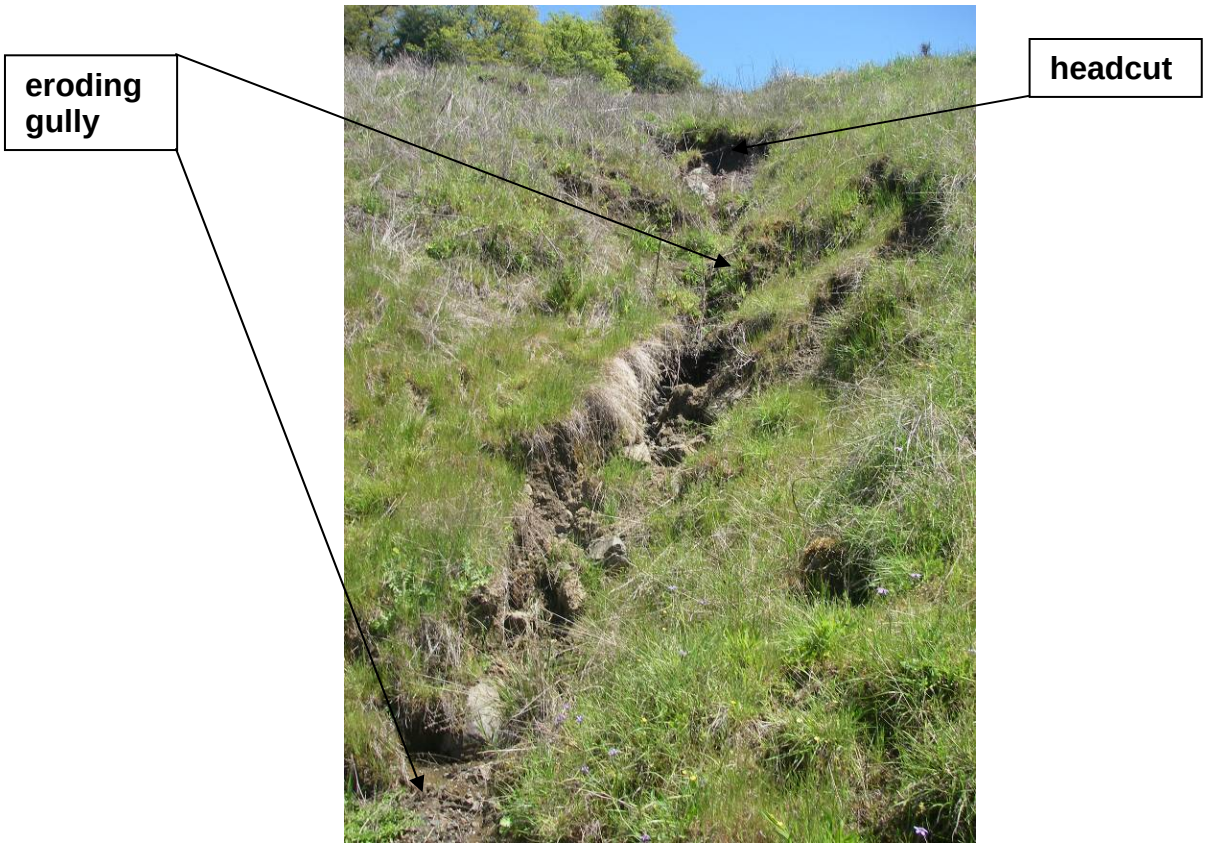
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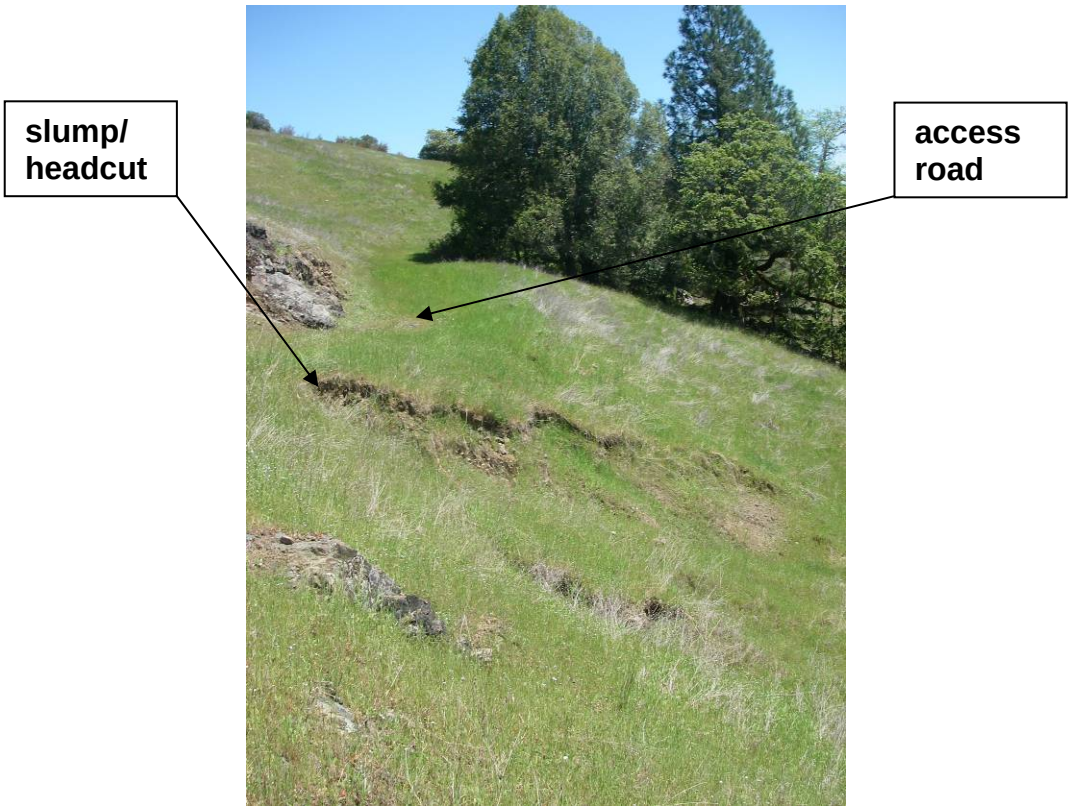
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Appendix A-36. Taylor 037-240-41_4


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Appendix A-39. Wildlands 108-060-01_1



Appendix H Invasive Plant Management Plan for Offsite Mitigation Parcels

Chapter 1 Introduction

The California Department of Transportation (Caltrans) in conjunction with the Federal Highway Administration (FHWA) is proposing to construct the Willits Bypass project (bypass project), a new section of U.S. Highway 101 (US 101) that will bypass the city of Willits in Mendocino County. The bypass will result in impacts on natural resources in and adjacent to the bypass project right-of-way. Caltrans is proposing compensatory mitigation for impacts on riparian and oak woodland habitat, jurisdictional wetlands and other waters of the United States, and special-status plants and fish.

As part of the bypass project's compensatory mitigation 37 parcels (totaling 2,098 acres) in Little Lake Valley have been identified for offsite mitigation that include restoration, creation, enhancement, and protection actions. The introduction and spread of invasive plants is a significant concern for the long-term health and sustainability of the offsite mitigation parcels.

1.1 Purpose of the Invasive Plant Management Plan

The purpose of this invasive plant management plan (IPMP or plan) is to provide methods for establishing the invasive plant baseline on the offsite mitigation parcels, and success criteria for measuring the success of the mitigation actions which specifically address invasive plants, and monitoring requirements. In addition, the plan provides an adaptive management framework to minimize the introduction and spread of invasive plants over time.

It should be noted that while this plan presents suggestions for invasive plant management, determining specific management at each offsite mitigation parcel may require adjustments after baseline distribution data is collected. The bypass project's mitigation program has an adaptive management component that allows for such adjustments. Practicality and flexibility are essential requirements of a successful invasive plant management plan.

Significant adjustments to the recommendations contained in this plan will be coordinated with the resource agencies and documented in an annual monitoring report.

Caltrans will work with the Mendocino County Resource Conservation District (MCRCD), to review this plan and, as necessary, assist with the development of specific offsite mitigation invasive plant management requirements. If necessary, Caltrans will consult with local experts to further refine the management program.

Once the short-term maintenance period is completed (after completion of performance monitoring and resource agency agreement that all mitigation has met the success criteria), the long-term management period will begin. At this time, this plan and all management recommendations will be reviewed to determine ongoing appropriateness. After this review, the plan will be reviewed a minimum of once every ten years to determine the need to adjust any of the management recommendations. The plan may be reevaluated sooner than once every ten years if the plan is not achieving its objectives. See Chapter 11, Long-Term Management Plan, in the MMP for more information on the IPMP review schedule.

1.2 Invasive Plant Management Goals and Objectives

The goal of the IPMP is to ensure existing invasive plant populations are documented, maintained at or below baseline levels and that new invasive plants are not introduced into offsite mitigation parcels.

In order to achieve the IPMP's goals, the following management objectives have been developed:

- Manage target invasive plant species so that their cover does not increase over the baseline level or is reduced.
- Adaptively manage invasive plant populations.
- Repair or address adverse conditions that are human-caused that may contribute to invasive plant introduction and spread.

1.3 Background

In California, the majority of plants are native (79%). Nonnative, non-invasive plants are the second largest category (19%), and invasive plants are the smallest category (2%) (Hrusa et. al. 2002; Rejmanek and Randall 1994). The vast majority of nonnative introduced plants do not become invasive, and it is the invasive plants that are the focus of this IPMP.

1.3.1 Definition of Invasive Plants

Invasive plants can be defined as plants that invade agricultural crops or infrastructures such as canals, or plants that invade natural communities, displace native species, and alter ecosystem functions (such as fire regime, hydrologic functions, and nutrient cycling) (Bossard et al. 2000).

For the IPMP, *invasive plants* are defined as those listed by the U.S. Department of Agriculture (USDA) as "Noxious", the California Department of Food and Agriculture (CDFA) as A, B or Q, or the California Invasive Plant Council (Cal-IPC) as "High" (USDA National Invasive Species Information Center 2008, CDFA 2009, Cal-IPC 2006 and 2007). Additional definitions are included below:

- **Weeds—***Weeds* are plants that grow in sites where they are not wanted and that usually have detectable economic or environmental effects (synonyms include pest plants, plants out of place, and prolific plants).
- **Noxious weed—***Noxious weed* is a term for plant species or groups of species that have been legally designated as pests by a county, state, or federal agency. Not all such designated noxious weeds are problems in natural areas, and only a small subset of the plant species that are problems in natural areas have been designated as noxious.
- **Invasive plants—***Invasive plants* are naturalized plants that produce reproductive offspring, often in very large numbers, at considerable distances from parent plants and thus have the potential to spread over a considerable area.
- **Nonnative—**The term *nonnative* is used for species that were directly or indirectly introduced by humans, that were not present in the region before this introduction, and that would not have spread into the area without human interference.
- **Vector—**A *vector* is an action, process, or activity, natural or human-induced, that moves an invasive species (or species propagule) along a pathway to a new location where it becomes established.

The following sections present noxious weed definitions provided by the U.S. Department of Agriculture (USDA) California Department of Food and Agriculture (CDFA) and Cal-IPC.

1.3.2 U.S. Department of Agriculture

The Federal Noxious Weed Act of 1974 defines a "noxious weed" as:

> Any living stage (including, but not limited to, seeds and reproductive parts) of any parasitic or other plant of a kind, or subdivision of a kind, which is of foreign origin, is new to or not widely prevalent in the United States, and can directly or indirectly injure crops, other useful plants, livestock, or poultry or other interests of agriculture, including the fish and wildlife resources of the United States or the public health.

1.3.3 California Department of Food and Agriculture

The California Agricultural Code states:

> Section 5004. "Noxious weed" means any species of plant that is, or is liable to be, troublesome, aggressive, intrusive, detrimental, or destructive to agriculture, silviculture, or important native species, and difficult to control or eradicate, which the director, by regulation, designates to be a noxious weed. In determining whether or not a species shall be designated a noxious weed for the purposes of protecting silviculture or important native plant species, the director shall not make that designation if the designation will be detrimental to agriculture.

CDFA maintains a list of noxious weeds and advises the County Agricultural Commissioners on the action to take regarding each noxious weed species[1] (California Department of Food and Agriculture 2009).

- A-rated weeds are subject to eradication, containment, rejection, or other holding action at the state-county level.
- B-rated weeds are subject to eradication, containment, control, or other holding action at the discretion of the County Agricultural Commissioner.
- C-rated weeds are subject to action to retard their spread outside of nurseries at the discretion of the County Agricultural Commissioner.
- The Q-rating is a temporary A-rating pending further investigation by CDFA.

[1] Current state and federal weed lists can be found at the California Department of Food and Agriculture website http://www.cdfa.ca.gov/phpps/ipc/encycloweedia/encycloweedia_hp.htm.

1.3.4 California Invasive Plant Council

Cal-IPC maintains a categorized list of nonnative invasive plants with a ranking for each species to indicate the level of its negative ecological impact. The Cal-IPC ranking system is the most comprehensive compilation of invasive plant properties and their impacts available for California. The ranking process is based on best available scientific information and peer review by experts. These rankings are defined below.

- **High.** These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Ecological amplitude and distribution are widespread.
- **Moderate.** These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, although establishment generally is dependent on ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.
- **Limited.** These species are invasive, but their ecological impacts are minor on a statewide level or there is not enough information to justify a higher ranking. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution generally are limited, but these species may be locally persistent and problematic.

1.4 Land Manager

MCRCD will be designated by Caltrans as the Land Manager for the offsite mitigation parcels. MCRCD will be responsible for coordinating invasive plant surveys, annual reporting, and management on the offsite mitigation parcels consistent with the IPMP.

Chapter 2 Establishment of Invasive Plant Baseline

Before specific invasive plant management for each offsite mitigation parcel can be developed baseline surveys will need to be completed. These surveys will be conducted in the summer of 2010.

2.1 Development of Invasive Plant Target List

Lists of the invasive plants that are known to occur, and/or have the potential to become introduced into the offsite mitigation parcels are presented in Tables 2-1 and 2-2. These lists include:

- Invasive plants known to occur on the offsite mitigation parcels and in the vicinity, based on field work conducted by Caltrans and their consultants;
- A query of Calfora's database for "what grows here?" centered on Willits (Calflora 2010); and
- The Red Alert weed list posted by the Inland Mendocino Cooperative Weed Management Area (2010).

In addition to the species and whether or not it is known to occur on the offsite mitigation parcels, the tables list the Cal-IPC rank, CDFA list and whether or not it is included on the Federal Noxious Weed List. A brief description of the habitat in which the plant is normally found is also included.

Table 2-1. List of Known and Potentially Occurring Invasive Plants on the Offsite Mitigation Parcels for the Willits Bypass Project—Proposed as Target Species for Baseline Weed Mapping, Monitoring and Management

Species Name	Known or Potential	Cal-IPC Rating	State Listing	Federal Listing	Habitats and Distribution
Barbed goatgrass (*Aegilops triuncialis*)	Potential (Calflora)	High	B	–	Grassland, oak woodland
Giant reed (*Arundo donax*)	Potential (observed by ICF botanist in Mendocino Co.)	High	B	–	Edge of streams and ditches, edge of riparian woodland
Woolly distaff thistle (*Carthamus lanatus*)	Potential (Calflora)	Moderate	B	–	Grasslands
Purple starthistle (*Centaurea calcitrapa*)	Potential (Calflora)	Moderate	B	–	Grasslands
Meadow knapweed (*Centaurea debeauxii* ssp. *thuillierii*)	Potential (Inland Mendocino WMA)	Moderate	–	–	Grasslands
Spotted knapweed (*Centaurea maculosa*)	Potential (Calflora)	High	A	–	Riparian, grasslands, wet meadows, forests
Yellow star-thistle (*Centaurea solstitialis*)	Known	High	C	–	Grassland, oak woodland, open habitats
Rush skeleton weed (*Chondrilla juncea*)	Potential (Inland Mendocino WMA)	Moderate	A	–	Grasslands
Pampas grass (*Cortaderia selloana* and *C. jubata*)	Potential (observed by ICF botanist in Mendocino Co.)	High	B	–	Grassland, open woodland
Scotch broom (*Cytisus scoparius*)	Known	High	C	–	Coastal scrub, oak woodland
Teasel (*Dipsacus fullonum*)	Known	Moderate	–	–	Grasslands, seep, riparian scrub, wetlands
Eggleaf spurge (*Euphorbia oblongata*)	Potential (Inland Mendocino WMA)	Limited	B	–	Meadows, woodlands
Edible fig (*Ficus carica*)	Potential (observed by ICF botanist in Mendocino Co.)	Moderate	–	–	Riparian woodland; scattered individuals and clumps
Sweet fennel (*Foeniculum vulgare*)	Known	High	–	–	Mesic grasslands

Species Name	Known or Potential	Cal-IPC Rating	State Listing	Federal Listing	Habitats and Distribution
French broom (*Genista monspessulana*)	Known	High	C	–	Oak woodland, grassland
Little robin (*Geranium purpureum*)	Potential (Inland Mendocino WMA)	–	–	–	Riparian (streambanks) and woodland areas
Dyer's woad (*Isatis tinctora*)	Potential (Calflora)	Moderate	B	–	Great Basin scrub and grasslands, coniferous forest
Perennial pepperweed (*Lepidium latifolium*)	Potential (Calflora)	High	B	–	Mesic grasslands, wetlands
Purple loosestrife (*Lythrum salicaria*)	Potential (Calflora)	High	B	–	Wetlands, marshes, riparian areas
Parrot's feather *(Myriophyllum aquaticum*)	Potential (Inland Mendocino WMA)	High	B	–	Freshwater aquatic systems (e.g., ponds, lakes, ditches)
Himalayan blackberry (*Rubus armeniacus*, formerly *R. discolor*)	Known	High	–	–	Riparian woodland; widespread
Tansy ragwort (*Senecio jacobaea*)	Known	Limited	B	–	Grasslands, riparian
Red sesbania (*Sesbania punicea*)	Potential (Inland Mendocino WMA)	High	B	–	Riparian areas
Spanish broom (*Spartium junceum*)	Potential	High	C	–	Riparian woodland, oak woodland, wetlands; scattered shrubs
Medusa-head (*Taeniatherum caput-medusae*)	Known	High	C	–	Grassland, oak woodland, open habitats

Notes:

California Invasive Plant Council (Cal-IPC) ratings:

High. These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Ecological amplitude and distribution are widespread.

Moderate. These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, although establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited. These species are invasive, but their ecological impacts are minor on a statewide level or there is not enough information to justify a higher ranking. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

The California Department of Food and Agriculture (CDFA) ratings:

A: A-rated weeds are subject to eradication, containment, rejection, or other holding action at the state-county level.
B: B-rated weeds are subject to eradication, containment, control, or other holding action at the discretion of the County Agricultural Commissioner.
C: C-rated weeds are subject to action to retard their spread outside of nurseries at the discretion of the County Agricultural Commissioner.
Federal Ratings from the U.S. Department of Agriculture (USDA)
NW: noxious weed
Sources: Calflora website (http://www.calflora.org), using the What Grows Here? search tool for Willits area
Inland Mendocino County WMA Red Alert website (http://cemendocino.ucdavis.edu/files/56646.pdf)
Field notes from ICF International and Caltrans biologists
Cal-IPC lists (http://www.cal-ipc.org/ip/inventory/pdf/Inventory2006.pdf and http://www.cal-ipc.org/ip/inventory/pdf/WebUpdate2007.pdf)
CDFA lists (http://www.cdfa.ca.gov/phpps/ipc/weedinfo/winfo_list-pestrating.htm)

Table 2-2. List of Known and Potentially Occurring Invasive Plants within the Onsite and Offsite Willits Bypass Project Area—Not Proposed for Baseline Mapping, Monitoring and Management

Species Name	Known or Potential	Cal-IPC Rating	State Listing	Federal Listing	Habitats and Distribution
Ovate goatgrass (*Aegilops ovata*)	Potential (Calflora)	–	B	–	Disturbed fields, roadsides, grassland, oak woodland
Bent grass (*Agrostis stolonifera*)	Known	Limited	–	–	Wetlands, riparian
Tree-of-heaven (*Ailanthus altissima*)	Potential (observed by ICF botanist in Mendocino Co.)	Moderate	C	–	Riparian areas, grasslands, oak woodland
Wild garlic (*Allium vineale*)	Potential (Calflora)	–	B	–	Disturbed places
Sweet vernal grass (*Anthoxanthum odoratum*)	Known	Moderate	–	–	Coastal prairie, coniferous forest
Slender wild oat (*Avena barbata*)	Known	Moderate	–	–	Coastal scrub, grasslands, oak woodland, forest
Wild oat (*Avena fatua*)	Known	Moderate	–	–	Coastal scrub, grasslands, chaparral, woodland, forest
Black mustard (*Brassica nigra*)	Known	Moderate	–	–	Widespread, many habitats
Field mustard (*Brassica rapa*)	Potential (Calflora)	Limited	–	–	Coastal scrub, grasslands, meadows, riparian
Quaking grass (*Briza maxima*)	Known	Limited	–	–	Grasslands

Species Name	Known or Potential	Cal-IPC Rating	State Listing	Federal Listing	Habitats and Distribution
Ripgut brome (*Bromus diandrus*)	Known	Moderate	–	–	Grasslands, dunes, scrub, woodland, forest
Soft chess (*Bromus hordeaceus*)	Known	Limited	–	–	Grasslands, sagebrush, serpentine soils
Red brome (*Bromus madritensis*)	Known	High	–	–	Widespread, incl. scrub, grasslands, desert washes, woodlands
Cheatgrass (*Bromus tectorum*)	Potential (Calflora)	High	–	–	Interior scrub, woodlands, grasslands
Italian thistle (*Carduus pycnocephalus*)	Known	Moderate	C	–	Forest, scrub, grasslands, woodlands
Tocalote (*Centaurea melitensis*)	Known	Moderate	C	–	Grasslands, oak woodland
Bull thistle (*Cirsium vulgare*)	Known	Moderate	C	–	Riparian areas, marshes, meadows
Poison hemlock (*Conium maculatum*)	Known	Moderate	–	–	Riparian woodland, grassland
Bindweed (*Convolvulus arvensis*)	Known	–	C	–	Grasslands
Bermuda grass (*Cynodon dactylon*)	Known	Moderate	–	–	Riparian scrub in southern CA.
Hedgehog dogtail-grass (*Cynosurus echinatus*)	Known	Moderate	–	–	Oak woodland, grassland
Orchard grass (*Dactylis glomerata*)	Known	Limited	–	–	Grasslands, broadleafed forest, woodlands
Patterson's curse (*Echium plantagineum*)	Potential (Inland Mendocino WMA)	–	–	–	Disturbed areas, fields
Redstem filaree (*Erodium cicutarium*)	Known	Limited	–	–	Widespread, many habitats
Tall fescue (*Festuca arundinacea*)	Known	Moderate	–	–	Coastal scrub, grasslands
Cutleaf geranium (*Geranium dissectum*)	Known	Limited	–	–	Widespread, many habitats
Waxy mannagrass (*Glyceria declinata*)	Known	Moderate	–	–	Vernal pools, wetlands, wet meadows
Velvet grass (*Holcus lanatus*)	Known	Moderate	–	–	Coastal grasslands, wetlands

Species Name	Known or Potential	Cal-IPC Rating	State Listing	Federal Listing	Habitats and Distribution
Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*)	Known	Moderate	–	–	Grasslands
Foxtail barley (*Hordeum murinum* ssp. *leporinum*)	Known	Moderate	–	–	Grasslands
Klamathweed (*Hypericum perforatum*)	Known	Moderate	C	–	Grassland, oak woodland, open habitats; scattered
Smooth cat's ear (*Hypochaeris glabra*)	Known	Limited	–	–	Scrub and woodlands
Rough cat's ear (*Hypochaeris radicata*)	Known	Moderate	–	–	Coastal dunes, scrub, and prairie, woodland, forest
Italian ryegrass (*Lolium multiflorum*)	Known	Moderate	–	–	Grasslands, oak woodland, pinyon-juniper woodland
Hyssop loosestrife (*Lythrum hyssopifolium*)	Known	Limited	–	–	Grasslands, wetlands, vernal pools
Bur-clover (*Medicago polymorpha*)	Known	Limited	–	–	Grasslands
Pennyroyal (*Mentha pulegium*)	Known	Moderate	–	–	Vernal pools, wetlands, wet meadows
Yellow glandweed (*Parentcellia viscosa*)	Known	Limited	–	–	Coastal prairie, grasslands, dunes, wetlands
Harding grass (*Phalaris aquatica*)	Known	Moderate	–	–	Coastal sites, especially moist soils
Bristly oxtongue (*Picris echioides*)	Known	Limited	–	–	Coastal prairie, scrub, riparian woodland
English plantain (*Plantago lanceolata*)	Known	Limited	–	–	Many habitats, primarily a turf weed
Kentucky bluegrass (*Poa pratensis*)	Known	Limited	–	–	Grasslands, scrub, riparian areas
Rabbitsfoot grass (*Polypogon monspeliensis*)	Known	Limited	–	–	Margins of ponds or streams, seasonally wet places, edge of coastal dunes
Wild radish (*Raphanus sativus*)	Known	Limited	–	–	Widespread, many habitats

Species Name	Known or Potential	Cal-IPC Rating	State Listing	Federal Listing	Habitats and Distribution
Sheep sorrel (*Rumex acetosella*)	Known	Moderate	–	–	Many habitats, riparian areas, forest, wetlands
Curly dock (*Rumex crispus*)	Known	Limited	–	–	Grasslands, vernal pools, meadows, riparian
Russian thistle (*Salsola tragus*)	Known	Limited	C	–	Desert dunes and scrub, alkali playa
Blessed milkthistle (*Silybum marianum*)	Known	Limited	–	–	Grasslands, riparian
Hedge parsley (*Torilis arvensis*)	Known	Moderate	–	–	Grasslands, forest, woodland
Common mullein (*Verbascum thapsus*)	Known	Limited	–	–	Meadows, riparian, sagebrush, pinyon-juniper woodlands
Periwinkle (*Vinca major*)	Known	Moderate	–	–	Riparian, oak woodland, coastal scrub
Rattail fescue (*Vulpia myuros* ssp. *myuros*)	Known	Moderate	–	–	Coastal sage scrub, chaparral, grasslands

Notes: See Table 2-1 Notes.

Table 2-1 contains the list of the most highly invasive plants observed or with the potential to occur on the offsite mitigation parcels. The list contains all of the plants listed by CDFA as "A" and ranked by Cal-IPC as High, with the exception of red brome and cheatgrass, which are widespread and considered more damaging to desert habitats. Some CDFA B listed and Cal-IPC ranked Moderate plants are included if they are already known from the offsite mitigation parcels or if they are already enhancement management targets (e.g., teasel). The species in Table 2-1 are recommended for mapping during baseline surveys, development of management objectives, monitoring and long-term management.

Plants which are not as highly ranked by CDFA or Cal-IPC are included in Table 2-2. These include some of the nonnative annual grasses which are widespread throughout California, as well as species with generalized habitat needs which are also widespread throughout the state. Species in Table 2-2 may be moved to Table 2-1 if they are observed to expand into habitat creation areas, compete with listed plants, or otherwise threaten management targets.

While the lists in Tables 2-1 and 2-2 are not an exhaustive inventory of all the nonnative plants present on the offsite mitigation parcels, they do include the most highly invasive plants known to occur in the area. During baseline surveys, crews will be directed to record all invasive plants observed, so it is possible the list may be increased after that effort. The rest of the plants in Table 2-1 which were not directly observed during surveys can serve as a "watch list" for future monitoring efforts, and if those plants are observed they should be reported immediately to the MCRCD, the Weed Management Area and the County Agricultural Commissioner.

2.2 Methods for Invasive Plant Baseline Surveys

Baseline invasive plant surveys will be conducted at each offsite mitigation parcel before project construction activities begin to determine which invasive plants are present at the site. Surveys are planned for summer 2010.

Invasive plant surveys will be conducted by biologists experienced with the vegetation of the offsite mitigation parcels and the identification of all potentially occurring invasive plants. Surveys will be conducted at an appropriate time of year when known and potentially occurring species will be evident and identifiable. The biologists will walk systematically back and forth through the offsite mitigation parcel, aiming for 100% visual coverage, until the entire project site has been observed for invasive plants.

All plant species encountered will be identified to the level necessary to determine whether they are invasives. Invasive plant locations will be identified and the approximate boundaries of the infestation mapped using handheld Global Positioning System (GPS) Units and/or marked on maps showing aerial photography overlaid with the offsite mitigation parcel, access roads, and other features. Each invasive plant location observed during a survey will be recorded using the Noxious Weed Inventory Form (Attachment A).

Each observation of invasive plants will include the assignment of a sequential unique location number and a visual estimate of the area of coverage and the number or density of plants as appropriate. Percent of absolute plant cover within infestation boundaries will be categorized in cover/distribution categories:

- Trace (rare): less than 1% cover;
- Low (occasional plants): 2–5% cover;

- Moderate (scattered plants): 6–25% cover;
- High (fairly dense): 26–50% cover; and
- Dense (very dense): more than 51% cover.

During the surveys, the biological monitors will record all nonnative plants encountered, and will be alert for invasive plants that may be new to the project site—such species will be mapped and their occurrence analyzed for inclusion in the weed maps and discussion of appropriate control measures. Examples of these types of plants include species that are recently emerging as a threat in the inland Mendocino County region (e.g., red sesbania [*Sesbania punicea*]) or species that are known to be invasive in other regions but are not yet known to occur or have limited distribution in the Outlet Creek watershed (e.g., eggleaf spurge [*Euphorbia oblongata*], woolly distaff thistle (*Carthamus lanatus*), and perennial pepperweed [*Lepidium latifolium*]).

Following the survey, invasive plant locations will be digitized into a geographic information system database compatible with the North American Invasive Plant Mapping Standards (North American Weed Management Association 2010). The resulting geodatabase will enable comparison of baseline and long-term invasive plant populations in order to determine whether mitigation installation activities have resulted in the introduction and spread of new invasive plant species or populations.

2.3 Invasive Plant Baseline Report

After baseline surveys are completed, an invasive plant baseline conditions report will be prepared and submitted to the resource agencies, including US Environmental Protection Agency (USEPA), US Fish and Wildlife Service (USFWS), and California Department of Fish and Game (CDFG). The report will include the survey methods, list of invasive plants observed, maps showing locations of invasive plant infestations, and general recommendations to manage invasive plants, as appropriate. Report will be submitted to the agencies by December 31, 2010.

Chapter 3 Invasive Plant Monitoring and Reporting

A critical step in developing an effective and ecologically sound IPMP is establishing criteria by which the prescription's implementation and effectiveness will be measured. Data collection over time allows for detecting trends related to the target invasive plants. Furthermore, monitoring after management actions have been initiated will ensure the effectiveness of the management actions. Invasive plant monitoring, which will continue in perpetuity, is the responsibility of MCRCD.

Invasive plant management is a key component of adaptive management, which will be an essential tool in the management at the offsite mitigation parcels. The adaptive management component of the mitigation program is described in Chapter 12 in the MMP.

3.1 Purpose of Monitoring

The offsite mitigation parcels will be monitored periodically to assess changes from baseline invasive plant conditions. The purpose of monitoring is to 1) determine the overall status and condition of the parcels; 2) identify whether invasive plant populations have increased; 3) document invasive plant management activities conducted on the offsite mitigation parcels and assess whether they have been successful; and 4) recommend corrective actions if the invasive plant management activities have not been successful.

3.2 Success Criteria

During the baseline invasive plant survey, each parcel will be surveyed and a list of invasive plants occurring there will be compiled. An estimate of absolute cover within the infestation area and throughout the community type it occurs in (wetland, riparian or oak woodland) present on the parcel will be prepared. This information will be used as the "baseline" of invasive plant infestation, and the performance criteria is listed in Table 3-1.

Table 3-1. Invasive Plant Success Criteria for each Sensitive Habitat Type.

Plant Community	Success Criteria
Jurisdictional Wetlands	The percent vegetation cover (i.e., absolute cover) for invasive plants must be no higher than the baseline amount at Year 5 for all the wetland habitat on each parcel.
Riparian Woodland	The percent vegetation cover (i.e., absolute cover) for invasive plants must be no higher than the baseline amount at year 10 for all the riparian woodland habitat on each parcel.
Oak Woodland	The percent vegetation cover (i.e., absolute cover) for invasive plants must be no higher than the baseline amount at year 10 for all the oak woodland habitat on each parcel.

3.3 Invasive Plant Monitoring Methods

3.3.1 Qualitative Inspections

The long-term management plan in Chapter 11 in the MMP requires qualitative inspections of the offsite mitigation parcels to document the overall condition of the parcels. These inspections will include checking fences and gates, trash accumulation, etc. These inspections will also include compliance with the grazing lease (e.g., proper placement of artificial water sources and salt licks). The inspections will be documented in a log book. For each inspection, the minimum information to be documented will include date, monitor's full name(s), other personnel present (full names, companies, etc.) parcel monitored, description of any specific events or activities monitored or problems encountered, reference to accompanying ground-level digital image(s) if applicable, and recommended remedial actions.

Qualitative monitoring will also include aerial photograph documentation of overall site conditions. Non-rectified aerial photographs will be taken every five years.

3.3.2 Quantitative Monitoring

Quantitative monitoring will be performed during the first year (year 1) of the performance monitoring period at the offsite mitigation parcels in order to establish baseline conditions, and repeated every five years thereafter. Table 3-2 presents the schedule for quantitative monitoring. Quantitative monitoring will include assessment of invasive plant cover in conjunction with monitoring of riparian and oak woodland habitat, jurisdictional wetlands, upland/grassland habitat, and grazing plan monitoring.

Data on invasive plant cover will be collected by walking transects through each offsite mitigation parcel and noting the species encountered along each transect. When one of the invasive plants listed in Table 2-1 is encountered a polygon of the plant boundary will be taken with GPS, then an estimate of percent cover within the polygon will be recorded using smaller sampling quadrats. The community type the invasive plant occurs in will also be noted, as well as general notes on the phenology of the infestation.

Data will be analyzed for comparison with the success criteria provided in Table 3-1. Data will be analyzed in a timely manner in order to be used along with annual invasive plant measurements to determine if management activities should be adjusted in subsequent years.

Invasive plant cover will be measured and recorded during years 1, 2, 3, and 4 and success of mitigation actions will be determined in year 5. Long-term monitoring will be conducted in years 5, 10 and 15 and every 10 years thereafter, after the success of the mitigation actions is determined. Monitoring will occur when plants in Table 1 are identifiable (usually during the summer) to determine whether percent cover is increasing over baseline. Areas which received management actions in previous years will also be monitored to determine whether percent cover of invasive plants is decreasing.

3.3.3 Photodocumentation

Digital images will be taken, from preset photostations, of key locations to document site conditions and management actions. Digital images will be annotated with photostation number (corresponding with accompanying photodocumentation key map) and date of photograph. In the event that invasive plants are removed and do not return over time the photodocumentation for their presence may be discontinued.

3.3.4 Monitoring Schedule

Table 3-2 presents the recommended monitoring schedule for the offsite mitigation parcels.

Table 3-2. Success Criteria Monitoring Schedule

Task	Responsible Party	Frequency
Qualitative Monitoring	Land Manager	Quarterly or at lesser intervals as described in Chapters 9, 10, and 11 in the MMP
Quantitative Monitoring	Land Manager	Every five years or at lesser intervals as described in Chapters 9, 10, and 11 in the MMP

3.4 Reports

Monitoring reports will be prepared to describe the results of the monitoring each year it is conducted. The annual reports will be completed by March 30 of the subsequent year and submitted to the resource agencies. At a minimum, the monitoring report will include the following items.

- A summary of invasive plant management activities and an evaluation of site conditions at each offsite mitigation parcel.
- A summary of the success criteria and monitoring methods.
- A summary and analysis of the monitoring results, including an evaluation of site conditions.
- Management recommendations, including discussion of areas with inadequate performance and recommendations for remedial actions.
- A discussion of modifications made to the monitoring methods.
- A list of personnel who prepared the content of the annual report and/or participated in monitoring activities that year.
- Digital images taken from predetermined photodocumentation stations (can be included as an appendix).

Chapter 4 Adaptive Management Recommendations

Adaptive management for the offsite mitigation parcels is covered in Chapter 12 of the MMP. It will be the responsibility of the land manager to develop methods for managing invasive plants on the offsite mitigation parcels. Some of the management options are discussed briefly below.

4.1 Invasive Plant Management Options

A comprehensive strategy for controlling invasive plants including mechanical, chemical and physical control methods is referred to as Integrated Pest Management (IPM). IPM stresses the inclusion of a wide variety of factors when considering which management techniques to employ. Some of the factors to consider when choosing a control technique are: effectiveness of a technique to accomplish management objectives, disturbance to the environment, the time period required for control and the cost. The following discussion of invasive plant control techniques is based on the Weed *Control Methods Handbook* (Tu et al., 2001) and the *Weed Workers' Handbook* (Watershed Project and California Invasive Plant Council 2004).

4.1.1 Manual and Mechanical Techniques

Manual and mechanical techniques such as pulling, cutting, and otherwise damaging plants, may be used to control some invasive plants, particularly if the population is relatively small. These techniques can be extremely specific, minimizing damage to desirable plants and animals, but they are generally labor and time intensive. Treatments must typically be administered several times to prevent the weed from re-establishing, and in the process, laborers and machines may severely trample vegetation and disturb soil, providing prime conditions for re-invasion by the same or other invasive species. Techniques include pulling by hand or with tools, mowing, brush cutting, weed-eating with string trimmers, girdling, mulching, soil solarization, tilling and flooding.

4.1.2 Grazing and Prescribed Fire

The MMP contains another appendix exclusively devoted to grazing (Appendix I). Grazing can either promote or reduce weed abundance at a particular site. By itself, grazing will rarely, if ever, completely eradicate invasive plants. However, when grazing treatments are combined with other control techniques, such as herbicides or biocontrol, severe infestations can be reduced and small infestations may be eliminated. Grazing animals may be particularly useful in areas where herbicides cannot be applied (e.g., near water) or are prohibitively expensive (e.g., large infestations).

Organizations that manage land for biodiversity often use prescribed burns to promote desired vegetation and species. Fire is sometimes necessary to prompt the germination of some plants, including a number of rare and endangered species. On the other hand, fire can also sharply reduce the abundance of some species. The weather, topography, and available fuel will determine the temperature and intensity of the prescribed burn, and this along with the timing of the treatment, largely determine how the burn impacts the vegetation and the abundance of particular species. The most effective fires for controlling invasive plant species are typically those administered just before flower or seed set, or at the young seedling/sapling stage. In some cases, however, prescribed burns can unexpectedly promote an invasive, such as when their seeds are specially adapted to fire, or when they resprout vigorously. Most successful weed control efforts that result from burning are due to the restoration of historical (natural) fire regimes, which had been disrupted by land use changes, urban development, fire breaks, or fire suppression practices. Repeated burns are sometimes necessary to effectively control weedy plants, and herbicide treatments may be required to kill the flush of seedlings that germinate following a burn.

4.1.3 Chemical

Determining the right course of action in weed management can be difficult. For many land managers, whether to apply herbicides is an ethical decision that is not taken lightly. Herbicides are often used as a last resort, when other attempts have failed, and action is imperative. Integrated Pest Management considers the overall impacts of herbicide use on sensitive habitats and the ecological system and the decision to use herbicides should be based on the management objectives of the site. Table 1 contains a list of the herbicides which could be used on the offsite mitigation parcels. However, it will be the responsibility of the Land Manger to determine whether or not herbicides

are an appropriate management option for each offsite mitigation parcel. Table 4-1 lists some commonly used herbicides which could be used on the offsite mitigation parcels.

Table 4.1. Example List of Herbicides that Could Be Used on the Offsite Mitigation Parcels

Herbicide	Brand Name Examples	Chemical Name	Herbicide Family	Target Weed Sps.	Notes
2,4 D	Navigate®, Class®, Weed-Pro®, Justice®	(2,4-dichlorophenoxy) acetic acid	phenoxy	broadleaf weeds	Inexpensive and common herbicide used for over 50 years.
Clopyralid	Reclaim®, Curtail®, Transline®	3,6-dichloro-2-pyridinecarboxylic acid	pyridine	annual and perennial broadleaf weeds	Highly selective herbicide developed as an alternative to picloram.
Fluazifop-p-Butyl	Fusilade DX®, Fusion®, Tornado®	(R)-2-[4-[[5-(trifluoromethyl)-2-pyridinyl]oxy]phenoxy] propanoic acid	arylozyphenoxy-propionate	annual and perennial grasses	Toxic to most grasses except annual bluegrass and all fine fescues.
Glyphosate	RoundUp®, Rodeo®, Accord®	N-(phosphonomethyl) glycine	none generally recognized	annual and perennial weeds	Little to no soil activity.
Imazapic	Plateau®, Plateau Eco-Pak®, Cadre®	(±)-2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1 H-imidazol-2-yl]-5-methyl-3-pyridinecarboxylic acid	imidazolinone	annual and perennial weeds	Degree of control depends on selectivity of individual plants.
Imazapyr	Arsenal®	(+)-2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid	imidazolidinone	annual and perennial grasses, broadleafs, vines, brambles, brush, and trees	Provides long-term total vegetation control.
Sethoxydim	Poast®	2-[1-(ethoxyimino)butyl]-5-[2-(ethylthio)propyl]-3-hydroxy-2-cyclohexen-1-one	cyclohexanedione	annual and perennial grasses	Rapid degradation can limit effectiveness.
Triclopyr	Garlon®, Remedy®	[(3,5,6-trichloro-2-pyridinyl)oxy]acetic acid	pyridine	woody and annual broadleaf weeds	Commonly used herbicide for woody vegetation.
Source: Weed Control Methods Handbook (Tu et al. 2001)					

4.1.4 Biological

Biological control (biocontrol for short) is the use of animals, fungi, or other microbes to feed upon, parasitize or otherwise interfere with a targeted invasive plant. Organisms used to feed on, parasitize, or otherwise interfere with invasive plants are called biocontrol agents. Successful biocontrol programs usually significantly reduce the abundance of the pest, but in some cases, they simply prevent the damage caused by the pest (e.g. by preventing it from feeding on valued crops) without reducing pest abundance (Lockwood 2000). Biocontrol is often viewed as a progressive and environmentally friendly way to control pest organisms because it leaves behind no chemical residues that might have harmful impacts on humans or other organisms, and when successful, it can provide essentially permanent, widespread control with a very favorable cost-benefit ratio. However, some biocontrol programs have resulted in harm to untargeted (non-pest) organisms and to ecological processes. Therefore, before releasing a biocontrol agent (or using other methods), it is important to balance its potential to benefit conservation targets and management goals against its potential to cause harm.

Chapter 5 References

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Appendix I Data Collection Forms from the USACE Wetland Successional Development Assessment

ARKELIAN 103-230-04 10.0AC

CHARACTERIZATION

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Arkelian 103-230-04 City/County: Mendocino Sampling Date: 6/14/2011

Applicant/Owner: Caltrans State: CA Sampling Point: Parcel Baseline

Investigator(s): DM KG / JM / RR Section, Township, Range:

Landform (hillslope, terrace, etc.): ALLUVIAL PLAIN Local relief (concave, convex, none): FLAT Slope (%): 1%

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: GEILOW SL 0-5%, COLUSA 0-2% NWI classification: Pf

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X No	**Is the Sampled Area within a Wetland?** Yes X No
Hydric Soil Present?	Yes X No	
Wetland Hydrology Present?	Yes X No	

Remarks: Parcel characterization. V/S/H observations reflect generalized wetland components of Parcel.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: ____)			
1. Rumex LOBATA			FAC
2. Festuca LATIFOLIA			FACW
3. Rubus URSINUS			FACW
4. Juncus sp			=
5. Cyperus sp			=
6.			
7.			
8.			
	= Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks: Parcel is mostly forested @ mature OAK/ASH, open understory @ some herbaceous cover. Does not appear to be grazed. A small portion is hayed.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10"	10YR 3/2	95	2.5YR 4/6	5	C	PL/M	cl	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: Redox Dark Surface -

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): Surface

Wetland Hydrology Present? Yes X No _____

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

Remarks: • No current standing water but has water stained leaves.
• Water draining off surface into ditch (ditch? channel?) Board Swale running to NW.

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
Arkelian 103-230-04	6 JAN 2011	10.0

TOTAL WETLAND AC:	OTHER WATER AC:		IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
8.6 AC	0 CALC FOR STATUS	Pem 0.4 AC	0	.4 AC	9.6 AC
	UPLAND 1.4 AC	Pf 8.2 AC			Pf - 8.2 AC
					UPL 1.4 CREATION ?

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE:
PALUSTRINE forested, SEASONALLY SATURATED
- Pf

LANDSCAPE POSITION:
ALLUVIAL PLAIN - @ SWALES
0% - 2% slope

HYDROLOGY TYPE & DURATION:
- very long duration, subsurface saturation
- Surface on-flow from upslope @ surface drainage confined to swales/old channels draining to NW
- Unlikely to flood but may pond water in surface depressions unable to drain for short duration periods after ppt events.

HYDRIC SOIL INDICATOR:
Redox dark surface - F6
No Ap

SOIL SURVEY MAP UNIT:
Geilow sl 0-5%
Cole cl 0-2%

WETLAND/ UPLAND BOUNDARY:
transitional

SLOPE & DRAINAGE:
0-1% surface sheet flow over swales forced drainage features

Dominant Species * Common Species+ — cyperus sp, scirpus sp
Quercus lobata
Fraxinus latifolia
Juncus sp
Rubus ursinus

MATURE closed canopy forest

NOXIOUS SPECIES:
None

GROWTH FORM:
Forested

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	North - palustrine forested South - agr. pasture east - agr. pasture west agr. pasture
	OBSERVED/INFERRED MODIFICATIONS: V - appears to be mature trees @ herbaceous understory S - None - no evidence of manipulation H - None - swales (may have been historic ditches?) drain water across and off the parcel. Primary hydrology is subsurface saturation
	CHARACTERIZATION: Closed canopy Palustrine forested seasonally saturated wetland. Parcel does not appear to be grazed or have significant modifications to current circumstance of hydrology or soil
	COMMENTS: • Small population of Pc ho observed on site. • Small upland inclusions at edge of parcel • No observed Li bn or potential habitat • Confusing map symbol for lowland oak grassland ..... is this an upland?

Arkelian - 6-JAN 2011

EXCLOSURE DESCRIPTION/ REFERENCE SITE	NONE SOIL SURVEY MAP UNIT: Geilow sl 0-5% Cole cl 0-2%.
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE
	HYDROLOGY: NONE
	VEGETATION CLASS: Palustrine forested - mature trees
	ESTIMATED SPECIES COMPOSITION CHANGE: NONE - already climax successional forest
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: None
	OTHER POTENTIAL ACTIONS: • Remove fencing • If oak woodland grassland lowland is upland can it be contoured to create PL ho habitat? That would add to creation credits.

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

Benbow I 007-020-03 33.5 Ac

BENBOW 1

CHARACTERIZATION

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

Project/Site: Benbow 1 007-020-03 City/County: Willits Sampling Date: 28 dec 10

Applicant/Owner: CALTRANS State: CA Sampling Point: Parcel Baseline

Investigator(s): DM / SZ, JM / RR Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Floodplain Terrace Local relief (concave, convex, none): FLAT Slope (%): 1 %

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: COLE & FELIZ & TALMAGE NWI classification: Pem

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation X, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X No _____	Is the Sampled Area within a Wetland? Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks: PARCEL CHARACTERIZATION. V/S/H observations Reflect Generalization of WETLAND component of PARCEL

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: _____)			
1. Festuca arundinacea			FAC
2. Lolium perenne			FAC
3. Ranunculus (orthorhynchus?)			FACW
4. Juncus patens			FAC
5. Trifolium (Repens ?)			FACU
6. Hypochaeris Radicata			UPL
7. Geranium dissectum			UPL
8.			
9.			
10.			
11. see JD data sheets for additional species			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		
% Bare Ground in Herb Stratum _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: GRAZED PASTURE – PARCEL MANAGED FOR FORAGE SPECIES / MOST COMMON/DOMINANT SPECIES

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2"	10YR 4/2	100%					sil	dense roots
2-16"+	10YR 4/2	80%	7.5YR 4/6	20%	C	PL, M	sil	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: DEPLETED MATRIX / MANY REDOX CONCENTRATIONS / NO Ap OR DARK A / NO OBVIOUS OR RECENT SOIL MANIPULATIONS

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- X Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 0-1"

Water Table Present? Yes X No ___ Depth (inches): 3"

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0"

Wetland Hydrology Present? Yes X No ___

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

Remarks:

▽ 3" / STANDING WATER IN DEPRESSIONAL POSITIONS-0-1" / SWALE FLOWING - NOT FLOODING PARCEL

PARCEL/UNIT: BenBow 1
APN# 007-020-03

FIELD INSP DATE: 28 Dec 10

TOTAL PARCEL AC: 33.5 Ac

TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
26.6 Ac Pf - 3.1 Ac Pem - 23.5 Ac	0.2 Ac — No impacts to OW. Part of channel at edge of Parcel	8.5 Ac 6.7 Ac upland	15.0 Ac	.2 Ac OW 3.1 Ac Pf 6.7 Ac upland

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE: Grazed pasture — Pem seasonally saturated — plants managed for forage

LANDSCAPE POSITION: wet meadow — floodplain terrace

HYDROLOGY TYPE & DURATION:
- Very long duration sub-surface saturation
- occasional flooding — short duration
- micro-depressional ponding / localized surface sheet flow

HYDRIC SOIL INDICATOR:
- Depleted matrix F-3
- No dark surface horizon
  No buried soil to 16+"

SOIL SURVEY MAP UNIT: Cole clay loam — 0-2%

WETLAND/ UPLAND BOUNDARY: Transitional — higher ridges adjacent to wetlands

SLOPE & DRAINAGE: ~1% S to N. Two vegetated swales running water

DOMINANT SPECIES: * common species +
Parcel dominated by pasture grasses + forbs including

Festuca*	Hypochaeris+
Lolium*	Geranium+
Ranunculus+	Poa+
Juncus+	Holdeum+
Trifolium*	(see SP's for complete list)

NOXIOUS SPECIES: None Identified

GROWTH FORM: Herbaceous

CURRENT CIRCUMSTANCE DESCRIPTION

SURROUNDING PARCELS:

S → E. COMMERCIAL RD. / AG fields-PASTURE
E → TRIBUTARY @ RIPARIAN INTO AG field-PASTURE
W → BRECHTEL CREEK @ RIPARIAN - RECREATIONAL Fields ?
N → BONBON II - MANAGED/GRAZED PASTURE

OBSERVED/INFERRED MODIFICATIONS:

VEGETATION - MANAGED/GRAZED PASTURE, PLANT COMMUNITY APPEARS TO BE DOMINATED BY INTRODUCED PASTURE GRASSES AND MANAGED THROUGH GRAZING TO RESTRICT SUCCESSIONAL DEVELOPMENT
SOIL - NO OBVIOUS MODIFICATION UNDER CURRENT CONDITION
HYDROLOGY - NO OBVIOUS MODIFICATION UNDER CURRENT CONDITION

CHARACTERIZATION:

GRAZED PASTURE @ MANAGED VEGETATION ON INTACT HYDRIC SOIL AND VERY LONG DURATION SUB-SURFACE SATURATED WETLAND HYDROLOGY. PARCEL MAY BE OCCASIONALLY FLOODED DURING EXTREME PPT EVENTS.

COMMENTS:

- NO OBSERVED POPULATIONS of PL ho OR Li ba.
- MOST of WETLANDS ON PARCEL IDENTIFIED AS POTENTIAL HABITAT FOR Li ba.
- PROJECT AREA (PERMANENT + TEMPORARY IMPACTS) OCCUR @ IN THIS PARCEL.
- HOUSE & OUTBUILDINGS ON PARCEL

EXCLOSURE DESCRIPTION/ REFERENCE SITE	No exclosures on Parcel. Similar soil units on parcels to the N have stumps and Tree Throw depressions indicating potential to support Woodland/Forest Qu Do, Fr la, Um ca. Increased cover Jupa.
	SOIL SURVEY MAP UNIT: Cole clay loam 0-2%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: None – current normal circumstance
	HYDROLOGY: None – Historically altered but currently in normal circumstances, V/D-SSS Seasonal flooding
	VEGETATION CLASS: Currently Pem seasonally saturated Agriculture Pasture Likely would support Pf/em seasonally saturated wetland woodland/meadow.
	ESTIMATED SPECIES COMPOSITION CHANGE: Shift from managed NG grasses (Festuca, Lolium, Trifolium, Geranium etc) to likely include a larger % cover or dominance by Juncus, Carex, Quercus, Fraxinus, Hordeum br, Alopecurus
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: • Remove grazing and vegetation management or other modifications that interfere w vegetation successional development
	OTHER POTENTIAL ACTIONS: • Remove debris • Remove unnecessary fencing • Remove stock lighting Fill Pile • Remove Rubus Patches • Riparian Plantings in wetland adj to creek • Upland Riparian Plantings Adj to Creek • Erosion control for RWQCB

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

BenBow II 007-010-04 36.2 AC

CHARACTERIZATION

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

Project/Site: Benbow II 007-010-04 City/County: Wilkins Sampling Date: 28 Dec 10

Applicant/Owner: CALTRANS State: CA Sampling Point: Paired Baseline

Investigator(s): DM/RR/SZ, JM Section, Township, Range:

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Flat/Swale Slope (%): 0-1%

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: Cole cl 0-2%, Felizano 0-2% NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X No ____	Is the Sampled Area within a Wetland?	Yes X No ____
Hydric Soil Present?	Yes X No ____		
Wetland Hydrology Present?	Yes X No ____		

Remarks: Paired characterization. V/S/H observations reflect generalized conditions of wetland component of paired

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Festuca arundinacea			FAC
2. Juncus patens			FAC
3. Ranunculus sp			FACW
4. Trifolium (Hexens?)			FACW
5. Hypochaeris radicata			UPL
6.			
7.			
8.			
9.			
10.			
11.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		
% Bare Ground in Herb Stratum ____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species ____	x 1 =	____
FACW species ____	x 2 =	____
FAC species ____	x 3 =	____
FACU species ____	x 4 =	____
UPL species ____	x 5 =	____
Column Totals: ____ (A)		____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Grazed pasture – paired matched for native species

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR4/2	70%	2.5YR4/6	30%	C	PL/M	cl	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: F-3 Depleted Matrix
No observable Ap or soil manipulations

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 0-2"

Water Table Present? Yes X No ___ Depth (inches): 4"

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0"

Wetland Hydrology Present? Yes X No _____

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

▽ 4"

Remarks:

- Very Long Duration Subsurface Saturation
- Shallow water in swales/depressions
- Surface sheet flow across flat and swales towards AV

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
BenBow II 007-010-04	28 Dec 10	36.2 AC

TOTAL WETLAND AC:	OTHER WATER AC:		IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
Pf - Riparian 3.5 AC Pem - 25.3 AC - 3.9	.3 AC UPLAND AC 7.1 AC - 3.9 AC		Pf 0.7 AC Pem 3.9 AC UPL - 3.9 AC	Pem - 21.4 AC	Pf - Riparian 3.5 AC - .7 = 2.8 AC UPL - 3.2 AC

CURRENT CIRCUMSTANCE DESCRIPTION	WETLAND TYPE:	LANDSCAPE POSITION:
	GRAZED PASTURE Pem seasonally saturated Forage grasses - does not appear to be hayed	Floodplain Terrace - wet meadow

HYDROLOGY TYPE & DURATION:

Very long duration subsurface saturation
- occasional flooding - short duration
- micro depressional ponding - localized surface sheet flow
- swales/old channels? collecting water

HYDRIC SOIL INDICATOR:	SOIL SURVEY MAP UNIT:	WETLAND/ UPLAND BOUNDARY:	SLOPE & DRAINAGE:
F3 - Depleted Matrix No observable Ap or soil manipulation	Cole cl 0-2% Feliz l 0-2%	Transitional	0-1% S to N, flat @ swales

Dominant Species * Common Species+	NOXIOUS SPECIES:
Festuca arundinacea Ranunculus sp Juncus patens Trifolium sp Hypochaeris erratic Trees (Quercus)	None

GROWTH FORM:

Herbaceous

CURRENT CIRCUMSTANCE DESCRIPTION

SURROUNDING PARCELS:

S - open pasture
N - open pasture
E - Riparian - open pasture
W - Riparian Beech to Creek / Willits Kiddie Pool

OBSERVED/INFERRED MODIFICATIONS:

V - managed grazed pasture, dominated by grasses for forage.

S - No observed modification - No Ap

H - No obvious modification under current circumstances
- swales/old channels may be remnants from flooding or surface disturbances.

CHARACTERIZATION:

Grazed pasture @ managed vegetation on intact Hydric soil @ very long duration sub surface saturated wetland. Parcel may be occassionally flooded.

COMMENTS:

- No observed populations of Li ba or Pl ko @ in Parcel
- Most of Parcel Proposed habitat for Li ba.
- Project impacts occur on W edge of Parcel.
- few exotic trees
- Riparian communities on creeks on both E + W edge.

BENBOW II 007-010-04

EXCLOSURE DESCRIPTION/ REFERENCE SITE	NONE. SIMILAR SOIL UNIT ON BENBOW III have numerous tree stumps indicating it was capable of supporting woody vegetation SOIL SURVEY MAP UNIT: Cole cl 0-2%. Feliz l 0-2%.
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: None - no observed modification HYDROLOGY: None - historically altered VEGETATION CLASS: currently Pem seasonally saturated Ag Pasture ESTIMATED SPECIES COMPOSITION CHANGE: likely support Quercus/Platanus woodland and meadow flowers including Juncus, Carex, Perennial Grasses MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: Remove grazing and allow successional vegetation development OTHER POTENTIAL ACTIONS: • Remove debris, Remove Rubus • Remove fencing • Additional Riparian planting

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

Benbow III 108-040-13 41.0 AC

Riparian woodland/wetland → 1.2 .3 .5 1.3 .2 .1 .2] 3.8 AC ~~Riparian~~ Forested wetland

Upland – .28 .18 .38 .44 .24 .61 → 2.3 AC

Other water 1.2 AC

Wetland < wet meadow / swale > 33.7 AC

CHARACTERIZATION

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

Project/Site: BENBOW III 108-040-13 City/County: WILLITS Sampling Date: 28 Dec 10

Applicant/Owner: CALTRANS State: CA Sampling Point: PARCEL BASELINE

Investigator(s): DM / RR / SZ JM Section, Township, Range: Ridge

Landform (hillslope, terrace, etc.): FloodPlain Terrace Local relief (concave, convex, none): FLAT / SWALES Slope (%): 0-2%

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: Cole cl 0-2% Feliz l 0-2% NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ___	Is the Sampled Area within a Wetland? Yes X No ___
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes X	No ___	

Remarks: Parcel characterization V/S/H observations reflect generalized wetland state of parcel.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus latifolia			FACW
2. Quercus robata			FAC
3. Gallery along old channel?			
4. erratic			
	___ = Total Cover		

Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	___ = Total Cover		

Herb Stratum (Plot size: ___)			
1. Festuca arundinacea			FAC
2. Juncus patens			FAC
3. Trifolium sp (Rerens?)			FACU
4. Hypochaeris radicata			UPL
5. Mentha pulegium			OBL
6. Lythrum hyssopifolia			FACW
7.			
8.			
9.			
10.			
11.			
	___ = Total Cover		

Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ___ (A)

Total Number of Dominant Species Across All Strata: ___ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ___ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation.

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: Grazed pasture – parcel managed for forage grass – numerous tree stumps and thrown holes on parcel surface – indicates parcel supported trees

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9"	10YR 4/2	95	7.5YR 4/6	5	C	PL/M	sil	
9-16"	10YR 4/1	100					CL	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: F3 - Depleted matrix
No AP no observed modification
some swale/ridge development but mostly flat

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No _____ Depth (inches): 0-3" - swales/depressions

Water Table Present? Yes X No _____ Depth (inches): 3"

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0"

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: ▽ 3"

Remarks:
Very low deflation Subsurface saturation, occasional flooding excess water sheet flowing into swales then flowing off to N
~ 5% of surface in low swales

BenBow III 108-040-13

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
BenBow III 108-040-13	28 Dec 10	41.0 AC

TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
	1.2 AC UPLAND AC			

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE:
Pem seasonally saturated
Agricultural Pasture

LANDSCAPE POSITION:
Floodplain Terrace
Wet meadow

HYDROLOGY TYPE & DURATION:
- very long duration sub surface saturation @ occassional flooding
- depressional swales & Tree throws. in places swales are deeper (swale/Ridge) and contain flowing water.

HYDRIC SOIL INDICATOR:
F-3 Depleted Matrix
No dark surface horizon
No observed AP

SOIL SURVEY MAP UNIT:
Cole cl 0-2%
Feliz l 0-2%

WETLAND/ UPLAND BOUNDARY:
Transitional - Swale + Ridge to Flat

SLOPE & DRAINAGE:
0-2%

Dominant Species * Common Species+
Festuca
Juncus
Trifolium
Hypochaeris
Mentha
Lythrum

NOXIOUS SPECIES:
None

GROWTH FORM:
Herbaceous
Wooded Gallery

CURRENT CIRCUMSTANCE DESCRIPTION

SURROUNDING PARCELS:

S - OPEN PASTURE
N - OPEN PASTURE
W - WASTE TREATMENT POND?
E. RIPARIAN CORRIDOR ALONG CREEK - OPEN PASTURE

OBSERVED/INFERRED MODIFICATIONS:

V - MANAGED/GRAZED PASTURE - WETTER END SPECIES IN SHALLOW PONDED SWALES/DEPRESSIONS -

H - NONE OBVIOUS

S - NONE

CHARACTERIZATION:

GRAZED PASTURE @ MANAGED FORAGE SPECIES ON INTACT HYDRIC SOIL @ VLD - SFS AND OCCASSIONAL FLOODING. APPEARS TO HAVE SUPPORTED TREES IN THE PAST. (STUMPS + TREE THROW DEPRESSIONS ACROSS SURFACE OF PARCEL)

COMMENTS:

- A TINY POPULATION OF Li ba OBSERVED ON PARCEL. NO PL HO
- MUCH OF PARCEL IDENTIFIED AS POTENTIAL Li ba HABITAT
- ~~No~~ PROJECT IMPACTS ON PARCEL
- A SMALL RIPARIAN GALLERY AND RELICT TREES. MAY HAVE BEEN LOGGED.

EXCLOSURE DESCRIPTION/ REFERENCE SITE	None -
	SOIL SURVEY MAP UNIT: cole cl 0-2%. Feliz l 0-2%.
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: None
	HYDROLOGY: None - historically may have been heads of TRIBUTARIES or back flow channels -
	VEGETATION CLASS: Pem
	ESTIMATED SPECIES COMPOSITION CHANGE: Likely to support Qu lo, FR Qa @ wetter end meadow species including Juncus, Carex, Perennial Grasses
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: Remove GRAZING and VEGETATION MANAGEMENT and ALLOW SUCCESSIONAL VEGETATION MANAGEMENT
	OTHER POTENTIAL ACTIONS: • Remove fencing • Remove debris

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

BEARBOW IV 108-030-07 54.7 ac

Characterization

Ben Burt IV

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

Project Site: Ben Burt IV 108-030-07 City/County: Willits Sampling Date: 28 Dec 10

Applicant/Owner: CalTrans State: CA Sampling Point: Paired Baseline

Investigator(s): DM/RR/JM.SZ Section, Township, Range:

Landform (hillslope, terrace, etc.): Floodplain Terrace Local relief (concave, convex, none): Flat / Slight Slope (%): 0-2%

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: Cole clay 0-2% Cleone sandy loam, Flumeneta NWI classification: Pem

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation X, Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X No	**Is the Sampled Area within a Wetland?**	Yes X No
Hydric Soil Present?	Yes X No		
Wetland Hydrology Present?	Yes X No		

Remarks: Paired characterization. V/S/H observations reflect generalized wetland characteristics of wetland component of Paired

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus lobata			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1. Rosa californica			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size:)			
1. Festuca arundinacea			FAC
2. Juncus patens			FAC
3. Alopecurus sp			OBL
4. Galium stolonifera			FACW
5. Cyperus sp			OBL
6. Ranunculus sp			FACW
7 Geranium dissectum			UPL
8.			
9.			
10.			
11.			
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: (A)

Total Number of Dominant Species Across All Strata: (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- Dominance Test is >50%
- Prevalence Index is ≤3.0[1]
- Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- Wetland Non-Vascular Plants[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks: Grazed Pasture –

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10"	10YR4/2	95	7.5YR4/6	5	C	PL/M	SiCl	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRA 1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: F-3 Depleted matrix

No observed Δp

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (LRR A)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (LRR A)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No _____ Depth (inches): 0

Water Table Present? Yes X No _____ Depth (inches): 12"

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): Surface

Wetland Hydrology Present? Yes X No _____

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

Remarks:

- Shallow standing water 0-1" on surface in depressions
- Very long duration sub surface saturation
- Deeper swales @ standing water, occasional flooding

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
Benbow IV 108-030-07	28 Dec 10	54.7 AC

TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
Pem - 53.8 AC	0 AC UPLAND .9 AC	0 AC	53.8 AC	.9 AC

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE:
Pem seasonally saturated
Grazed Ag pasture

LANDSCAPE POSITION:
Floodplain Terrace

HYDROLOGY TYPE & DURATION:
- very long duration sub surface saturation
- occassional flooding
- shallow ponded water in swales + depressions
- deep swales (High Flow channels?) (w flowing water

HYDRIC SOIL INDICATOR:
F-3 Depleted Matrix
No obvious Ap

SOIL SURVEY MAP UNIT:
Cole cl 0-1%
Sielowsl 0-5%
Fluvaquents 0-1%

WETLAND/ UPLAND BOUNDARY:
Transitional

SLOPE & DRAINAGE:
0-1%
deeper swales @ flowing water

Dominant Species * Common Species+
Festuca
Juncus
Alopecurus
Agrostis
Cyperus
Ranunculus
Cichorium

NOXIOUS SPECIES:
None

GROWTH FORM:
herbaceous
erratic trees

CURRENT CIRCUMSTANCE DESCRIPTION

SURROUNDING PARCELS:

N - open pasture
S - open pasture
E - open pasture
W - open pasture

OBSERVED/INFERRED MODIFICATIONS:

V - grazed pasture

H - None

S - None

CHARACTERIZATION:

Palustrine emergent seasonally saturated grazed agricultural pasture @ interior hydric soil and very long duration sub surface saturated wet meadow. May occasionally flood and has swales @ shallow flowing water.

COMMENTS:

- Li ba populations observed @ N parcel
- Wetland @ N parcel has been proposed as Li ba potential habitat
- No PL ho populations observed on parcel
- No project impacts @ N parcel

Benbow III 108-030-07

EXCLOSURE DESCRIPTION/ REFERENCE SITE	None –
	SOIL SURVEY MAP UNIT: Cole cl 0-1%, Gilcow sl 0-5%, Fluvaquent 0-1%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: None
	HYDROLOGY: None
	VEGETATION CLASS: P-em
	ESTIMATED SPECIES COMPOSITION CHANGE: decrease in pasture grasses and increase in perennial grasses/forbs Mesic Juncus, Carex Possible Quercus / Fraxinus
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: Remove Vegetation management + Grazing
	OTHER POTENTIAL ACTIONS: Remove fencing Remove water trough and piping

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

Berbow V 108-020-06 46.61c

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

Project/Site: Benbow V 108-020-06 City/County: Willits Sampling Date: 28 Dec 10

Applicant/Owner: Caltrans State: CA Sampling Point: Parcel Baseline

Investigator(s): DM / JM SZ / RR Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Floodplain Terrace Local relief (concave, convex, none): Flat Slope (%): 0-1%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Gelcow sl 0-5% NWI classification: Pem

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Parcel characterization. V/S/H observations reflect generalized site condition for wetland component of parcel

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Ranunculus sp			FACW
2. Juncus patens			FAC
3. Trifolium sp (Lepens)			FACU
4. Festuca arundinacea			FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Parcel grazed – does not appear to be hayed
erratic trees (quercus)

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-10"	10YR 3/2	95	7.5YR 4/6	5%	C	PL/SM	CL	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks: F6 - Redox Dark Surface
No apparent AP

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required, check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (LRR A)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (LRR A)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

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

Water Table Present? Yes X No ___ Depth (inches): 3"

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0"

Wetland Hydrology Present? Yes X No ___

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

Remarks:
- standing water in swales / depressions 0"-4"
- very flat - N end of AP reach @ surface water

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
Benbow V 108-020-06	28 Dec 10	46.6 AC

TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
	0			

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE:
Pem seasonally saturated
Grazed Ag Pasture

LANDSCAPE POSITION:
Floodplain Terrace

HYDROLOGY TYPE & DURATION:
- sub surface saturation for very long duration
- occasionally flooded
- standing water in swales / depressions

HYDRIC SOIL INDICATOR:
F-6 Redox Dark Surface
Ag apparent Ap

SOIL SURVEY MAP UNIT:
Girlow Sl 0-5%

WETLAND/ UPLAND BOUNDARY:
Transitional

SLOPE & DRAINAGE:
0-1%

Dominant Species * Common Species+
Juncus patens
Trifolium
Festuca
Ranunculus
Alopecurus
Juncus (oxymeris?)
Mentha
Typha
Carex

NOXIOUS SPECIES:
None

GROWTH FORM:
herbaceous

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	N, E, W, S → AG PASTURE
	OBSERVED/INFERRED MODIFICATIONS:
	V – GRAZED – few forage GRASSES, mostly wetter end perennial H – NONE S – NONE
	CHARACTERIZATION:
	Pem seasonally saturated grazed AG pasture @ intact soil and current circumstance hydrology
	COMMENTS:
	• few populations of Li ba scattered across parcel. Remainder of parcel identified as Li ba potential habitat. • No project impacts @ in parcel • No PL ho identified @ in parcel • erratic trees

EXCLOSURE DESCRIPTION/ REFERENCE SITE	None
	SOIL SURVEY MAP UNIT: Gaclow gl 0-5%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: None
	HYDROLOGY: None
	VEGETATION CLASS: Pem seasonal saturated grazed Ag pasture
	ESTIMATED SPECIES COMPOSITION CHANGE: increase - perennial Juncus, Carex, grass Less - forage grasses Likely - Quercus/Fraxinus
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: Remove vegetation management and allow successional plant development
	OTHER POTENTIAL ACTIONS: • Remove levee • Remove fencing

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

Brooke

108-030-01	11.9 Acres
038-040-09	15.0 Acres
108-020-03	9.2 Acres
108-030-01	16.9 Acres

CHARACTERIZATION

PARCELS 108-030-01, 038-040-09, 038-020-11, 108-020-03

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

UNIT A

Project/Site: BROOKE FORESTA City/County: Mendocino Sampling Date: 27 JAN 2011

Applicant/Owner: CALTRANS State: CA Sampling Point: PARCEL BASELINES

Investigator(s): DM, KL, DW, RD, SZ Section, Township, Range: _____

Landform (hillslope, terrace, etc.): FLOODPLAIN TERR Local relief (concave, convex, none): FLAT Slope (%): 0-1%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: FLUVAQUENTS 0-1% HAPLAQUENTS 0-1% NWI classification: PF/SS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: PARCEL CHARACTERIZATIONS. V/S/H OBSERVATIONS REFLECT GENERALIZED CONDITION ACROSS F/SS UNITS OF 4 PARCELS

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus Pontifolia			FACW
2. Quercus Lobata			FAC
3. Salix sp			FACW
4.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size: ____)			
1. Rubus discolor			FACW
2. Rubus ursinus			FACW
3.			
4.			
5.			
		= Total Cover	

Herb Stratum (Plot size: ____)			
1. Juncus effusus			OBL
2. Diasacus			NI
3. Scirpus			OBL
4. Juncus patens			FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
		= Total Cover	

Woody Vine Stratum (Plot size: ____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

__ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Wetland Non-Vascular Plants[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: FALLOW fields

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-14"	10YR 4/2		7.5YR 4/6	5				depletions 2% 10YR 5/1

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks: F-3. Depleted Matrix

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required, check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (LRR A)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (LRR A)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

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

Water Table Present? Yes ✓ No ___ Depth (inches): 10"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 6"

Wetland Hydrology Present? Yes X No ___

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

Remarks: Moist throughout top 14"

PARCEL/UNIT: Brooke - Forested Parcels 108-030-01, 038-040-09, 038-020-11, 108-020-03 11.9 15.0 9.2 16.9			FIELD INSP DATE: 27 JAN 2014	TOTAL PARCEL AC: 53.0 4 Parcels
TOTAL WETLAND AC: Pem-marsh 29.5 AC Pf - 21.0 AC	OTHER WATER AC: 1.4 AC UPLAND AC 1.1 AC	IMPACTS IN WETLAND AC: Pf - 2.3 AC Pem - 2.7 AC	ENHANCEMENT AC: ~~26.8 AC~~ 0 AC	PRESERVATION AC: Pf 18.7 AC 1.4 AC OW 1.1 AC UPL 26.8 AC Pem Marsh

CURRENT CIRCUMSTANCE DESCRIPTION	WETLAND TYPE: palustrine [illegible]	LANDSCAPE POSITION: [illegible]

HYDROLOGY TYPE & DURATION:

- very long duration ponding
- subsurface saturation
- occasional flooding

HYDRIC SOIL INDICATOR:	SOIL SURVEY MAP UNIT:	WETLAND/ UPLAND BOUNDARY:	SLOPE & DRAINAGE:
F3	Fluvaquents 0-1% Udipsamments 0-1%	Transect	[illegible]

Dominant Species * Common Species+	NOXIOUS SPECIES:
[illegible]	None
	GROWTH FORM: [illegible]

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	N - fallow field, riparian woodland, ag. pasture W - highway, hillside S - agr. pasture E - creek, railroad, agr. pasture
	OBSERVED/INFERRED MODIFICATIONS: S - NONE H - NONE V - unit has been fallow since disturbance of early 90's
	CHARACTERIZATION: - palustrine forested w/ shrub + herbaceous understory. Very long duration ponding with subsaturation; occassional flooding - Parcel is fallow, no current grazing or vegetation management.
	COMMENTS: • No Li ba or Pl ho • PROJECT IMPACTS ON 2 PARCELS 038-020-11 + 038-040-09

BROOKE - FORESTED
23 JAN 2014

EXCLOSURE DESCRIPTION/ REFERENCE SITE	NONE SOIL SURVEY MAP UNIT: FLUVAQUENTS 0-1% HYDRAQUEPTS 0-1%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE
	HYDROLOGY: NONE
	VEGETATION CLASS: post disturbance / pioneer is currently fallow
	ESTIMATED SPECIES COMPOSITION CHANGE: continued colonization of Fraxinus and Quercus in understory veg.
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: NONE -
	OTHER POTENTIAL ACTIONS: - Rubus removal - Debris removal - annual cycle

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

CHARACTERIZATION

PARCELS 108-030-01, 038-040-09, 038-020-11, 108-020-03

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

UNIT B

Project/Site: BROOKE – Mendo City/County: MENDOCINO Sampling Date: 27 JAN 2011

Applicant/Owner: CALTRANS State: CA Sampling Point: PARCEL BASELINES

Investigator(s): DM, KG, DW, RP, SZ Section, Township, Range: _____

Landform (hillslope, terrace, etc.): FLOODPLAIN TERRACE Local relief (concave, convex, none): FLAT Slope (%): 0-1%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: FLUVAQUENTS 0-1% HAPLAQUEPTS 0-1% NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: CHARACTERIZATION OF 4 PARCELS FOR MARSH WETLAND UNITS. V/S/H OBSERVATIONS REFLECT GENERALIZED CHARACTERS

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Juncus + glutinosus inf			FACW
2. Scirpus			OBL
3. Bechmannia			OBL
4. Bipsalis			NI
5. EUTHAMIA			OBL
6. CAREX			FACW
7.			
8.			
9.			
10.			
11.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: – FALLOW FIELDS. NO GRAZING / VEGETATION MANAGEMENT FOR 15+ YEARS.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4-5/2		7.5YR 4/6	20			silty clay	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRA 1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks: - root zone is loose that is starting to develop as A-Horizon
- 15+ years ago parcel @ being grubbed to remove vegetation but was stopped as unauthorized. Small piles from root balls still evident. Gouges in ground @ standing water.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required, check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (LRR A)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (LRR A)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 1-6"

Water Table Present? Yes ✓ No ___ Depth (inches): surface

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): surface

Wetland Hydrology Present? Yes X No ___

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

Remarks: - standing water in depressions

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
BROOKE - Marsh 4 PARCELS @ PARTIAL MARSH UNITS (B) 108-030-01, 038-040-09, 038-020-11 + 108-020-03	[illegible] 2011	

TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:

CURRENT CIRCUMSTANCE DESCRIPTION	WETLAND TYPE:	LANDSCAPE POSITION:
	palustrine emergent	flood plain terrace

HYDROLOGY TYPE & DURATION:

- very long duration ponding
- VLD subsurface saturation
- occasional flooding

HYDRIC SOIL INDICATOR:	SOIL SURVEY MAP UNIT:	WETLAND/ UPLAND BOUNDARY:	SLOPE & DRAINAGE:
F3	FLUVAQUENTS 0-1% HAPLAQUEPTS 0-1%	trans.	0-1% sheet flow to N

Dominant Species * Common Species+

gladiated-leafed Juncus
Scirpus
Carex
Dipsacus
Beckmannia
- Epilobium
- Rumex

NOXIOUS SPECIES:

None

GROWTH FORM:

Herbaceous

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	N - riparian woodland, ag. pasture E - riparian woodlood land, creek, ag. pasture W - Highway, hillside w/ development S - woodland, then ag. pasture
	OBSERVED/INFERRED MODIFICATIONS: ag. pasture left fallow. Early '90's portion of parcel had been grubbed to convert to ag. pasture as they abandoned.
	CHARACTERIZATION: Palustrine emergent, with very long duration ponding, subsurface saturation, no current grazing or veg. management. - gladiated [illegible] [illegible] [illegible] [illegible] already going toward [illegible] veg. State.
	COMMENTS: • No populations of Li ba or PL ho identified on any parcel • No identified potential habitat proposed on any parcel • Project impacts on parcels 038-020-11 + 038-040-09

Brooke

EXCLOSURE DESCRIPTION/ REFERENCE SITE	BROOKE - Mowbh 27 JAN 2014 4 PARCELS NONE SOIL SURVEY MAP UNIT: FLUVAQUENTS HAPLAQUEPTS
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE HYDROLOGY: NONE VEGETATION CLASS: - palustrine emergent / palustrine forested ESTIMATED SPECIES COMPOSITION CHANGE: - increase in Fraxinus colonization (erratic trees encroaching into mowbh) MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: - NONE OTHER POTENTIAL ACTIONS: • Remove SASQUATCH washing machine w Beer CAN IN TUB • Remove fencing

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

Ford 108-010-05 76.6 ac

#1

FORD

CHARACTERIZATION

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

UNIT A

Project/Site: FORD - 108-010-05-Mash City/County: MENDOCINO Sampling Date: 26 JAN 2004

Applicant/Owner: CALTRANS State: CA Sampling Point: UNIT BASELINE

Investigator(s): DM, KG, DW / RP, SJ Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Floodplain Terrace Local relief (concave, convex, none): FLAT Slope (%): <1%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: HAPLAQUEPTS 0-1% FLUVAQUENTS 0-1% Gielow SL 0-5% NWI classification: Pem

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation +/-, Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: PARCEL UNIT CHARACTERIZATION. V/S/H OBSERVATIONS REFLECT GENERALIZED CONDITION OF WETLAND IN PARCEL UNIT

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Scirpus			OBL
2. Juncus (oxymerus?)			FACW
3. Pleuropogon (davei)			OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: DENSE SCIRPUS STAND. OPEN TO GRAZING BUT APPEARS TO HAVE LITTLE TO NO EFFECT ON PLANT COMMUNITY.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3								newly deposited silt
3-	10YR 4/1	50	7.5YR 4/6	50			silt/clay	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRA 1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks: F-3 Depleted matrix
- Newly deposited layer of silt on surface

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required, check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- X Sediment Deposits (B2)
- X Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ___ Salt Crust (B11)
- X Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (LRR A)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (LRR A)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 0-10"+

Water Table Present? Yes ✓ No ___ Depth (inches): 0"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0"

Wetland Hydrology Present? Yes X No ___

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

Remarks: - Snail grazing on newly deposited silt
- Very long duration subsurface saturation
- Very long duration ponding 0"-8"+
- Frequent flooding likely

UNIT A

PARCEL/UNIT: FORD 108-010-05 Marsh UNIT A			FIELD INSP DATE: 26 Jan 2011	TOTAL PARCEL AC: 76.6 AC
TOTAL WETLAND AC:	OTHER WATER AC: 1.2 AC	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE: palustrine emergent - ponded marsh
SEASONAL TO PERENNIAL

LANDSCAPE POSITION: floodplain terrace

HYDROLOGY TYPE & DURATION:

- very long duration ponding
- VLD subsurface saturation
- seasonal flooding may be frequent

HYDRIC SOIL INDICATOR: F3 depleted matrix
3"-4" inches of newly deposited SILT ON SURFACE.

SOIL SURVEY MAP UNIT: Haplaquepts 0-1%, Fluvaquents 0-1%, Gielow SL 0-5%

WETLAND/ UPLAND BOUNDARY: trans.

SLOPE & DRAINAGE: 0-1% shallow to N-NW

Dominant Species * Common Species+

Scirpus - Dense stand
Juncus
Pleuropogon

NOXIOUS SPECIES: None

GROWTH FORM: Ambaceous

CURRENT CIRCUMSTANCE DESCRIPTION

SURROUNDING PARCELS:

M, E, W, S - agricultural pasture

OBSERVED/INFERRED MODIFICATIONS:

S - None

N - None

✓ - grazing but probably little to no effect on SCIRPUS community.

CHARACTERIZATION:

- palustrine emergent - seasonally flooded marsh
- already @ a stable perennial marsh community

COMMENTS:

- Li BA populations across site and within Parcel UNIT
- Most of Parcel UNIT identified as POTENTIAL Li BA habitat
- No Project impacts on Parcel UNIT
- UNIT is mostly dominated @ SCIRPUS stands. UNIT is open to GRAZING but does not appear to be played or ANY effects to plant community from GRAZING.

EXCLOSURE DESCRIPTION/ REFERENCE SITE	FORD 108-010-05 Marsh 26 Jan 2001 NONE SOIL SURVEY MAP UNIT: HAPLAQUEPTS 0-1% FLUVAQUENTS 0-1% Gielow Sil 0-5%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE
	HYDROLOGY: NONE
	VEGETATION CLASS: palustrine emergent - marsh vegetation is already at expected, wetter species of Scirpus, Juncus.
	ESTIMATED SPECIES COMPOSITION CHANGE: ? probably none due to seasonal flooding.
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: • removal of grazing may have a limited effect.
	OTHER POTENTIAL ACTIONS: • Remove fencing

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

CHARACTERIZATION

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

UNIT B

Project/Site: FORD 108-010 -05- Mendocino City/County: MENDOCINO Sampling Date: [illegible]

Applicant/Owner: CALTRANS State: CA Sampling Point: UNIT BASELINE

Investigator(s): DM, R.G, DW/SZ, RP Section, Township, Range: _____

Landform (hillslope, terrace, etc.): FLOODPLAIN TERR. Local relief (concave, convex, none): FLAT Slope (%): 1%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Haplaquepts 0-1%, Fluvaquents 0-1%, Gilcow 0-5% 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 X 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 X	No _____	Is the Sampled Area within a Wetland? Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks: PARCEL UNIT CHARACTERIZATION. V/S/H observations reflect generalization of wetland characters in parcel unit.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: _____)			
1. Alopecurus sp			OBL
2. Ranunculus sp			FACW
3. Mentha pulegium			OBL
4. Rumex crispus			FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

__ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Wetland Non-Vascular Plants[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: PARCEL UNIT APPEARS TO be MOWED AND GRAZED. ALMOST TOTAL COVER by ALOPECURUS.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4"	5Y 2.5/1	100%					silty loam	dense roots
4-12"	10YR 4/1	40	7.5YR 4/6	40	C	PL/SM	silty clay loam	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRA 1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks: Root mass of perennial grasses appears to be developing an A horizon.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required, check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (LRR A)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (LRR A)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

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

Water Table Present? Yes ✓ No ___ Depth (inches): 3"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): surface

Wetland Hydrology Present? Yes X No ___

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

Remarks: surface water in swales and surface depressions. - seasonal / occasional flooding

UNIT B

PARCEL/UNIT: FORD 108-010-03 Meadow UNIT B			FIELD INSP DATE: 26 JAN 2004	TOTAL PARCEL AC: 76.6 AC
TOTAL WETLAND AC:	OTHER WATER AC: 1.2 AC	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:

CURRENT CIRCUMSTANCE DESCRIPTION	WETLAND TYPE: Palustrine emergent - wet meadow SEASONALLY SATURATED Hayed/Grazed Ag PASTURE	LANDSCAPE POSITION: Floodplain terrace
	HYDROLOGY TYPE & DURATION: - very long duration ponding, subsurface saturation - seasonal/occasional flooding	

HYDRIC SOIL INDICATOR:	SOIL SURVEY MAP UNIT:	WETLAND/ UPLAND BOUNDARY:	SLOPE & DRAINAGE:
F3 Depleted MATRIX	Haplaquepts 0-1% Fluvaquents 0-1% Gielow sl 0-5%	[illegible]	0-1% Sheetflow to [illegible]

Dominant Species * Common Species+	NOXIOUS SPECIES:
Alopecurus - almost 100% Ranunculus Mentha Rumex glaucoded - [illegible] Juncus	None
	GROWTH FORM: Herbaceous

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	N - Agricultural pasture E - Agricultural pasture W - Agricultural pasture S - Agricultural pasture
	OBSERVED/INFERRED MODIFICATIONS: S - None H - ditch running from S-N probably to help take surface water off V - Hayed and grazed agr. pasture demarked by Alopecurus
	CHARACTERIZATION: - Most of parcel appears to be hayed due to uniform vegetation; additional grazing - Palustrine emergent - wet meadow that has frequent to occasional flooding; varying duration of ponding; subsurface saturation
	COMMENTS: • Numerous observed Li ba plant populations observed in Parcel unit • Most of Parcel unit proposed as Li ba potential habitat • No project impacts @ in Parcel unit • Wet meadow supporting Alopecurus but not introduced forage grasses - may not result in change in vegetation type but shift in species composition.

UNIT 3

EXCLOSURE DESCRIPTION/ REFERENCE SITE	FORD 108-010-05 Meadow NONE SOIL SURVEY MAP UNIT: Haplaquepts 0-1% Fluvaquents 0-1% Gielow sl 0-5%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE
	HYDROLOGY: NONE
	VEGETATION CLASS: palustrine emergent - wet and meadow
	ESTIMATED SPECIES COMPOSITION CHANGE: shift to wetter end species ? marsh vegetation (Sumpa, Cerex, Juncus) Rather than almost total domination by Alopecurus Few erratic trees (Fraxinus) along Fenceline.
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: - removal of grazing and vegetation management
	OTHER POTENTIAL ACTIONS: - fence removal

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

FORD 108-010-06 138.9 AC

#2

CHARACTERIZATION FORD

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

UNIT A

Project/Site: FORD 108-010-06 w Hamburg City/County: Mendocino Sampling Date: 06 JAN 2011

Applicant/Owner: CALTRANS State: CA Sampling Point: _____

Investigator(s): DM, KG, DW/SZ, RP Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Abandoned terrace Local relief (concave, convex, none): FLAT Slope (%): 1%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: HAPLAQUEPTS 0-1%, FLUVAQUENTS 0-1%, GRELOW SP 0-5% NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation X, Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No _____	Is the Sampled Area within a Wetland? Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks: Parcel unit characterization. V/S/H observations reflect generalized conditions of wetland characters @ in parcel unit.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: _____)			
1. Festuca arundinacea			FAC
2. Juncus patens			FAC
3. Ranunculus sp			FACW
4. Alopecurus sp			OBL
5. Juncus (oxymeris ?)			FACW
6.			
7.			
8.			
9.			
10.			
11.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: Vegetation grazed and some of parcel unit may be bayed. erratic trees

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/2	90	7.5YR 4/6	20	C	PL/M	SiL	10YR 4/2 dry color

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRA 1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: F-3 Depleted Matrix

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ✓ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (LRR A)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (LRR A)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ✓ No _____ Depth (inches): 0-6"

Water Table Present? Yes ✓ No _____ Depth (inches): 11"

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): Surface

Wetland Hydrology Present? Yes X No _____

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

Remarks: Saturated w/in rooting zone and further below along pos transect - depressional area, ponded at footslope some @ algal mats

UNIT A

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
FORD 108-010-06 - Wetmeadow	26 JAN 2011	138.9 AC

TOTAL WETLAND AC:	OTHER WATER AC:		IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
111.9 AC	3.4 AC UPLAND AC 23.6 AC	UNIT A → 81.8 AC UNIT B → 26.9 AC MARSH Pf → 3.2 AC	0 ~~AC~~	81.8 AC	23.6 AC UPL 3.2 AC Pf 26.9 AC MARSH 3.4 AC OW

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE: palustrine emergent - seasonally saturated grazed / mowed + Ag pasture

LANDSCAPE POSITION: floodplain terrace

HYDROLOGY TYPE & DURATION:

- very long duration subsurface saturation
- with occasional flooding
- surface ponding in swales and depressions

HYDRIC SOIL INDICATOR: F3 Depleted Matrix

SOIL SURVEY MAP UNIT: Haplaquepts 0-1% Fluvaquents 0-1% Gielow SL 0-5%

WETLAND/ UPLAND BOUNDARY: mans.

SLOPE & DRAINAGE: 1-2% sheet flow to N-NW

Dominant Species * Common Species+

Festuca
Juncus patens
Ranunculus
Alopecurus
Junus (Oxymelis ?)

Fraxinus - [illegible]
Rumex
Mentha
[illegible]
[illegible]
Lolium perenne

NOXIOUS SPECIES: None

GROWTH FORM: Herbaceous

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	N - agr. pasture E - agri. pasture S - agr. pasture W - Hoging (?), hillsides
	OBSERVED/INFERRED MODIFICATIONS: N - grazing across parcel unit and portions may also be hayed S - None H - None
	CHARACTERIZATION: - palustrine emergent, wet meadow with grazing and Hay, not - very long duration, [illegible] - occassional flooding w erratic fraxinus
	COMMENTS: • fill pile in Northwestern portion of parcel possible restoration • Scatter small to large populations of Li ba across parcel unit. The remainder of unit was identified as potential Li ba habitat. • No populations of PL ho were identified in parcel unit. • No project impacts w/in parcel unit.

wetmeadow
FORD 108-010-06 24 JAN 20 UNIT A

EXCLOSURE DESCRIPTION/ REFERENCE SITE	None SOIL SURVEY MAP UNIT: HAPLAQUEPTS 0-1% FLUVAQUENTS 0-1% Giclow Sl 0-5%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE
	HYDROLOGY: NONE
	VEGETATION CLASS: palustrine emergent → palustrine forested with an increase of wetter grasses and forbes
	ESTIMATED SPECIES COMPOSITION CHANGE: increases in Juncus, Carex, Fraxinus, Quercus may shift to P f/em
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: • removal of grazing and vegetation management
	OTHER POTENTIAL ACTIONS: • Remove fencing

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

CHARACTERIZATION

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

UNIT B

Project/Site: FORD - 108-010-06-Mmbk City/County: Mendocino Sampling Date: 06 JAN 2011

Applicant/Owner: CALTRANS State: CA Sampling Point: _____

Investigator(s): DM, KG, DW / E.Z. RP Section, Township, Range: _____

Landform (hillslope, terrace, etc.): FLOODPLAIN TERR. Local relief (concave, convex, none): FLAT Slope (%): <1%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: HAPLAQUEPTS 0-1% FLUVAQUENTS 0-1% GREEN SL 0-5% NWI classification: Pem

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No _____	Is the Sampled Area within a Wetland? Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks: PARCEL UNIT CHARACTERIZATION. V/S/H OBSERVATIONS REFLECT GENERALIZED CONDITIONS ACROSS WETLAND IN PARCEL UNIT

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: _____)			
1. Alisma plantago-aquatica			OBL
2. Juncus mellicus? mexicanus?			OBL
3. Mentha pulegium			OBL
4. Scirpus			OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: – dense stands of SCIRPUS in places @ IN UNIT
– GRAZING UNLIKELY TO EFFECT EXISTING PLANT COMMUNITY

TOO WET TO SUPPORT PASTURE GRASSES FOR FORAGE

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-10+	10YR 4/1	60	7.5 YR 4/6	40	C	PL/SM	[illegible]	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRA 1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks: F3 Depleted Matrix

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required, check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (LRR A)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (LRR A)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 1-8"

Water Table Present? Yes ✓ No ___ Depth (inches): 0"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0"

Wetland Hydrology Present? Yes X No ___

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

Remarks: Parcel unit underwater - VLD SSS, VLD Ponding.

UNIT B

PARCEL/UNIT: FORD 108-010-06. Mixed marsh			FIELD INSP DATE: 20 Jan 2004	TOTAL PARCEL AC:
TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE: palustrine emergent, seasonally flooded marsh,

LANDSCAPE POSITION: Floodplain terrace

HYDROLOGY TYPE & DURATION:

- very long duration ponding and subsurface saturation
- flooding

HYDRIC SOIL INDICATOR:

— F3 Depleted matrix —

- very Long duration Ponding/Flooding

SOIL SURVEY MAP UNIT:	WETLAND/ UPLAND BOUNDARY:	SLOPE & DRAINAGE:
Haplaquepts 0-1% Fluvaquents 0-1% Gielow Sl 0-5%	trans.	0-1% [illegible]

Dominant Species * Common Species+

Alisma p-a
Juncus [illegible]
Menthon pulegium
Grasses

NOXIOUS SPECIES: None

GROWTH FORM: [illegible]

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	N - agr. pasture E - creek, riparian trees, agricultural pasture W - creek riparian woodland agr. pasture S - agr. pasture
	OBSERVED/INFERRED MODIFICATIONS:
	S - NONE H - NONE V - NONE, exposed to grazing but probably no effect.
	CHARACTERIZATION:
	palustrine emergent, seasonally ponded marsh various deviation ponding, subsurface saturation limited effect of grazing on veg. composition due to seasonal ponding
	COMMENTS:
	• Parcel unit may encompass some identified populations of Li bA • Some of parcel unit identified as potential habitat for Li bA • No populations of PL ho have been identified @ in parcel unit. • No project impacts @ in parcel unit

UNIT B

EXCLOSURE DESCRIPTION/ REFERENCE SITE	FORD 108-010-06 MARSH 26 JAN 2011 NONE SOIL SURVEY MAP UNIT: HAPLAQUEPTS 0-1% FLUVAQUENTS 0-1% GIELOW SL 0-5%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE HYDROLOGY: NONE VEGETATION CLASS: palustrine emergent very long duration ponded and sub surface saturated ESTIMATED SPECIES COMPOSITION CHANGE: NONE - Already supporting obl marsh species MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: • removal of grazing probably would have very little change to veg. since [illegible] OTHER POTENTIAL ACTIONS: • remove fencing

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

Ford 108-020-04 143.8 ac
#3

CHARACTERIZATION FORD

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

Project Site: FORD 108-070-04 City/County: MENDOCINO Sampling Date: 25 JAN 2011

Applicant/Owner: CALTRANS State: CA Sampling Point: _____

Investigator(s): DM K.G.J.H. DW/RP, SZ Section, Township, Range: _____

Landform (hillslope, terrace, etc.): FLOODPLAIN TERRACE Local relief (concave, convex, none): FLAT Slope (%): 0-1%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: FLUVAQUENTS 0-1% GIELOW SL 0-5% NWI classification: Pem

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation X, Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No _____	Is the Sampled Area within a Wetland? Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks: PARCEL CHARACTERIZATION. V/S/H OBSERVATIONS REFLECT GENERALIZED COMPONENTS OF WETLAND @ IN PARCEL

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: _____)			
1. Phalaris aquatica			FAC
2. Ranunculus sp			FACW
3. Juncus patens			FAC
4. Alopecurus sp			OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: GRAZED PASTURE – PARCEL DOES NOT APPEAR TO BE HAYED.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12+	10YR 4/1	75	7.5YR 4/6	25	C	PL/M	silty loam	w/clay inclusion

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRA 1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks: F3 Depleted Matrix
No evidence of Ap

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required, check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ✓ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (LRR A)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (LRR A)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

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

Water Table Present? Yes ✓ No ___ Depth (inches): 10"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 7"

Wetland Hydrology Present? Yes X No ___

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

Remarks: saturation @ surface in root zone; soil is moist further down to 10"
saturated to 7"

- surface ponding in swales/depressions
- VLD SSS

PARCEL/UNIT: FORD 108-020-04			FIELD INSP DATE: 25 JAN 2004	TOTAL PARCEL AC: 143.8 AC
TOTAL WETLAND AC:	OTHER WATER AC: 1.7 AC	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE: palustrine emergent - seasonally saturated
GRAZED AG PASTURE

LANDSCAPE POSITION: floodplain terrace

HYDROLOGY TYPE & DURATION:

very long duration, subsurface saturation

standing water in depressions + swales.

- occassional floodings may be localized to swales/ ABANDONED high flow channels

HYDRIC SOIL INDICATOR:

F3 Depleted MATRIX

No evidence of Ap

SOIL SURVEY MAP UNIT:	WETLAND/ UPLAND BOUNDARY:	SLOPE & DRAINAGE:
FLUVAQUENTS 0-1%	trans.	1-2% N-NW sheet flow
Gelow sil 0-5%		

Dominant Species * Common Species+

Phalaris aquatica
Ranunculus
Juncus spatula
Alopecurus

- Mentha
- Fraxinus along fenceline
- Trifolium - repens + wormscaldii

CRATIC POPULUS/ FRAXINUS/ QUERCUS

NOXIOUS SPECIES: Desplos 1 individual

GROWTH FORM: Herbaceous

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	N - agricultural pasture E - riparian woodland, creek, then agricultural pasture S - agricultural pasture W - riparian woodland, creek, then woodland.
	OBSERVED/INFERRED MODIFICATIONS: V - grazed S - none A - none
	CHARACTERIZATION: grazed palustrine emergent, seasonally saturated agr. pasture u/d-SSS, surface ponding in swales + depressions, occassional flooding
	COMMENTS: • No project impacts @ in Parcel • SCATTERED POPULATIONS of Li ba observed on Parcel • WETLAND ON PARCEL IDENTIFIED AS POTENTIAL HABITAT for Li ba • No PL ho observed on parcel

FORD 108-020-04 05 JAN 2011

EXCLOSURE DESCRIPTION/ REFERENCE SITE	NONE SOIL SURVEY MAP UNIT: FLUVAQUENTS 0-1% Grelow Sl 0-5%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE
	HYDROLOGY: NONE
	VEGETATION CLASS: palustrine emergent, grazed agr. pasture
	ESTIMATED SPECIES COMPOSITION CHANGE: increase in Juncus, water and grasses and forbes possible increase in Quercus + Fraxinus
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: - removal of grazing to allow veg. succession - ineffective drainage ditches running S-N (probably @ lake level)
	OTHER POTENTIAL ACTIONS: - fence removal

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

Ford 108-030-02 60.0 Ac
#4

FORD

Characterization

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

Project/Site: FORD 108-030-02 City/County: MENDOCINO Sampling Date: 25 JAN 2001

Applicant/Owner: CALTRANS State: CA Sampling Point: Parcel Baseline

Investigator(s): D.M, KG, DW, J.H / R.P, SB Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Flood Plain Terrace Local relief (concave, convex, none): FLAT Slope (%): 1%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Gielow SE 0-5% Fluvaquents 0-1% NWI classification: Pem

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation X, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ___	Is the Sampled Area within a Wetland? Yes X No ___
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes X	No ___	

Remarks: Parcel characterization. V/S/H observations reflect generalized wetland characters @ in Parcel

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	___ = Total Cover		
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	___ = Total Cover		
Herb Stratum (Plot size: ___)			
1. Alopecurus sp			obl
2. Juncus patens			FAC
3. Ranunculus sp			FACW
4. Mentha pulegium			obl
5. Agrostis stolonifera			FACW
6.			
7.			
8.			
9.			
10.			
11.			
	___ = Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ✓

Remarks: Tree line w/ Fraxinus and Quercus - Grazed Pasture
Ceratic Trees on Parcel

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/1	75	7.5YR 4/6	25	C	PL/SM	silt loam	wetland deposit - 12-14" fine

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: F-3 Depleted matrix

No observed dye

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

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

Water Table Present? Yes ✓ No ____ Depth (inches): 9"

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:

- moist but not saturated @ surface; saturation within root build-up
- standing water in depressions, swales
- VLD - SSS

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
FORD 108-030-02	25JAN2011	51.0 AC

TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
Pem-35.8 Pf/ss 1.1 AC	.5 AC UPLAND AC 13.6	0 AC	35.8 AC	.5 AC OW 13.6 AC UPL 1.1 AC Pf/ss

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE: palustrine emergent - seasonally saturated
GRAZED Ag PASTURE

LANDSCAPE POSITION: floodplain terrace

HYDROLOGY TYPE & DURATION:

- very long duration; sub surface saturation
- with occassional flooding; depressional standing water
- ineffective ditch draining toward lake
  no flow @ standing water
  No slope -

HYDRIC SOIL INDICATOR: F3 depleted matrix
No observed Ap

SOIL SURVEY MAP UNIT: Gulowsl 0-5%
Fluvaquents 0-1%

WETLAND/ UPLAND BOUNDARY: transitions

SLOPE & DRAINAGE: 1-2%
sheet flow towards N-NW

Dominant Species * Common Species+ →

Alopecurus
Gladiated-leafed juncus
Juncus patens
Ranunculus
Mentha
Agrostis

Hordeum hystrix
Plagiaurus aquatica
Pleuropogon ?
Vulpia
Carex
Quercus + Fraxinus along the fenceline
? cottonwoods

NOXIOUS SPECIES: None

GROWTH FORM: herbaceous.

CURRENT CIRCUMSTANCE DESCRIPTION

SURROUNDING PARCELS:

N - agr. pasture
E - agr. pasture
S - creek with riparian woodland, agr. pasture beyond
W - creek with riparian woodland

OBSERVED/INFERRED MODIFICATIONS:

N - grazing w/ agr. management

E - None

S - None

CHARACTERIZATION:

palustrine emergent/wet meadow with grazed pasture grasses and recruited forbs/juncos

COMMENTS:

- No PROJECT IMPACTS ON PARCEL
- FEW SMALL POPULATIONS OF LI BA OBSERVED ON PARCEL
- WETLAND ON PARCEL IDENTIFIED AS LI BA HABITAT
- NO PL LO IDENTIFIED ON PARCEL

25 JAN 2011

EXCLOSURE DESCRIPTION/ REFERENCE SITE	FORD 08-030-02 None SOIL SURVEY MAP UNIT: Grenlow S-L 0-5% FLOODPLAINS 0-1%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE
	HYDROLOGY: NONE
	VEGETATION CLASS: emergent palustine -> emergent palustine/forested may support perennial woody vegetation
	ESTIMATED SPECIES COMPOSITION CHANGE: increase in juncus and woody and grasses and forbes increase in Quercus + Fraxinus
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: -removal of grazing, agr. management.
	OTHER POTENTIAL ACTIONS: -debris removal -debris removal -removal of unnecessary fences

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

Ford 108-030-05 #5 80.4 ac

FORD

CHARACTERIZATION

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

Project/Site: FORD 108-030-05 City/County: MENDOCINO Sampling Date: 28 JAN 04

Applicant/Owner: CALTRANS State: CA Sampling Point: Parcel Baseline

Investigator(s): DM, RG, JH, DW/RP, SZ Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Flood Plain Terrace Local relief (concave, convex, none): FLAT/G slope Slope (%): 0-2%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Gielows 0-5% Fluvaquents 0-1% NWI classification: Pem

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Parcel characterization. V/S/H observations reflect generalized characters of wetland component of unit

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. erratic populus			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Juncus patens			FAC
2. Lolium perenne			FAC
3. Alopecurus sp			OBL
4. Trifolium dragens			FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Grazed pasture - portions of unit @ dense Juncus clumps
• Does not appeared to be hayed

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-20"	10YR 3/2	90	7.5YR 4/6	10	C	PL/DM	Sil	10YR 4/1 depletions - 15%

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks: redox concentrations on ped faces - 10%
F6 - Redox DARK SURFACE

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- X Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (LRR A)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (LRR A)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

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

Water Table Present? Yes ✓ No ___ Depth (inches): 14"

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

Wetland Hydrology Present? Yes X No ___

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

Remarks:
- saturated @ top 2" then soil moist to 14"
- LONG duration sub surface saturation
- OCCASSIONAL flooding
- Parcel flooded this PPT season
- ALGAL MATS ON VEGETATION IN depressions

PARCEL/UNIT: FORD 108-030-05	FIELD INSP DATE: 25 JAN 201	TOTAL PARCEL AC: 80.4AC

TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
	2.1AC			

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE: palustrine emergent seasonally saturated GRAZED Ag PASTURE

LANDSCAPE POSITION: floodplain terrace

HYDROLOGY TYPE & DURATION:

- long duration, subsurface saturation fluxuating water table ≈14"
- occassional flooding

HYDRIC SOIL INDICATOR:	SOIL SURVEY MAP UNIT:	WETLAND/ UPLAND BOUNDARY:	SLOPE & DRAINAGE:
FG - redox dark surface	Gicloweld 0-5% Fluvaquents 0-1%	trans.	1-2% sheet flow to N-NW

Dominant Species * Common Species+

Trifolium repens
Juncus patens
Alopecurus
Lolium perenne

- mentha
- cottonwood
- Quercus
- Fraxinus
- Rumex ? patchen & [illegible]
- gradiated - leafed juncus

NOXIOUS SPECIES: None

GROWTH FORM: Herbaceous

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	N - agricultural pasture E - fenceline [illegible], agricultural pasture S - waste water [illegible] W - riparian woodland creek, agricultural pasture
	OBSERVED/INFERRED MODIFICATIONS:
	V - grazed agr pasture H - None - areas adj to check may be subject to fluxuating ▽ S - None
	CHARACTERIZATION:
	• palustrine emergent, [illegible] saturated, grazed agr pasture with long duration [illegible]. subsurface saturation
	COMMENTS:
	• No populations of PL ho observed on parcel • No populations of LI ba observed on parcel • Wetland component of parcel identified as potential LI ba habitat • No project impacts in parcel • ellatic cottonwoods in parcel

FORD 108-03005

EXCLOSURE DESCRIPTION/ REFERENCE SITE	NONE SOIL SURVEY MAP UNIT: Gielow Sil 0-5% FLUVAQUENTS 0-1%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE
	HYDROLOGY: NONE
	VEGETATION CLASS: palustrine emergent, seasonally saturated Grazed as pasture
	ESTIMATED SPECIES COMPOSITION CHANGE: - increase in juncus, possible increase Quercus and Fraxinus with forbs + grasses
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: - removal of grazing, vegetation management
	OTHER POTENTIAL ACTIONS: - depris removal - removal of fencing, posts - Rubus removal

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

FR.ST 108-070-04 46.6 AC

CHARACTERIZATION FROST

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: FROST 108-070-04 City/County: Mendocino Sampling Date: [illegible]

Applicant/Owner: CALTRANS State: CA Sampling Point: PARCEL BASELINE

Investigator(s): P. Martel; KG / SZ / RR Section, Township, Range: _____

Landform (hillslope, terrace, etc.): TERRACE Local relief (concave, convex, none): GENTLE SLOPE Slope (%): 1%-2%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Cole clay loam 0-2% / Gielow sandloam 0-5% NWI classification: Pem

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: PARCEL CHARACTERIZATION. V/S/H observations reflect GENERALIZATION of WETLAND COMPONENT of PARCEL CURRENT CIRCUMSTANCE

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		

Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		

Herb Stratum (Plot size: ____) in order of abundance			
1. Fectuca			FAC
2. Ranunculus orthorynchus?			FACW
3. Lolium perenne			FAC
4. Juncus tenuis?			FACW
5. Juncus patens			FAC
6. Holcus lanatus?			FACW
7. Mentha pulegium			OBL
8. Trifolium sp (Repens?)			FACU
	____ = Total Cover		

Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ____

Remarks: Plants are dominated by FAC + FACW species with an absence of OBL and FACU species. GRAZED PASTURE - RECENT BUILD UP of VEGETATION. Few HEAD ON PARCEL IN LAST YEAR. PLANT SPECIES LISTED WERE MAJOR DOMINANTES ACROSS PARCEL.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14"	7.5YR 3/1	80	7.5YR 4/6	20	C	PL/M	sicl	surface saturated
								standing H2O in adjacent depressions
14"+	10YR 4/2 probably	80	7.5YR 4/6	20%	C		Cl	depleted MATRIX
			ARGILLIC	HORIZON				

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: clay aquitard @ 14" - 7.5[redox], slightly lighter → ½ depleted matrix

→ soil has not been disturbed, no improvement possible

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3) – to surface
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No _____ Depth (inches): 0"-1"

Water Table Present? Yes X No _____ Depth (inches): 0"

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0"

Wetland Hydrology Present? Yes X No _____

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

Remarks: water seeping in at surface of soil pit

- Very long duration subsurface saturation ★
- No impediments to hydrology → already maxed out

- Mulch is attenuating water movement off of ground
  → reduces flashiness of streams

On eastern side of pit, higher flow in saturated zone, surface water flowing through

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
FROST	JAN. 4, 2011	46.6 AC

TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
41.5 AC	.3 AC UPLAND AC 4.8 AC	0 AC	41.5 AC	4.8 AC UPLAND

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE:

Palustrine emergent, agricultural pasture
NATIVE species Removed and Replaced/MANAGED for FORAGE

LANDSCAPE POSITION:

- wet meadow, flat-sloping down to flood terrace NW, 1-2% slope
- FLAT TERRACE

HYDROLOGY TYPE & DURATION:

- very long duration, subsurface saturation; flats and minodepression storage
- Localized surface sheet flow during ppt events after system is saturated
- Probably NOT subject to flooding during major events

HYDRIC SOIL INDICATOR:

- F6 - Dark Redox, 1 chroma soils w/ 20% redox concentrations
- ARGILLIC horizon close to surface (~14")

SOIL SURVEY MAP UNIT:

Cole cl 0-2%
&
Gielow sl 0-5%

WETLAND/ UPLAND BOUNDARY:

transitional small upland patches are elevated ridges, too low H_2O table.

SLOPE & DRAINAGE:

1-2%

Dominant Species * Common Species+

Festuca, Ranunculus, Lolium, Juncus tenuis, J. patens

- add here other list
- Rumex
Pleuropogon
Limnanthes
Holcus
Bromus
Hordeum hystrix
Agrostis

100% cover

NOXIOUS SPECIES:

None observed

GROWTH FORM:

HERBACEOUS

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	East - open agricultural field w/scattered trees south - roadway w/ residences North - ↑ no less scattered trees. UNNAMED TRIBUTARY off PARCEL edge West - scattered trees with similar landforms. PARCELS SPARATED by SHALLOW DITCH
	OBSERVED/INFERRED MODIFICATIONS:
	- Agricultural pasture management to support grazing. VEGETATION dominated by introduced PASTURE GRASSES. GRAZING MANAGEMENT hinders SUCCESSIONAL development. SOIL - No obvious modification under current circumstance No Ap Hydrology - No obvious modifications under current circumstance. Direct ppt, sheet flow over surface, sub surface through flow
	CHARACTERIZATION:
	GRAZED PASTURE @ MANAGED VEGETATION ON INTACT Hydric soil and VLD, SSS WETLAND Hydrology.
	COMMENTS:
	- NE corner has channelized tributary, flow along northern edge of property. Historic channel is still evident on surface and aerial photo - observed populations of PL ho and Li ba - No PROJECT IMPACTS ON PARCEL - APPEARS to be hand dug very NARROW & SHALLOW drainage ditch RUNNING S TO N @ W edge of field - CHANNALIZED TRIBUTARY IN NE corner

FROST JAN 4, 2011

EXCLOSURE DESCRIPTION/ REFERENCE SITE None	• on similar soil unit scattered trees to the west. APPEARS TO be ON SAME SOIL UNITS (COLE + GEILOW) • UPSLOPE PARCELS have WHAT APPEARS TO be UNGRAZED/LIGHTLY GRAZED CONDITION @ MORE JU PA COVER AND QU LO PATCHES SOIL SURVEY MAP UNIT: COLE cl 0-2%. GEILOW sl 0-5%.
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: None - soil APPEARS TO be Hydric @ no RECENT Dp or evidence of LEVELING OR MODIFICATION
	HYDROLOGY: None - HISTORICALLY ALTERED by ROADS, CHANNALIZED TRIBUTARIES. CURRENTLY EXHIBITING WETLAND HYDROLOGY UNDER CURRENT CIRCUMSTANCES. No obvious MODIFICATION TO TYPE OR EXTENT.
	VEGETATION CLASS: Pem Ag - palustrine emergent -> palustrine forested/emergent -> successional climax community Likely to support Pf/em seasonally SATURATED WET MEADOW/WOODLAND @ SUCCESSIONAL development
	ESTIMATED SPECIES COMPOSITION CHANGE: Shift from managed Ag GRASSES and PASTURE WEEDS TO Likely include A LARGER % COVER OR DOMINANCE by PERENNIAL JUNCUS, CAREX, QUERCUS ..... other PERENNIAL GRASSES?
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: - REMOVE GRAZING - MAYBE PLANTING • Remove GRAZING + VEGETATION MANAGEMENT OR other modifications THAT INTERFERE @ VEGETATION SUCCESSIONAL development
	OTHER POTENTIAL ACTIONS: - erosion fixes on stream • Remove debris - may need to put fence to limit neighboring grazing • RIPARIAN PLANTING IN WETLAND ADJ TO TRIBUTARY • UPLAND RIPARIAN PLANTINGS ADJ TO CREEK

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	

COMMENTS:

DM - This parcel was mapped Twice during wetland delineation. In Apr/May 10? parcel had been heavily grazed. Parcel appears to have been lightly grazed since 10' growing season! Vegetation cover has greatly increased.

FUNCTIONAL EQUIVALENT INDEX:	
	UNIT ENHANCEMENT:

Goss 103-230-02 10.01c

CHARACTERIZATION

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 6055 103-230-02 UNIT A City/County: MENDOCINO Sampling Date: 6 MAY 2008

Applicant/Owner: CALTRANS State: CA Sampling Point: PARCEL BASELINE

Investigator(s): DM, KG, JEE, JH Section, Township, Range:

Landform (hillslope, terrace, etc.): FLOODPLAIN TERRACE Local relief (concave, convex, none): FLAT Slope (%): 0-2%

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: CLEAR LAKE clay 0-2%, GLENN SL 0-5% NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation X, Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X No	**Is the Sampled Area within a Wetland?** Yes X No
Hydric Soil Present?	Yes X No	
Wetland Hydrology Present?	Yes X No	

Remarks: PARCEL UNIT CHARACTERIZATION. V/S/H OBSERVATIONS REFLECT GENERALIZATION OF WETLAND UNIT @ N PARCEL

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size:)			
1. Festuca arundinacea			FAC
2. Vulpia (bromoides?)			FACU
3. Mentha pulegium			OBL
4. Ranunculus sp			FACW
5. Plantago lanceolata			OBL
6.			
7.			
8.			
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum % Cover of Biotic Crust

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: (A)

Total Number of Dominant Species Across All Strata: (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- Dominance Test is >50%
- Prevalence Index is ≤3.0[1]
- Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks: HAYED/GRAZED PASTURE UNIT OF PARCEL. SPECIES COMPOSITION APPEARS TO BE INFLUENCED BY MANAGEMENT.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12"	10YR 3/1	95	7.5YR 4/6	5	C	PL/M	clay loam	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: F6 Redox Dark Surface - at edge of clear lake unit. dark vertic intergrade. No obvious Ap.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No _____ Depth (inches): 0-1"

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

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): top 5"

Wetland Hydrology Present? Yes X No _____

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

Surface saturation

Remarks: High clay content causing surface ponding @ depressions - likely long duration saturation in upper soil profile.

Goss A

PARCEL/UNIT: Goss - UNIT A 103-230-02	FIELD INSP DATE: 6 years ago	TOTAL PARCEL AC: 10.0 AC

TOTAL WETLAND AC:	OTHER WATER AC:		IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
8.0 AC	0	Pf - 2.6 AC	0	5.4 AC	2.6 AC Pf 2.0 AC UPL
	UPLAND AC 2.0 AC	Pem - 5.4 AC		* much of acreage is PL ho population	

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE:
palustrine-emergent (GRAZED?) / Hayed Pasture @ Seasonal SATURATED SOIL

LANDSCAPE POSITION:
Flood Plain Terrace - Post alluvium @ base of hillside

HYDROLOGY TYPE & DURATION:
- long to very long duration subsurface saturation epi-aquic -> due to ↑ clay soil

- shallow depressional storage 0-1" above surface L-VL.D
. unlikely to flood but may have ponded surface sheet flow - SB Radic

HYDRIC SOIL INDICATOR:
F6 Redox dark surface

No obvious hp

dark soil - VERTIC INTERGRADE

SOIL SURVEY MAP UNIT:
Clear Lake clay 0-2%

Glenn SL 0-5%

WETLAND/ UPLAND BOUNDARY:
transitional

SLOPE & DRAINAGE:
0-2% → NW
surface drainage sheet flow

Dominant Species * Common Species+
Festuca
Vulpia
Ranunculus
Mentha
Ranunculaceae

→ Lotus corniculatus
= Trifolium
- Vicia

NOXIOUS SPECIES:
None

GROWTH FORM:
herbaceous

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	~~East~~ - open pasture south ~~South~~ - west → open pasture (directly ~~North~~ - mature riparian woodland
	OBSERVED/INFERRED MODIFICATIONS: V - veg. management, cropland (grazed?) introduced pasture grass dominate. S. - None - No obvious modification H - No obvious modification - VCD-SSS, sheet flow over unit eventually collecting in swales/ditches? draining to NW
	CHARACTERIZATION: Hayed/(grazed?) pasture @ managed vegetation on intact Hydric soil and VCD-SSS wetland. Probably does not flood but has surface sheet flow across unit.
	COMMENTS: • Large populations of Pl ho on unit • No project impacts @ in unit • No Li ba identified @ in unit. Parcel unit not identified as Li ba habitat.

GOSS - 6 JAN 2011 GOSS #A

EXCLOSURE DESCRIPTION/ REFERENCE SITE	- The central portion which is not managed is supporting a mature riparian-woodland area on both soil series identified on unit.
	SOIL SURVEY MAP UNIT: clear lake clay 0-2% Gielow sl 0-5%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: None
	HYDROLOGY: none
	VEGETATION CLASS: palustrine-emergent VLD-SSS on Parcel unit under current management
	ESTIMATED SPECIES COMPOSITION CHANGE: agricultural pasture → palustrine forested → Fraxinus, Quercus emergent understory
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: - remove vegetation management allow vegetation succession
	OTHER POTENTIAL ACTIONS: remove fencing.

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: GOSS 103-230-02 B City/County: MENDOCINO Sampling Date: 6 JAN 2011

Applicant/Owner: CALTRANS State: CA Sampling Point: PARCEL BASELINE

Investigator(s): DM KG / DR, YM Section, Township, Range: _____

Landform (hillslope, terrace, etc.): FLOOD PLAIN TERRACE Local relief (concave, convex, none): FLAT Slope (%): 0-2%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: CLEARLAKE CLAY 0-2%, GULCH SL 0-5% NWI classification: Pf

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks: PARCEL UNIT CHARACTERIZATION. V/S/H observations reflect Generalized wetland unit @ in Parcel.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus lobata			FAC
2. Fraxinus latifolia			FACW
3.			
4.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	

Herb Stratum (Plot size: _____)			
1. Juncus (effusus)?			OBL
2. Rumex crispus			FACW
3. Pleuropogon hooverianus			OBL
4. Ranunculus orthorhynchus			FACW
5. UNID GRASS			–
6. Rubus ursinus			FACW
7. Hulcus lanatus			FAC
8.			
		= Total Cover	

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:
- MATURE closed canopy forest.
- LEAF LITTER on ground

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12+	10YR 3/1	95	7.5YR 4/6	5	C	PL/M	cL	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: F6 - Redox Dark Surface - DARK subsoil @ no Apparent Ap - clayey

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No _____ Depth (inches): 1-2'

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

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 0

Wetland Hydrology Present? Yes X No _____

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

Remarks: VLJ - SSS in upper part - shallow 0-2" standing water in localized depressions. Vertic intergrade - peds not saturated below surface.

GOSS UNIT B 103-230-02

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
GOSS UNIT B 103-230-02	6 JAN 11	10.0NC

TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
	0			

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE:
emergent - forested/ VLD SOS soil @ shallow surface ponding.

LANDSCAPE POSITION:
Flood Plain Terrace - historic headwaters of tributary?

HYDROLOGY TYPE & DURATION:
very long ponding in shallow depressional positions above surface saturation - VLD - clay soil NOT SATURATED @ IN pods below the surface

HYDRIC SOIL INDICATOR: F6 Redox DARK Surface

SOIL SURVEY MAP UNIT:
clearlake clay 0-2%
Sidown sl 0-5%

WETLAND/ UPLAND BOUNDARY: transitional

SLOPE & DRAINAGE: surface sheet flow beginning to channelize in central position (swale)

Dominant Species * Common Species+

Juncus (effusus)
Pleuropogon
Quercus LOBATA
Fraxinus LATIFOLIA
Ranunculus orthorhynchus

→ UNID GRASS
Hordeum
Rubus
Rumex
Toxicodendron

NOXIOUS SPECIES: None

GROWTH FORM: Forested w/ herbaceous understory

CURRENT CIRCUMSTANCE DESCRIPTION

SURROUNDING PARCELS:

EAST - OPEN PASTURE - HAYLAND
WEST - OPEN PASTURE/FOREST
NORTH - OPEN PASTURE HAYLAND
SOUTH - OPEN PASTURE HAYLAND

OBSERVED/INFERRED MODIFICATIONS:

NONE - UNIT APPEARS TO BE UNDISTURBED/UNMANAGED MATURE CLOSED CANOPY WOODLOT.

CHARACTERIZATION:

PALUSTRINE FORESTED WETLAND @ HERBACEOUS UNDERSTORY. VERY LONG DURATION SUB SURFACE SATURATION ON CLAYEY SOILS. SHALLOW DEPRESSIONS ON SURFACE @ PONDED WATER. NO EVIDENCE OF GRAZING OR OTHER MANAGEMENT. SWALES BEGIN TO ACCUMULATE SURFACE WATER AND DISCHARGE TOWARD NW.

COMMENTS:

- LARGE POPULATION OF PI HO @ IN UNIT.
- NO PROJECT IMPACTS PROPOSED @ IN UNIT
- APPEARS TO BE EXAMPLE OF A MATURE NON-MANAGED SUCCESSIONAL PLANT COMMUNITY WETLAND.

GOSS UNIT B 103-230-02

EXCLOSURE DESCRIPTION/ REFERENCE SITE	NONE SOIL SURVEY MAP UNIT: clear lake clay 0-2% Glencoe sl 0-5%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE
	HYDROLOGY: NONE
	VEGETATION CLASS: palustrine forested @ VLD-SSS + shallow depressional ponding.
	ESTIMATED SPECIES COMPOSITION CHANGE: NONE
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: NONE
	OTHER POTENTIAL ACTIONS: Fence removal.

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

HUFF 037-240-RW 12.6 ac

CHARACTERIZATION

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

037-240-RW

Project/Site: HUFF • EMERGENT WETLAND City/County: Mendocino Sampling Date: 14 JAN 20

Applicant/Owner: CALTRANS State: CA Sampling Point: Parcel Baseline

Investigator(s): DM KG / SZ / RP Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Floodplain Terrace Local relief (concave, convex, none): Flat to Convex Slope (%): 0-5%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Feliz 0-5 / Fluvaquents / Cassabone-Wholy 30% NWI classification: Pem

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ___	Is the Sampled Area within a Wetland? Yes X No ___
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes X	No ___	

Remarks: Parcel unit characterization. V/S/H observations reflect generalized condition of wetland unit of parcel.

VEGETATION – Use scientific names of plants. Pem unit in lower ground at base of fill / scalped soil?

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	___ = Total Cover		
Sapling/Shrub Stratum (Plot size: ___)			
1. Salix sp ?			FACW?
2.			
3.			
4.			
5.			
	___ = Total Cover		
Herb Stratum (Plot size: ___)			
1. Lolium perenne			FAC
2. Juncus tenuis			FACW
3. Dipsacus (fullonum)			NI
4. [illegible] sp			OBL?
5. Cyperus (eragrostis ?)			FACW?
6. [illegible]			FAC
7. Juncus [illegible]			FAC
8.			
9.			
10.			
11.			
	___ = Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ___ (A)

Total Number of Dominant Species Across All Strata: ___ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ___ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: Fallow/abandoned emergent wetland @ in parcel. Some vehicle tracks/depressions on surface of wetland. Salix in perimeter ditch.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12"	10YR 3/1	95	7.5YR 4/6	5	C	PL/SM	Sil	some fine GRAVEL in TOP few needed

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks: Redox dark surface
No obvious soil manipulations / some vehicle tracks (not significant)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 0-2"

Water Table Present? Yes ✓ No ___ Depth (inches): 3"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes X No ___

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

Remarks: - surface water in restrictive depressions. 0"-2"
- VLD-SSS
- Open to occassional flooding - ADJ to outlet check

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
HUFF EMERGENT WETLAND/SCRUB wet meadow component of JD map. Riparian scrub 037-240-RW	[illegible]	12.6 AC

TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
* 1.1 AC Pem/SS 3.1 AC Pf	2.0 AC - • No impacts proposed	0 AC	0 AC	

CURRENT CIRCUMSTANCE DESCRIPTION	WETLAND TYPE:	LANDSCAPE POSITION:
	palustrine emergent/scrub Fallow/Abandoned Pem and created Pss drainage	- floodplain Terrace - drainage feature

HYDROLOGY TYPE & DURATION:

- [illegible] duration [illegible]
- subsurface [illegible] - VLD
- occasional flooding

HYDRIC SOIL INDICATOR:	SOIL SURVEY MAP UNIT:	WETLAND/ UPLAND BOUNDARY:	SLOPE & DRAINAGE:
F6 - Redox Dark Surface	Feliz P 0-5% Fluvaquents Cassabone/ Wholly 30%+	[illegible] Ditch abrupt	[illegible]

Dominant Species * Common Species+ — [illegible]

Lolium
[illegible]
[illegible]
[illegible]
[illegible]
Salix sp.

NOXIOUS SPECIES:

[illegible]

GROWTH FORM:

[illegible]/ Scrub Shrub

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	E - 101 N - Railroad, riparian woodland, 101 W - Riparian woodland, outlet creek S - riparian woodland, outlet creek
	OBSERVED/INFERRED MODIFICATIONS: SOME FILL MATERIAL (GRAVEL) IN SOIL BUT SOIL IS BASICALLY UNDISTURBED.
	CHARACTERIZATION: palustrine emergent - no grazing, some disturbance from offroad vehicles and SCRUB/SHRUB in Perimeter ditch.
	COMMENTS: • No proposed activity on Parcel - • Creation opportunities on High Ground (~4.0 AC) are limited because of Access Problems. - probably no suitability studies/tests done to date. • Possible small population of Li ba found in Pem (GIS color code confusing). Does not appear Parcel identified as suitable habitat for Li ba or Pl ho. • No Project impacts on Parcel

EXCLOSURE DESCRIPTION/ REFERENCE SITE	HOFF - EMERGENT WETLAND/SS NONE - FALLOW/ABANDONED SOIL SURVEY MAP UNIT: Fe Cz 0-5% FLUVAQUENTS CASSABONE/Wholly 30%+
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE
	HYDROLOGY: NONE
	VEGETATION CLASS: PALUSTRINE EMERGENT/SS
	ESTIMATED SPECIES COMPOSITION CHANGE: NONE - Parcel appears to have been abandoned LONG AGO - successional development already apparant on Parcel
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: - [illegible]
	OTHER POTENTIAL ACTIONS: debris [illegible]

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

CHARACTERIZATION

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

037-240-RW

Project/Site: HWFF - RIPARIAN WOODLAND City/County: MENDOCINO Sampling Date: 14 JAN 2014

Applicant/Owner: CALTRANS State: CA Sampling Point: Parcel Baseline

Investigator(s): DM, KG / SZ, RP Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Floodplain Terrace Local relief (concave, convex, none): FLAT Slope (%): 1%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Feliz l / Fluvaquent / Cassabone / wholy 30% NWI classification: Pf

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Parcel unit characterization. V/S/H observations reflect generalized state of wetland forested component of parcel.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus latifolia			FACW
2. Quercus lobata			FAC
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. Rubus ursinus			FAC
2. Toxicodendron diversilobium			UPL
3. Aiuus discolor			FACW
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Conium maculatum			FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: Unmanaged Riparian Forest - adj to outlet creek

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12"	2.5Y 4/2	100	7.5YR 4/6	5	C	PL/M	SiLt loam	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: F-6 Redox Dark Surface

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 0-3"

Water Table Present? Yes ✓ No ___ Depth (inches): 5"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No _____

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

Remarks: surface water in relatively depressional surface flow in swales feeding to the NW, parallel to drainage ditch

- subject to occasional flooding

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
037-240-RW	[illegible]	12.6 AC

TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
* 3.1 AC Pf 1.1 AC Rem/SS	2.0 AC • No Impacts Proposed	0 AC	0 AC	

CURRENT CIRCUMSTANCE DESCRIPTION	WETLAND TYPE:	LANDSCAPE POSITION:
	Palustrine forested Abandoned Parcel	Floodplain Terrace

HYDROLOGY TYPE & DURATION:

- Very long duration [illegible]
- subsurface saturation - VLD
- infrequent/occasional feeding

HYDRIC SOIL INDICATOR:	SOIL SURVEY MAP UNIT:	WETLAND/ UPLAND BOUNDARY:	SLOPE & DRAINAGE:
Redox dark surface	Feliz 0-5% Fluvaquents Cassabone/ Wholy 30%	[illegible]	[illegible]

Dominant Species * Common Species+	NOXIOUS SPECIES:
[illegible]	None

GROWTH FORM:

[illegible]

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	[illegible]
	OBSERVED/INFERRED MODIFICATIONS:
	None - Hopefully [illegible] Abandoned
	CHARACTERIZATION:
	[illegible]
	COMMENTS:
	• No LI [illegible] or PL [illegible] identified on this unit [illegible] Parcel. [illegible] proposed as habitat for [illegible] species
	• No impacts proposed
	• Wetland [illegible] @ upland forest
	• No [illegible] enhancement opportunities on this unit.

[illegible] 037-240-RW

EXCLOSURE DESCRIPTION/ REFERENCE SITE	HOPF 14 JAN 2004 NONE SOIL SURVEY MAP UNIT: Feliz l 0-5% Fluvaquents Cassabone/wholy 30%+
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE
	HYDROLOGY: NONE
	VEGETATION CLASS: palustrine forested
	ESTIMATED SPECIES COMPOSITION CHANGE: NONE - already at climax successional stage of emergent forested
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: NONE
	OTHER POTENTIAL ACTIONS: - [illegible] - Plantation

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

Lusher 108-030-03 23.9 NC

108-060-08 18.7 NC

CHARACTERIZATION

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

Project/Site: Lusher - 108-030-03/108-06-08 City/County: MENDOCINO Sampling Date: 12 JAN 2006

Applicant/Owner: CALTRANS State: CA Sampling Point: Parcel Baseline

Investigator(s): DM, KG, DW / SB, RP Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain terrace Local relief (concave, convex, none): Flat Slope (%): 1-2

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: FLUVAQUENTS cole & 0-2% NWI classification: Pem

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 X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks: currently grazed agr. pasture - PARCEL CHARACTERIZATION of WETLAND Lusher - 038-06-02 is adjacent parcel with same wetland characterization; most is in impact area of bypass

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. FRAXINUS LATIFOLIA			FACW
2. SEQUOIA sempervirens			UPL
3. QUERCUS LOBATA			FAC
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: _____)			
1. Festuca arundinacea			FAC
2. Lolium perenne			FAC
3. Ranunculus sp			FACW
4. Juncus patens			FAC
5. Trifolium (replens?)			FACU
6. Phalaris arundinacea			OBL
7.			
8.			
9.			
10.			
11.			
	= Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: • few SCATTERED TREES • GRAZED PASTURE -

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3"	10 YR 3/1	100	—	—	—	—	cl	no Redox dense roots
3-14"	2.5 YR 3/1	60	7.5 YR 4/6	40	C	PL/M	clay loam	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks: DARK Redox surface - no evidence of Ap no obvious soil manipulations.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 0-6" in relative depressions

Water Table Present? Yes ✓ No ___ Depth (inches): 8"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): surface

Wetland Hydrology Present? Yes ✓ No _____

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

Remarks:

- surface water in swales and depressional features 0-6"
- occasional flooding, especially in northern swales
- VCD - SSI

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
LUSHER - 108-030-03 108-060-08	12 JAN 2011	03-23.9 AC 08-18.7 AC

TOTAL WETLAND AC:	OTHER WATER AC:		IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
24.1 AC	.6 AC Upland 17.8 AC	Pf 1.9 AC Pem 22.2 AC	.4 AC Pf .2 AC OW 10.4 AC Pem 9.0 AC Pl	11.8 AC Pem	1.5 AC Pf 8.8 AC Pl .4 AC OW

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE:
- palustrine emergent @ scattered trees @ wetland.
- grazed pasture

LANDSCAPE POSITION:
flood plain terrace

HYDROLOGY TYPE & DURATION:
- very long duration surface ponding and subsurface saturation
- occasional ponding/flooding through to northern portion of parcel.
  - flooding appears to be from mill creek

HYDRIC SOIL INDICATOR:
F6 - Dark Redox Surface

SOIL SURVEY MAP UNIT:
Fluvaquents
cole cl
0-2%

WETLAND/ UPLAND BOUNDARY:
- transitional
- upland levee to E

SLOPE & DRAINAGE:
1-2%
surface water drains to N-NW.
ditch in central drains S-N.

Dominant Species * Common Species+
Lolium
Festuca
Ranunculus
Juncus
Trifolium(s)
phaleurus arundinaceae
Mentha
Rumex
Limnanthes
gladiated-leafed juncus
Lotus

NOXIOUS SPECIES:
NONE

GROWTH FORM:
herbaceous
w/some Quercus in central swale.

CURRENT CIRCUMSTANCE DESCRIPTION

SURROUNDING PARCELS:

S - abandoned agricultural pasture

N - forested woodland, quercus/fraxinus mature closed overstory

W - 101 and then 45% sloped hillside with oak/fir

E - creek and railroad, followed by agr. pasture

OBSERVED/INFERRED MODIFICATIONS:

J - veg. management and grazing; veg. is already succeeding into juncus, ranunculus plant community; still see evidence of veg. management in presence of Trifolium sp.

H - +/- functioning drainage ditch capable of removing flood water. Probably no effect on SS water table or dry/less wet storage.

S - NONE

CHARACTERIZATION:

Palustrine emergent with some scattered quercus/fraxinus in what may have been historic channel (currently ponded with surface water). Seasonally saturated with ponding in relative depressions and swales and has subsurface saturation.

COMMENTS:

- cattle and horses are still present on parcel
- LARGE populations of Li ba observed on Parcels
- No PL ho
- MOST of parcels identified as POTENTIAL Li ba HABITAT.
- Residential + out buildings on Parcel
- Upp creek contained by constructed levee
- Parcel to N closed canopy ash forest
- most of 038-060-08 is in PERMANENT IMPACT AREA
  Some of 108-030-03 is in Impact Area

LUSHER 108-030-03 12 JAN 2011

EXCLOSURE DESCRIPTION/ REFERENCE SITE	PARCEL TO W/ ON SAME SOIL UNIT (FLUVAQUENTS) AND IS MOSTLY A CLOSED CANOPY ASH FOREST (Pf) [BROOKES] SOIL SURVEY MAP UNIT: FLUVAQUENTS COLE cl 0-2%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE
	HYDROLOGY: NONE - most of central ditch is in impact area of bypass ditch helps drain non-depressional surface water. UNLIKELY TO effectively lower SS WATERTABLE
	VEGETATION CLASS: palustrine emergent; wet meadow to palustrine forested/emergent.
	ESTIMATED SPECIES COMPOSITION CHANGE: ↓ festuca, lolium → ↑ juncus, ranunculus w/ Quercus and Fraxinus Phalaeuros arundinacea. Likely to support Ash/OAK forest or woodland (Ash saplings observed in vacinity of scattered trees)
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: - Removal of grazing; allow veg. successional
	OTHER POTENTIAL ACTIONS: - removal of unnecessary fencing - removal of abandoned farming equipment - removal of rubus - filling drainage ditch

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

Lusk R 108-030-04 66.1 AC

CHARACTERIZATION LUSHER

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

38 acres UNIT A

Project Site: LUSHER 108-036-04 City/County: Mendocino Sampling Date: 25 Oct 05

Applicant/Owner: CALTRANS State: CA Sampling Point: Paired Baseline

Investigator(s): D.W. Kelley, J. Miller, S.J. Section, Township, Range:

Landform (hillslope, terrace, etc.): Floodplain Terrace Local relief (concave, convex, none): Flat/Sloped Slope (%): 1-2%

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: Cellow sl 0-5%, Fluvaquents 0-1% NWI classification: Pem

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation +/-, Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X No	**Is the Sampled Area within a Wetland?**	Yes X No
Hydric Soil Present?	Yes X No		
Wetland Hydrology Present?	Yes X No		

Remarks: Paired unit characterization. V/S/H observations Reflect generalized component of wetland unit in Parcel

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size:)			
1. Juncus patens			FAC
2. Alopecurus			OBL
3. carex sp (praecalitis?)			FACW
4. lotus purshianus			FAC
5. vulpia (Bromoides ?)			FACU
6. Trifolium (hyans ?)			FACU
7. UNID GRASS			-
8. Juncus (conglomeratus ?)			FACW
9.			
10.			
11.			
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: (A)

Total Number of Dominant Species Across All Strata: (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- Dominance Test is >50%
- Prevalence Index is ≤3.0[1]
- Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- Wetland Non-Vascular Plants[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks: Grazed Pasture.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2	80	7.5YR 4/6	20	C	PL&M	silt loam	depletion 10YR 4/1 - 10%

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks: claylom on top of sand layer ≈ 8" F-6 Redox dark surface
No observed Ap No obvious soil manipulations -

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required, check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- X Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (LRR A)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (LRR A)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

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

Water Table Present? Yes ✓ No ___ Depth (inches): 6"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0"

Wetland Hydrology Present? Yes X No ___

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

Remarks: ∇6" - soil saturated to surface -
Sporadic algal mats on vegetation in low areas indicating recent long duration ponding in depressions.
- occassional flooding

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
LUSHER - WET MEADOW 108-030-04 Parcel unit A	25 JAN 2004	66.1 Ac 37.7

TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
Pf/ss - 16.4 AC Pem - 19.4 AC	1.9 AC UPLAND AC 28.4 AC	0 AC	P-em 19.4 AC	Pf/ss 16.4 AC UPLAND 28.4 AC

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE: palustrine emergent - wet meadow
seasonally saturated
Ag Pasture - Grazed

LANDSCAPE POSITION: floodplain terrace

HYDROLOGY TYPE & DURATION:

- very long duration
  Sub surface saturation
- occassional flooding

HYDRIC SOIL INDICATOR: F6 Redox DARK Surface

No observed Ap

- sl @ 8" +

SOIL SURVEY MAP UNIT: Geilow sl 0-5%
Fluvaquents 0-1%

WETLAND/ UPLAND BOUNDARY: Trans

SLOPE & DRAINAGE: 1.2% sheet flow towards N-NW

Dominant Species * Common Species+

Juncus patens
Trifolium
Carex
Alopecurus
Vulpia
Lotus corniculatus
Juncus (oxymeris?)

geranium
rumex pulcher
cirsium
Juncus mexicanus
Conium
Quercus [illegible]
[illegible]
Vicia
Rubus
Polygonum

NOXIOUS SPECIES: None

GROWTH FORM: Herbaceous

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	N - agricultural [illegible] E - creek, [illegible] agr. pasture W - riparian woodland [illegible], agr. pasture S - [illegible] upland, agr. pasture
	OBSERVED/INFERRED MODIFICATIONS: V - [illegible] mostly recruited grasses no indication of intensive planting management S - None - may be subject to flooding @ deposition sand layers below soil H - None - occassional flooding -
	CHARACTERIZATION: [illegible] saturated [illegible]. Occassional flooding @ evidence of large creek blow out on aerial photo.
	COMMENTS: • observed population of PL ho on parcel but not in unit • No observed Li ba. Parcel not identified as Li ba habitat • No project impacts @ in unit or parcel • old creek bed crosses parcel. creek re-routed around parcel. Creek has blown out levee and flooded parcel in recent past.

EXCLOSURE DESCRIPTION/ REFERENCE SITE	LUSTER - WET MEADOW 108-030-04 25 JAN 2004 UNIT A NONE SOIL SURVEY MAP UNIT: Grelow Sl 0-5% FLUVAQUENTS 0-1%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE HYDROLOGY: NONE VEGETATION CLASS: emergent palustrine => ? palustrine forested increase in water grasses and forbes ESTIMATED SPECIES COMPOSITION CHANGE: increase in Juncus, carex species some Quercus, Fraxinus MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: - removal of grazing, veg. management OTHER POTENTIAL ACTIONS: - Pubes removal - removal of fencing

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

CHARACTERIZATION

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

UNIT B

Project/Site: LUSHER - FORESTED 108-030-04 City/County: Mendocino Sampling Date: 05 JAN 04

Applicant/Owner: CALTRANS State: CA Sampling Point: _____

Investigator(s): DW, KA, JH, DW (RR, SP) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Floodplain terrace Local relief (concave, convex, none): FLAT Slope (%): 1%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Gleeson sl 0-5% FLUVAQUENTS 0-1% NWI classification: Pf/SS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No _____
Hydric Soil Present?	Yes X	No _____
Wetland Hydrology Present?	Yes X	No _____

Is the Sampled Area within a Wetland? Yes X No _____

Remarks: PARCEL UNIT CHARACTERIZATION. V/S/H OBSERVATIONS REFLECT GENERALIZED COMPONENTS OF WETLAND PARCEL UNIT

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus latifolia			FACW
2. Baccharis sp (Pasiolepus ?)			FACW
3. Quercus lobata			FAC
4.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size: _____)			
1. Rubus			FACW
2. Toxicodendron			FACU
3.			
4.			
5.			
		= Total Cover	

Herb Stratum (Plot size: _____)			
1. Agrostis sp.			
2. Rumex pulcher			FAC
3. Mentha pulegium			obl
4. Juncus patens			FAC
5. Juncus (oxymerus?)			FACW
6.			
7.			
8.			
9.			
10.			
11.			
		= Total Cover	

Woody Vine Stratum (Plot size: _____)			
1.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

...e Ground in Herb Stratum _____

...s UNIT MAY be open TO GRAZING but LITTLE INDICATION IT HAS ...FFECT ON VEGETATIVE STRUCTURE/SPECIES COMPOSITION

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 4/1	70	7.5YR 5/6	30	C	PL/M	SiL	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (except MLRA 1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks: F-3 Depleted Matrix

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ✓ Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (LRR A)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (LRR A)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

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

Water Table Present? Yes ✓ No ___ Depth (inches): 6"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): surface

Wetland Hydrology Present? Yes ✓ No ___

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

Remarks:

- standing water in swales on depressions
- VLD-555
- Area was subject to recent flooding

PARCEL/UNIT: LUSHER - FORESTED 108-030-04 UNIT B			FIELD INSP DATE: [illegible]	TOTAL PARCEL AC: 66.1 AC
TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE:
palustrine forested
seasonally saturated @
occassional flooding.

LANDSCAPE POSITION:
floodplain terrace

HYDROLOGY TYPE & DURATION:
- very long duration ponding
- VLD subsurface saturation
- occassional flooding

- Area includes historic channel of outlet creek
creek was re-aligned/diverted. Appears to occassionally
jump levee -

HYDRIC SOIL INDICATOR:
F3 - Depleted matrix

SOIL SURVEY MAP UNIT:
Gielow sl 0-5%.
Fluvaquents 0-1%.

WETLAND/ UPLAND BOUNDARY:
trans.

SLOPE & DRAINAGE:
1-2%
N-NW
Shallow

Dominant Species * Common Species+
Fraxinus
Salix [illegible] ?
[illegible]
[illegible]

[illegible]
[illegible]
[illegible]
Agrostis sp

NOXIOUS SPECIES:
None

GROWTH FORM:
[illegible]
[illegible]
[illegible]

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	N - creek with riparian woodland, upland agricultural pasture E - creek with riparian woodland, agr. pasture S - riparian woodland, agr. pasture W - agr. pasture, railroad, creek, agr. past
	OBSERVED/INFERRED MODIFICATIONS: NONE - open for grazing?
	CHARACTERIZATION: palustrine [illegible] with seasonal flooding, [illegible] duration, [illegible] saturation
	COMMENTS: • PL no population observed in UNIT. • No Li ba observed in Parcel. Parcel not identified as potential habitat • No project impacts in Parcel

UNIT B

EXCLOSURE DESCRIPTION/ REFERENCE SITE	LUSHER - FORESTER 108-030-04 25 [illegible] NONE SOIL SURVEY MAP UNIT: Gidon Sl 0-5% Rivadeneira 0-1%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE HYDROLOGY: NONE VEGETATION CLASS: Already at successional, mature state. ESTIMATED SPECIES COMPOSITION CHANGE: ? - very little [illegible] MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: -NONE OTHER POTENTIAL ACTIONS: Remove fencing

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

MGC Plasma Middle - 103-250-14 27.0 AC

CHARACTERIZATION

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: MGC Plasma Middle City/County: Manteca Sampling Date: Jan 4, 2010
Applicant/Owner: CALTRANS State: CA Sampling Point: Parcel Baseline
Investigator(s): D. Mauro KG / SZ / RR Section, Township, Range:
Landform (hillslope, terrace, etc.): FLAT Base of Slope Local relief (concave, convex, none): FLAT Slope (%): 0-1 %
Subregion (LRR): A Lat: Long: Datum:
Soil Map Unit Name: NWI classification: PEM
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are Vegetation X, Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X No	**Is the Sampled Area within a Wetland?** Yes X No
Hydric Soil Present?	Yes X No	
Wetland Hydrology Present?	Yes X No	

Remarks: → PARCEL CHARACTERIZATION. V/S/H OBSERVATIONS REFLECT GENERALIZATION OF WETLAND COMPONENT OF PARCEL

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size:)			
1. Hordeum hystrix			FAC
2. Phalaris aquatica			FAC
3. Hypochaeris radicata			UPL
4. Trifolium sp			-
5. Media - dominant where present			UPL
6. Lolium perenne			FAC
7. Juncus patens			FAC
8. Mentha pulegium			OBL
ranunculus, Agrostis, geranium, Limnanthes	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum % Cover of Biotic Crust

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: (A)
Total Number of Dominant Species Across All Strata: (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
__ Dominance Test is >50%
__ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks: APPEARS TO BE LIGHTLY USED TO ABANDONED PASTURE. PORTIONS OF WETLAND BEGIN AS SEEPS ON HILLSIDE AND BECOMES SHALLOW STANDING WATER ON FLAT GROUND. DEPRESSIONAL AREAS HAVE VLD PONDING. HORSES IN ADJ PASTURE.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	95	7.5YR 4/6	5	C	PL	silty clay loam	with 15% gravel

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: DARK Redox surface @ Redox. Gravelly inclusions in upper Profile. Soil may have been leveled/graded? No Recent Dp.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2) @ 6" - varying to 9"
- X Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 0"-2"

Water Table Present? Yes X No ___ Depth (inches): 0"

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0"

Wetland Hydrology Present? Yes X No _____

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

Remarks: surface depressional storage

FLAT SOILS AT BASE of slope has SURFACE WATER. AN/INeffective DITCH channelized SURFACE WATER TOWARDS NW AT BASE of Slope. L TO UL DURATION SURFACE WATER @ SATURATION @ SURFACE

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
MGC PLASMA-Middle	January 4, 2011	27.0 AC

TOTAL WETLAND AC:	OTHER WATER AC:		IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
2.5 AC	0	Pem - 2.5 AC	0 AC	2.5 AC	24.5 AC NPC
	UPLAND 24.5 AC				

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE:

- Palustrine emergent, wet meadow/seep
- Veg on this parcel may reflect extreme long dry season effects

LANDSCAPE POSITION:

flats at tow of slope; very broad swale/overland flow

HYDROLOGY TYPE & DURATION:

- Long to very long duration
- Shallow surface ponding, sheet flow across wetland from seep
- subsurface saturation. 0-3"

HYDRIC SOIL INDICATOR:

F6 - redox dark surface
1 chroma 5% [redox]
w/gravely inclusions

SOIL SURVEY MAP UNIT:

WETLAND/ UPLAND BOUNDARY:

abrupt topographic change on and then gradual.

SLOPE & DRAINAGE:

<0-1%

PARTIALLY DRAINED by ditch - WATER SPREAD OUT OVER LOW SURFACE (COMMENTS)

Dominant Species * Common Species+

Hordeum hystrix *
Phalaris aquatica
Hypochaeris radicata
Trifolium sp
Madia (stunted)
Lolium perenne
Juncus patens
Mentha pulegium

+
Limnanthes sp
Ranunculus
Agrostis
Granium
Pleuropogon

- wetter end species found in deep pond (abandoned stock pond?)

NOXIOUS SPECIES:

None Identified

GROWTH FORM:

herbaceous

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	wooded 45% slopes to east open field to south, west, north
	OBSERVED/INFERRED MODIFICATIONS: - drainage ditch that has been placed on west of the roadway ditch provides ineffective drainage and turns into sheet flow/ shallow ponding across wetland area adjacent to horse pasture. - Abandoned or lightly grazed (cattle horses?) pasture. Pasture grasses on upland portion of parcel
	CHARACTERIZATION: Disturbed fallow field - evidence of ineffective drainage. Broad areas of surface sheet flow portions of which were identified as wetlands during delineation. An abandoned excavation (stock pond?) has deep extended ponding.
	COMMENTS: - Water accumulates from hillside seep + subsurface throughflow? at base of slope and runs over low areas of surface. Some of the water surface flows into adj. horse pasture. Lack of slope and broad low areas allow L-VL duration shallow ponding. - duration of saturation and available water may not extend into the dry season. Soil may be extremely dry and exposed to summer sun / dessication. - Plant development may be restricted to annuals, shallow rooted perennials may not be able to tolerate dry season. - This parcel has a small percentage of wetlands. A large upland field (fallow?) may not have suitable soil conditions for wetland creation.

MSG Plasma Middle

EXCLOSURE DESCRIPTION/ REFERENCE SITE

NONE - ADJACENT HORSE PASTURE HAS MORE THATCH BUT IS HEAVILY GRAZED.

SOIL SURVEY MAP UNIT:

DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:

SOIL: INTACT - GRAVELLY CLAY LOAM - MAY HAVE BEEN SOME HISTORIC GRADING? DOES NOT APPEAR TO PERC WELL

HYDROLOGY: SEEPAGE, SUBSURFACE FLOW AT BASE OF HILL TURNING INTO SURFACE SHEET FLOW ACROSS BROAD SHALLOWLY PONDED SWALE INTACT.

VEGETATION CLASS: PALUSTRINE EMERGENT SEASONALLY SATURATED Ag field MAY NOT CHANGE TO ANOTHER WETLAND TYPE @ REMOVAL OF VEG/AG MANAGEMENT. MAY ALREADY HAVE HAD MANAGEMENT Removed.

ESTIMATED SPECIES COMPOSITION CHANGE: LITTLE TO NO CHANGE @ Ag REMOVAL.

MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: PASSIVE MANAGEMENT ACTIONS (REMOVAL OF GRAZING) MAY NOT CHANGE EXISTING WETLAND TYPE. ACTIVE modifications MAY BE possible including CREATION of depressions CAPABLE of STORING WATER PROMOTING VLD PONDING/SATURATION and POTENTIAL HABITAT for Plectrophenax & Limnanthes. LIMITED OPTIONS.

OTHER POTENTIAL ACTIONS:
- MAY BE good area for Limnanthes establishment; would not have issue w/ reintroduction of pools - does not flood.
- FENCE REMOVAL

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

MGC PLASMA NORTH 103-230-06 18.2 AC

CHARACTERIZATION

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: MSC Plasma North 103-230-06 City/County: Mendocino Sampling Date: Jan. 4, 2011

Applicant/Owner: CALTRANS State: CA Sampling Point: PARCEL BASELINE

Investigator(s): DM KG/SZ/RR Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Base of hillslope/ Local relief (concave, convex, none): Slope Slope (%): 0-2%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Geelow sl 0-5%, clear lake clay 0-2% cole cl 0-2% NWI classification: Pem

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: PARCEL CHARACTERIZATION. V/S/H observations reflect generalized wetland component of parcel

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus lobata			FAC
2.			
3.			
4.			
	____ = Total Cover		

Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		

Herb Stratum (Plot size: ____)			
1. Lolium perenne			FAC
2. Juncus tenuis			FACW
3. Mentha pelecanum			OBL
4. Juncus sp (xiphoides?)			FACW
5. Lythrum hyssopifolia			FACW
6. Ranunculus			FACW?
7. Trifolium sp			FACU?
8. Pistura arundinacea			FAC
	____ = Total Cover		

Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: GRAZED PASTURE – WETTER PORTIONS OF PARCEL ARE ASSOCIATED @ SHALLOW DRAINAGE DITCHES. CLEAR VEGETATION CHANGES ACROSS UPL/WETLAND BOUNDARIES

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18"	10YR3/1	90	7.5YR4/6	10	C	PL/PF	clayey	- dry loam w/no granite

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks: 10% 10YR4/1 depletions
- soil saturated 0-3"
- water is moving down pedfaces are loaded w/saturation

ARGILLIC HORIZON @ 14+" IN SOIL SAMPLED IN UPLAND

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 0"-1"

Water Table Present? Yes X No ___ Depth (inches): 0"

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0"

Wetland Hydrology Present? Yes X No ___

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

Remarks: water is seeping in at soil pit; VLD-SSS and shallow ponding in relative depressions and surface sheet flow downslope. Water collects in shallow drainage ditches and flows into Goss. Ditch runs along S at edge of parcel.

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
MSL Plasma North 103-230-06	January 9, 2011	18.2 AC

TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
4.0 AC	0 AC UPL 14.2 AC Pem 4.0 AC	0 AC	4.2 AC	14.2 AC UPL

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE:

Palustrine emergent, wet meadow

erratic trees

LANDSCAPE POSITION:

slope 0-5%.

edge of steeper alluvium to E (9%-15%)

HYDROLOGY TYPE & DURATION:

- very long duration, subsurface saturation
- 0-2" surface depressional storage
- two cut ditches draining water @ S edge and near center. water entering from upslope and distributes some of the water over the parcel
- Series of ditches/swales across property, mostly ponded and moving off site

HYDRIC SOIL INDICATOR: F6-"

- Redox dark surface
- distinct Argillic horizon found in upland point adjacent to mapped wetland

SOIL SURVEY MAP UNIT:	WETLAND/ UPLAND BOUNDARY:	SLOPE & DRAINAGE:
Gerlow sl 0-5% Clear Lake clay 0-2% Cole cl 0-2%	transitional ponded to sloped	0-2%

Dominant Species * Common Species+

Lolium perenne,
Juncus tenuis,
Mentha
gladiated juncus sp.
Juncus bufonius,
Trifolium
Festuca arundinacea
Hordeum lystrix
Hypochaeris
Plantago

NOXIOUS SPECIES:

None

GROWTH FORM:

herbaceous

erratic trees

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	East - pasture, ag. field North - open ag. fields West - combination woodlot/pasture South - open ag. fields
	OBSERVED/INFERRED MODIFICATIONS: S - (- good potential for creation aquitard close to surface at upland area - 12" no observed Δp) H - dug drainage ditches at middle / to enhance surface [illegible] aquitard - VLD SSS and shallow ponded/flooded areas in depressions/swales V - Grazed pasture - wetter and non-grasses in swales/depressions
	CHARACTERIZATION: Grazed pasture @ very long duration subsurface saturation on unmodified hydric soil. Two formed flowing ditches enter property from the E (upslope). Numerous ditches/swales cut of parcel surface to distribute water as surface sheet flow probably for grass management.
	COMMENTS: • Small population of Li ba identified on parcel. • Parcel identified as potential Li ba habitat • No project impacts on parcel • Creation potential on parcel • Pl ho populations identified on parcels to W (Goss). Small population on MGC-N Appears historic attempts to redirect water for surface sheet irrigation on shallow slopes. ditches/swales in various states of abandonment.

MSC Plasma North

EXCLOSURE DESCRIPTION/ REFERENCE SITE	southern parcel w/trees (GRAZING) (Quercus) on Clear Lake clay same soil as SW corner of MGC-N. erratic trees on Geilow sl on MGC-N and Pf area on Goss on same soil unit. SOIL SURVEY MAP UNIT: Geilow sl 0-5% Clear Lake clay 0-2% Cole cl 0-2%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: None –
	HYDROLOGY: ? drainage ditches removing p potential to retain/redirect surface water
	VEGETATION CLASS: • Palustrine emergent → wet meadow • erratic trees
	ESTIMATED SPECIES COMPOSITION CHANGE: Grass/Forb Herbaceous likely to shift to a wooded overstory @ Qu lo + Fr la and Rubus, Juncus, Carex etc as understory.
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: • Remove grazing and vegetation/hydrology management • Allow vegetation succession. • Water in ditches could be redirected to sheet flow over site / extend hydroperiod for ponding/flooding
	OTHER POTENTIAL ACTIONS: • Remove fencing • Potential creation - available water in ditches/ argillic horizon close to surface in uplands.

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

NANCE 108-050-06 73.9 NC

CHARACTERIZATION

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

108-050-06

Project/Site: NAACCE - wet Meadow - A City/County: MENDOCINO Sampling Date: 14 JAN 2011

Applicant/Owner: CALTRANS State: CA Sampling Point: PARCEL BASELINE

Investigator(s): DM, KG, JSB BP Section, Township, Range:

Landform (hillslope, terrace, etc.): BASIN / FLOODPLAIN Local relief (concave, convex, none): SLOPE Slope (%): 0-1%

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: HAPLAQUOLLS / COLE CL NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____, (If no, explain in Remarks.)

Are Vegetation +/-, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: PARCEL UNIT CHARACTERIZATION. V/S/H OBSERVATIONS REFLECT CHARACTERIZATION OF WETLAND COMPONENT OF PARCEL UNIT

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Carex (undifferentiated) ?			OBL
2. Juncus (cf balticus?)			obl
3. Limnanthes douglasii			obl
4. Lindanthes bakeri			obl
5. Mentha pulegium			obl
6. Cynodon dactylon			FACW
7. Elymus glaucus			FACW
8. FESTUCA ARUNDINACEA			FAC
9. Ranunculus sp			FACW?
10.			
11.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: PARCEL UNIT GRAZED BUT DOES NOT SUPPORT PASTURE GRASSES.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18"	10 YR 3/1	70	5 YR 4/6	30	C	PL/M	clay loam	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: Redox DARK Surface - No Dp
No obvious or recent soil manipulations

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 0-3"

Water Table Present? Yes ✓ No ___ Depth (inches): Surface

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): Surface

Wetland Hydrology Present? Yes X No _____

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

Remarks: slightly higher ground than the pooled area, influence of subsurface saturation & surface ponding.
- Surface ponding in relative depressions
- may be sub-surface seep zone from upslope ditch

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
[illegible] UNIT A 108-050-06	14 JAN 2011	73.9 AC

TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
70.1 AC	.2 UPL 3.2 AC Hayed Pem meadow AL SP 56.8 AC Pem marsh 4.3 AC Pem meadow grazed 9.4 AC	0 AC	9.4 AC 56.8 AC	3.2 AC UR .2 AC OW 4.3 AC Pem marsh

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE: palustrine emergent P-em
SEASONALLY SATURATED -
UNIT GRAZED BUT PLANTS UNMANAGED OR MANAGEMENT INEFFECTIVE

LANDSCAPE POSITION: BASIN - FLOOD PLAIN TERRACE

HYDROLOGY TYPE & DURATION:
- very long duration, surface ponding / sheet flow over surface
- subsurface saturation - VLD
- occassional flooding - ADJACENT TO LARGE PONDED AREA

HYDRIC SOIL INDICATOR: F6 - Redox DARK SURFACE
- NO Ap. No APPARENT SOIL MANIPULATION.
- May be Seep Zone @ subsurface WATER SURFACING AND FLOWING OVER SURFACE

SOIL SURVEY MAP UNIT: Cole cl 0-2%; Haplaquep II 0-1%

WETLAND/ UPLAND BOUNDARY: transitioning TO UPSLOPE NON-WETLAND ABRUPT AT TRIBUTARY BERM

SLOPE & DRAINAGE: 1-2% sheetflow to west

Dominant Species * Common Species+
carex (nebrascensis)?
Juncus balticus
[illegible]
- Mentha pulegium
Lythrum hyssopifolia
Rumex crispus
Fenicea arundinacea
L. douglasii
Ranunculus sp

NOXIOUS SPECIES: NONE

GROWTH FORM: [illegible]

CURRENT CIRCUMSTANCE DESCRIPTION

SURROUNDING PARCELS:

E - ag. pasture

W - seasonally ponded, Berry creek, Ag pasture

NW - Riparian woodland, ag pasture

S - ag. pasture.

OBSERVED/INFERRED MODIFICATIONS:

- V → grazing. EXISTING PLANT COMMUNITY IS either NOT MANAGED by PLANTING OR EFFORTS ARE INEFFECTIVE.

S ⇒ No OBVIOUS modification

H ⇒ No obvious modification

CHARACTERIZATION:

palustrine emergent - wet meadow that has some grazing but too wet for veg. management.

- probably good for limnanthes management

- EXTENDED SURFACE WATER + SSS MAY KEEP SITE from SUPPORTING FAC TYPE PASTURE GRASSES.

COMMENTS:

- observed POPULATIONS of Li bA
  No observed PL ho.
  PORTIONS of UNIT NOT IDENTIFIED AS observed OCCURRENCE WAS IDENTIFIED AS POTENTIAL HABITAT
- EXTENDED WETNESS of SITE MAY MAKE THIS PARCEL UNIT AN IMPORTANT Li bA UNIT.
- No PROJECT IMPACTS @ IN PARCEL.

Name: [illegible] A [illegible] 108-050-06

EXCLOSURE DESCRIPTION/ REFERENCE SITE	ADJACENT PARCEL TO N of PARCEL UNIT has WOODLAND COVER but may have MANAGEMENT - Fr la.
	SOIL SURVEY MAP UNIT: Cole Cl 0-2% Hiphaquepts 0-1%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE
	HYDROLOGY: NONE. Surface of UNIT @ shallow standing water probably from subsurface seepage.
	VEGETATION CLASS: CURRENTLY Pem seasonally SATURATED AGRICULTURAL PASTURE (GRAZED). Mostly dominated by obl species @ little evidence of locally common AG GRASSES.
	ESTIMATED SPECIES COMPOSITION CHANGE: removal of grazing may influence some shift in species (? Fraxinus). However already too wet for agr. veg. management. ADJACENT PARCEL TO N ON SIMILAR SOIL UNIT @ FR la.
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: • removal of grazing • Allow successional plant development
	OTHER POTENTIAL ACTIONS: • removal of unnecessary grazing • debris removal • Riparian plantings adjacent to Belly Creek (plantings would be in wetlands)

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

CHARACTERIZATION

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

108-050-06

Project/Site: Nance - (Mixed Marsh) seasonally/perennial Ponded - B City/County: Mendocino Sampling Date: 14 JAN 2011

Applicant/Owner: CALTRANS State: CA Sampling Point: Parcel Baseline

Investigator(s): DM, KG, KZ, RP Section, Township, Range: _____

Landform (hillslope, terrace, etc.): BASIN / FLOODPLAIN Local relief (concave, convex, none): CONCAVE Slope (%): 0-1

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Cole cl 0-2% Haplaquepts 0-1% NWI classification: Pem

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 X 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 X	No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: PARCEL UNIT CHARACTERIZATION. V/S/H OBSERVATIONS REFLECT GENERALIZATION OF WETLAND COMPONENT OF PARCEL UNIT.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Juncus balticus ?			obl
2. Alisma plantago-aquatica			obl
3. Thypha latifolia			obl
4. Rumex crispus			FACW
5. Mentha pulegium			obl
6. Carex nebraskensis			obl
7. Oenanthe sarmentosa			obl
8.			
9.			
10.			
11.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: PARCEL UNIT GRAZED BUT DOES NOT SUPPORT PASTURE GROSS.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-	10 YR 2/1	70	7.5 YR 4/6	30	C	PL/SM	clay loam	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks: Redox dark Surface

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 3" - 24"+

Water Table Present? Yes ✓ No ___ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes X No ___

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

Remarks:
- Very long duration ponding w/algae
- may be perennially SATURATED – sub surface seepage.

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
NANCE - seasonally ponded area B 108-050-06	14 JAN 2014	

TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE: Palustrine emergent SEASONAL (PERENNIAL?) SATURATION / ponded - UNITGRAZED @ UNMANAGED OR INEFFECTIVE PASTURE GRASS MANAGEMENT

LANDSCAPE POSITION: floodplain terrace basin - RELATIVE depression @ VLD ponding.

HYDROLOGY TYPE & DURATION:

- Very long duration surface ponding / perennially ponded
- subsurface saturation VLD to PERENNIAL
- part of lake - currently flooded 3-24"+
- STORAGE of upslope on-flow AND SURFACE sheet flow ALONG SEEPAGE ZONE.

HYDRIC SOIL INDICATOR: F6 - Redox DARK Surface

SOIL SURVEY MAP UNIT: Cole cl 0-2% HAPLAQUEPTS 0-1%

WETLAND/ UPLAND BOUNDARY: transitional

SLOPE & DRAINAGE: 0-1% sheet flow to North (Berry creek)

Dominant Species * Common Species+ → Trifolium, Limnanthes, Cammasonia

↓ Juncus, Alisma, Typha, Ranus, Mentha, Carex neb.

NOXIOUS SPECIES: None

GROWTH FORM: Herbaceous

CURRENT CIRCUMSTANCE DESCRIPTION

SURROUNDING PARCELS:

S - Ag. Pasture
N - Riparian woodland, ag. pasture, residence
W - creek w/riparian trees, ag. pasture
E - Ag. Pasture

OBSERVED/INFERRED MODIFICATIONS:

V - grazing. Existing Plant Community is either not managed by planting or efforts are ineffective.

S - No obvious modification.

H - No obvious modification - Possible historic channel at base of slope to capture seepage.

CHARACTERIZATION:

- palustrine emergent - currently ponded, sheet flow of surface to the North. Grazed area isn't too wet for veg. management.
- may be perennial ponded/sub surface saturation - very wet.

COMMENTS:

- Most of this unit was not observed to have populations of Li ba or Pl ho. (may be too wet)
- Unit identified as Li ba potential habitat.
- No Project impacts @ N parcel
- Extended ponded condition supporting aquatic species (Alisma, Typha)

EXCLOSURE DESCRIPTION/ REFERENCE SITE	NANCE - seasonally ponded B 14 JAN 2011 108-050-06 NONE SOIL SURVEY MAP UNIT: Cole cl 0-2% Haplaquepts 0-1%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE
	HYDROLOGY: NONE
	VEGETATION CLASS: palustrine emergent seasonally ponded/saturated - supports obl aquatic species
	ESTIMATED SPECIES COMPOSITION CHANGE: ? None - wet enough to have mostly Juncus dominated plant community, Alisma, Typha.
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: • remove grazing • allow successional plant development However, hydroperiod is sufficiently long enough to support obl aquatics. Not likely to change.
	OTHER POTENTIAL ACTIONS: • removal of unneeded fencing

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

Characterization

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

Project/Site: Nance 108-050-06 Unit C City/County: Mendocino Sampling Date: 13 Jan 2014

Applicant/Owner: Caltrans State: CA Sampling Point: Parcel Unit Baseline

Investigator(s): DM, KG/SZ/RP Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Flood Plain Terrace Local relief (concave, convex, none): Flat Slope (%): 1%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Cole cl 0-2% Haplaquepts 0-1% NWI classification: Pem

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Parcel unit characterization. V/S/H observations infered from adjacent parcel. Unable to access parcel unit.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Alopecurus pratensis			obl
2. Ranunculus orthorhynchus			facw
3. Camassia quamash			obl
4. Poa palustris			facw
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Vegetation estimated from adjacent parcels, delineation data and aerials. Site not accessable likely hayed and grazed.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR4/2	80	2.5YR4/8	20	C	PM	scl	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: SPA9 JAN 08 JD SUBMITTAL

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

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

Water Table Present? Yes ✓ No ___ Depth (inches): 4"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 1"

Wetland Hydrology Present? Yes X No _____

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

Remarks: SPA9 JAN 08 JD SUBMITTAL

UNIT C

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
NANCE 108-050-06 UNIT C	26 JAN 11	73.9 AC

TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
	.2 AC			

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE:
PEM SEASONALLY SATURATED
AG PASTURE (HAYED + GRAZED)

LANDSCAPE POSITION:
FLOOD PLAIN TERRACE

HYDROLOGY TYPE & DURATION:
- Very long duration sub surface saturation
- occassional flooding

HYDRIC SOIL INDICATOR:	SOIL SURVEY MAP UNIT:	WETLAND/ UPLAND BOUNDARY:	SLOPE & DRAINAGE:
F3 - Depleted MATRIX	COLUCL 0-2% Haplaquepts 0-1%	TRANSITIONAL	0-1%

Dominant Species * Common Species+

Alopecurus
Ranunculus
Poa
Camassia

NOXIOUS SPECIES:
None

GROWTH FORM:
herbaceous

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	N, S, E, W - open AG pastures
	OBSERVED/INFERRED MODIFICATIONS:
	V - AG GRASS for HAY + GRAZING S - None H - None
	CHARACTERIZATION:
	Pem Seasonally saturated Ag pasture @ Haying + grazing on intact Hydric soil and historically modified Hydrology
	COMMENTS:
	• Large Area of Li ba identified on Parcel UNIT. Remainder of UNIT identified as potential habitat • No PL ho populations identified on site • No project impacts identified on site

UMTC

EXCLOSURE DESCRIPTION/ REFERENCE SITE	None SOIL SURVEY MAP UNIT: Cok cl 0-2%. Haplaquepts 0-1%.
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: None
	HYDROLOGY: None
	VEGETATION CLASS: Pcm Ag pasture Hay + Grazing
	ESTIMATED SPECIES COMPOSITION CHANGE: - Perennial grass species composition change - Possible forbs/weeds
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: - Remove Ag management Hay + Grazing - Allow vegetation succession development
	OTHER POTENTIAL ACTIONS: - Remove fencing

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

NIESEN 108-040-02 27.4 AC

CHARACTERIZATION

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

Project/Site: NIELSEN 108-040-02 City/County: MENDOCINO Sampling Date: 10 JAN 2011

Applicant/Owner: CALTRANS State: CA Sampling Point: PARCEL BASELINE

Investigator(s): D.M., K.G., DW/SF, RP - JOE GWILLIAM Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain terrace Local relief (concave, convex, none): flat Slope (%): 1-2

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: COLE clay loam 0%-2% Generally 0-5% NWI classification: PEM

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 X No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks: PARCEL CHARACTERIZATION. V/S/H OBSERVATIONS REFLECT GENERALIZATION OF WETLAND COMPONENT OF PARCEL

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Nasturtium sp			OBL
2. Mentha pulegium			OBL
3. Ranunculus sp			FACW
4. Lythrum hyssopifolia			FACW
5. Festuca arundinacea			FAC
6. Lotus corniculatus			FAC
7. Trifolium (Reduns?)			FACW
8. Phalaris aquatica?			OBL
9.			
10.			
11.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species ____	x 1 =	____
FACW species ____	x 2 =	____
FAC species ____	x 3 =	____
FACU species ____	x 4 =	____
UPL species ____	x 5 =	____
Column Totals: ____ (A)		____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: GRAZED PASTURE - PARCEL NOT GRAZED SINCE LAST GROWTH SEASON.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10 YR 3/1	80	7.5 YR 4/6	20	C	PL/SM	clay loam	pore lings, soft masses

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks: Redox Dark Surface - No developed A or apparent Ap. No indications of extensive soil manipulations.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 0-6"

Water Table Present? Yes ✓ No ___ Depth (inches): surface

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): surface

direct ppt / run on from upslope positions

Wetland Hydrology Present? Yes ✓ No ___

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

Remarks: saturated through ped faces due to ↑ clay content in soil.
Relative depressions and swales @ shallow water 0"-6" deep.
Surface sheet flow to N.
Parcel not likely to experience generalized flooding

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
Niesen 108-040-02	12 JAN 2011	27.4 AC

TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
19.4 AC	.5 AC UPL 7.5 AC / Pf .6 AC Pen 18.8 AC	11.4 AC Pen 1.07 OW 1.1 ACL/PL	7.4 Pen	Pf - .6 AC .5 AC OW 6.4 AC UPL

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE:
palustrine emergent; wet meadow
SEASONALLY SATURATED

historic managed agricultural pasture with grazing

LANDSCAPE POSITION:
floodplain terrace -

HYDROLOGY TYPE & DURATION:
sub surface SATURATION
major state is very long duration with depressional areas and swales having standing water up to 4-6" in deeper areas -
- excess water sheet flows to N
- direct ppt & run on - NOT likely to flood

HYDRIC SOIL INDICATOR:
F6
DARK Rebon surface
No developed A or evidence of Ap

SOIL SURVEY MAP UNIT:
Cole clay loam 0-2%
Gerlow sl 0-5%

WETLAND/ UPLAND BOUNDARY:
- Transitional on flat ground
- Abrupt adjacent to fill Rd

SLOPE & DRAINAGE:
1-2%
- drainage to N - NW
- surface water sheet flow in swale - central portion of parcel.

Dominant Species * Common Species+
Alopecurus
Mentha
Ranunculus
Lythrum
Festuca
Lotus
Trifolium
Juncus (oxymeris?)

Juncus spinosus
Agrostis
- Boidevallia
- cirsium
- Hordeum aquatica
- gladiated juncus
- Juncus
- pleuropogon
- Eryngium aristolatum
- Madea
- Phaleurus arundinacea
- Rubus
- Teasel
- Alisma,
- Mentha,
- Ranunculus,
- Rumex
- Lactuca cerriola
- Lotus lunatus
- Daucus
- Hordeum hystrix
- Limnanthes

Relative to other more managed parcels this parcel has more species diversity.

NOXIOUS SPECIES:
None

GROWTH FORM:
Herbaceous

CURRENT CIRCUMSTANCE DESCRIPTION

SURROUNDING PARCELS:

N: agriculture pasture
E: railroad tracks, creek, then open pasture
W: mod and 45% slope oak/fir Hill
S: agricultural pasture

OBSERVED/INFERRED MODIFICATIONS:

S: NONE

H: NONE

V: Historically grazed, veg. management that has been removed since LAST GROWING SEASON. PASTURE GRASSES DISAPPEARING IN WETTER SWALES/depressions. in swales

CHARACTERIZATION:

Formally grazed pasture, very long duration surface ponding, and subsurface saturation with intact soils (clay loam). Observed increased species richness of vegetation probably due to removal of grazing and veg. management.

COMMENTS:

- Parcel has abandoned house and three outbuildings and numerous shed w/associated gravel driveway, turnaround.
- Parcel is already expressing vegetative shift associated with removal of veg. management and horse and cattle grazing - probably removed by summer of 2009.
- Parcel is within impact area of proposed bypass.
- Need to confirm that are using most updated JD map.
- Li ba observed ON SITE - most of parcel identified as POTENTIAL HABITAT. No PL ho

Niesen - 12 Jan 2001

EXCLOSURE DESCRIPTION/ REFERENCE SITE	NONE SOIL SURVEY MAP UNIT: Cole cl 0-2% Gallow sl 0-5%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE HYDROLOGY: NONE VEGETATION CLASS: palustrine emergent possible succession to palustrine forested/em ESTIMATED SPECIES COMPOSITION CHANGE: Little vegetation change possibly increase of Quercus and Fraxinus. Grazing has already been removed. MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: PERMANENT REMOVAL of GRAZING. ALLOW VEG COMMUNITY TO MATURE by SUCCESSIONAL development. OTHER POTENTIAL ACTIONS: - Remove unnecessary fencing - Remove Rubus - Removal of road to original grade. - removal of gravel/pad in south central area (impact area?) - Upland areas in southwestern area appears appropriate for wetland creation by removal of fill and regrading; will need performance criteria; limited area constrained by current ice, culverts, and placement of new bypass

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

WATSON 037-221-30 115.6 AC

WATSON

CHARACTERIZATION

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

UNIT A

Project/Site: WATSON – 037-221-30 wetland City/County: MENDOCINO Sampling Date: 13 JAN 2011

Applicant/Owner: CALTRANS State: CA Sampling Point: PARCEL BASELINE

Investigator(s): DM, K.G, DW/SZ, RP Section, Township, Range: _____

Landform (hillslope, terrace, etc.): ALLUVIAL FAN/FLOOD PLAIN Local relief (concave, convex, none): GENTLE SLOPE Slope (%): 0-3%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Cole Cl 0-2/ Feliz Cl 0-2% NWI classification: Pem

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: PARCEL UNIT CHACTERIZATION. V/S/H OBSERVATIONS REFLECT GENERAL CONDITION OF WETLAND UNIT @ IN PARCEL

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Lolium perenne			FAC
2. [illegible] Pulegium			OBL
3. [illegible] (SPS)			FACU
4. [illegible]			FAC
5. [illegible]			FAC
6.			
7.			
8.			
9.			
10. Limnanthes bakeri			
11.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: HEAVILY GRAZED @ POOR PASTURE GROWTH – WEEDY. LIBA COMMON IN SWALES @ STANDING WATER

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14"	10YR 4/1	100	7.5YR 4/6	10				

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks:

- gravel inclusion from hillside on east and existing stream; sampling @ 12"; pockets of sand as well
- No A horizon
- Portions of UNIT heavily TRAMPLED @ disrupted soil surface

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ✓ No _____ Depth (inches): 2 - 4"

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

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): Surface

Wetland Hydrology Present? Yes ✓ No _____

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

Remarks:

- main outlet in relative vicinity; unclear where it goes

PARCEL/UNIT: WATSON - 037-221-30 WETLAND UNIT A	FIELD INSP DATE: 13 JAN 2014	TOTAL PARCEL AC: 115.6 AC

TOTAL WETLAND AC:	OTHER WATER AC:		IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
Pf - 15.1 AC Pem-meadow - 42.7 AC Pem-marsh - 23.3 AC	.3 AC UPLAND AC 34.2 AC	→ SOME CREATION IN UPLAND	0 AC	42.7 meadow PARTIAL HAYED ←	Pf - 15.1 AC Pem marsh 23.3 AC 34.2 UPL .3 UW

CURRENT CIRCUMSTANCE DESCRIPTION	WETLAND TYPE:	LANDSCAPE POSITION:
	palustrine emergent - Pem Heavily grazed pasture / Feed lot [illegible]	UPPER PORTIONS of UNIT ALLUVIAL FAN (shallow) AND FLOODPLAIN

HYDROLOGY TYPE & DURATION:

very long duration surface ponding; subsurface saturation

occasional flooding; rock-line is present

depressions and swales @ shallow ponding/flooding 0"-3"

HYDRIC SOIL INDICATOR:	SOIL SURVEY MAP UNIT:	WETLAND/ UPLAND BOUNDARY:	SLOPE & DRAINAGE:
F3 - depleted MATRIX	Cole cl + Feliz cl	TRANSITIONAL [illegible]	[illegible]

Dominant Species * Common Species+

Lolium
Mentha
Trifolium
Juncus [illegible]

- graduated - tested juncus
- Limnanthes
- chicharon
- Hordeum hystrix
- [illegible]
- geranium
- Ranunculus
- [illegible]
- plantage
- TARAXICUM
- Hypochaeris

NOXIOUS SPECIES:
NONE
- SOME CENTAUREA IN UPLANDS

GROWTH FORM:
Herb [illegible]

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	N - agriculture pasture, grazed S - agricultural pasture E - Road, [illegible] @ 30-40 [illegible] W - riparian woodland, [illegible] watering, [illegible]
	OBSERVED/INFERRED MODIFICATIONS: • parcel has had a series of shallow swales, [illegible] w/ [illegible] ridges for [illegible] sheet flow (TOPOGRAPHY CONTOUR) • PORTIONS OF SITE ARE heavily TRAMPLED AND devoid of VEGETATION. VEGETATION Reduced TO STUBBLE
	CHARACTERIZATION: Managed agricultural pasture, palustrine [illegible] near meadow with occasional flooding during extreme events. Heavily GRAZED FEEDLOT.
	COMMENTS: · Agricultural pasture that has several swales [illegible] to [illegible] into the parcel · Good site for [illegible] establishment, [illegible] species [illegible] • UPSLOPE RUN ON CHANNALIZED IN TWO formed TRIBUTARIES THAT SPREAD TO SURFACE SHEET FLOW ON FLATTER PORTIONS OF PROPERTY. • AG USES INCREASE CHANCES/OCCURRANCE OF SEDIMENTS BEING MOBILIZED. ORGANICS. • SEVERAL AREAS of SLIGHTLY HIGHER GROUND NOT MAPPED AS WETLAND. OPPORTUNITIES for WETLAND CREATION ON THIS PARCEL

WATSON 037-221-03 [illegible] UNIT A

EXCLOSURE DESCRIPTION/ REFERENCE SITE	None SOIL SURVEY MAP UNIT: cole cl 0-2% feliz cl 0-2%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NO MAJOR IMPACTS. Some AREAS TRAMPLED & devoid of VEGETATION.
	HYDROLOGY: • redirecting of drainage swale → works may be to incorporate with wetland creation
	VEGETATION CLASS: palustrine emergent / palustrine [illegible] • HEAVILY GRAZED weedy species
	ESTIMATED SPECIES COMPOSITION CHANGE: age, [illegible] → ↑ [illegible], [illegible], [illegible], ↑ [illegible] [illegible]
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: - removal of veg management: grazing - STABILIZE SOIL @ veg cover
	OTHER POTENTIAL ACTIONS: • [illegible] • [illegible] • southern upland [illegible] slopes, excellent [illegible] for removing soil, regrading [illegible]

ORE:		RELATED REFERENCE:
ROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

CHARACTERIZATION

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

UNIT B

Project/Site: Watson-Riparian [illegible] City/County: [illegible] Sampling Date: 13 JAN 11

Applicant/Owner: DM, KG / SZ, RP, KL State: CA Sampling Point: PARCEL BASELINE

Investigator(s): _____ Section, Township, Range: _____

Landform (hillslope, terrace, etc.): BASIN/FLOOD PLAIN Local relief (concave, convex, none): FLAT Slope (%): 1%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Cole cl 0-2% Feliz cl 0-2% NWI classification: Pf

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation +/-, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: PARCEL UNIT CHARACTERIZATION V/S/H OBSERVATIONS REFLECT GENERAL CONDITION OF WETLAND UNIT @ IN PARCEL

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus latifolia			FACW
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. FRAXINUS LATIFOLIA			FACW
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Ocimum [illegible] SARMENTOSA			obl
2. RUMEX			FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: UNIT IS EXPANDING FORESTED FRINGE MOSTLY @ IN PARCEL. FORESTED AREA IS EXPOSED TO GRAZING.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR3/1		7.5YR4/6	2			Sandy	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks:

- No gravel, some fine sandy Redox dark surface
- Some areas of concentrated hoof shear

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 1-3"

Water Table Present? Yes ✓ No ___ Depth (inches): 0"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No _____

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

Remarks:

- Water flowing over portions of forested unit.
- Occassional deep flooding

PARCEL/UNIT:			FIELD INSP DATE:	TOTAL PARCEL AC:
[illegible] UNIT B [illegible]			13 JAN 11	
TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:

CURRENT CIRCUMSTANCE DESCRIPTION	WETLAND TYPE:	LANDSCAPE POSITION:
	[illegible] Pf Ag GRAZED	BASIN edge / Flood Plain

HYDROLOGY TYPE & DURATION:
[illegible] VLD [illegible] [illegible] deep, flooding

HYDRIC SOIL INDICATOR:	SOIL SURVEY MAP UNIT:	WETLAND/ UPLAND BOUNDARY:	SLOPE & DRAINAGE:
F6 - Redox Dark Surface	Cole cl 0-2% Feliz cl 0-2%	mostly surrounded by wetland	0-1% [illegible]

Dominant Species * Common Species+	NOXIOUS SPECIES:
[illegible] Rumex Oenanthe	Cows
	GROWTH FORM:
	Closed canopy Forest @ herbaceous understory

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	east - ag. pasture North - woodland, ag pasture west - ponded ag. field fertilizing south - ag. pasture
	OBSERVED/INFERRED MODIFICATIONS: H/ some shallow swale as sheet flow but @ VLD - SSS and occassional flooding S/ some areas of extensive hoof shear V/ Woody trees creeping out into field
	CHARACTERIZATION: ~~[illegible]~~ palustrine forested w/ ponded water, sheet flow to west. Ag pasture.
	COMMENTS: · Trees do not continue into ponded area where vegetation is hayed. They do persist along fenceline to S. Mature trees along fenceline @ recruits extending into field.

[illegible] UNIT B

EXCLOSURE DESCRIPTION/ REFERENCE SITE	NONE SOIL SURVEY MAP UNIT: Cole cl 0-2% Feliz cl 0-2%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE
	HYDROLOGY: NONE
	VEGETATION CLASS: NONE - is already at climax successive state of Fraxinus may be changes to understory @ GRAZING Removal
	ESTIMATED SPECIES COMPOSITION CHANGE: ?
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: may eliminate grazing to foster understory pulsation emergent veg and extend colonization of Fraxinus
	OTHER POTENTIAL ACTIONS: • Remove fencing • Debris Removal

CHARACTERIZATION

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

UNIT C

Project/Site: [illegible] City/County: [illegible] Sampling Date: [illegible]

Applicant/Owner: CALTRANS State: CA Sampling Point: PARCEL BASELINE

Investigator(s): [illegible] Section, Township, Range:

Landform (hillslope, terrace, etc.): BASIN Local relief (concave, convex, none): FLAT Slope (%): 0 - 1%

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: HAPLAQUEPTS NWI classification: P em

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Seasonally ponded PARCEL UNIT CHARACTERIZATION. V/S/H observations Reflect General condition of WETLAND UNIT WIN PARCEL

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Juncus			FACW-obl
2. Festuca			FAC
3. Lolium			FAC
4. Rumex			FACW
5. Carex			OBL
6. Ranunculus			FACW
7. Cotula coronopifolia			OBL
8.			
9.			
10. Beckmannia ?			
11. Polygonum ?			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		
% Bare Ground in Herb Stratum ____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species ____	x 1 =	____
FACW species ____	x 2 =	____
FAC species ____	x 3 =	____
FACU species ____	x 4 =	____
UPL species ____	x 5 =	____
Column Totals: ____ (A)		____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Hayed/Grazed AG LAND – Species composition Likely Affected by MANAGEMENT. Includes WETTED and RECRUITED species.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8"	10YR 3/1	90	7.5YR 4/6	10	C	PL/M	SiL	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: Redox dark surface – No obvious recent soil manipulations ..... No Ap

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 0-5"

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

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

Wetland Hydrology Present? Yes X No _____

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

Remarks: Seasonal lake – VLD SSS + ponding @ occasional deep flooding

UNIT C

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
WATSON - Seasonally Ponded UNIT	13 JAN 11	115.6 AC

TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
	.3 AC			

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE:
Pem - AG HAYLAND
AND GRAZED PASTURE
SEASONALLY FLOODED - VLD

LANDSCAPE POSITION:
FLOODPLAIN - BASIN/
SEASONAL LAKE

HYDROLOGY TYPE & DURATION:
- very long duration, surface ponding
- [illegible] surface [illegible] - VLD
- OCCASSIONALLY deeply Flooded for LONG DURATION

HYDRIC SOIL INDICATOR:
F6

SOIL SURVEY MAP UNIT:
HaplaQuepTS

WETLAND/ UPLAND BOUNDARY:
UNIT of PARCEL SURROUNDED by WETLAND

SLOPE & DRAINAGE:
0-1% DRAINS TO NW

Dominant Species * Common Species+
[illegible]

NOXIOUS SPECIES:
None

GROWTH FORM:
Herbaceous

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	W - Riparian woodland, ag pasture S - ag. pasture, ponded N - agri pasture, ponded E - agriculture pasture, and
	OBSERVED/INFERRED MODIFICATIONS: V/ AREA HAYED AFTER WATER RETREATS. GRAZED AFTER MOWING SPECIES COMPOSITION APPEARS TO BE RECRUITED GRASSES + FORBS. H/ VLD SEASONAL LAKE @ VLD-SSS, OCCASSIONAL deep FLOODING NONE S/ NONE
	CHARACTERIZATION: [illegible] emergent - wet meadow agr. pasture [illegible] WETTER end RECRUITED SPECIES @ SOME LOLIUM / FESTUCA @ edge. - unit is edge of seasonally lake surface AND OCCASIONALLY deeply flooded * HAY BALES TAKEN FROM UNIT INCLUDED ALISMA, BECKMANIA, POLYGONUM
	COMMENTS: • [illegible] • STANDS of SCIRPUS / TYPHA JUST beyond edge of UNIT. • WATER LEVELS AND DURATIONS MAY be AFFECTED by debris PILED UP AT CONSTRUCTION of OUTLET CREEK

UNIT C

EXCLOSURE DESCRIPTION/ REFERENCE SITE	[illegible] seasonally ponded) NONE SOIL SURVEY MAP UNIT: Haplaquepts -
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE
	HYDROLOGY: NONE
	VEGETATION CLASS: [illegible] - [illegible] AO - Hayland + Pasture
	ESTIMATED SPECIES COMPOSITION CHANGE: currently dominated by perennial Juncus, Carex, Rumex @ Festuca/Lolium at edges Likely to succeed to perennial Carex, wet native grasses, Polygonum, Scirpus, Typha
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: - eliminate haying + grazing
	OTHER POTENTIAL ACTIONS: [illegible]

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

WATSON 037-250-05 51.1 Ac

WATSON

characterization

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

Project/Site: watson - 037-250-05 City/County: mendocino Sampling Date: 26 JAN 11

Applicant/Owner: CALTRANS State: CA Sampling Point: Paired baseline

Investigator(s): DM, KG, DW / SZ / RP Section, Township, Range:

Landform (hillslope, terrace, etc.): BASIN Local relief (concave, convex, none): flat/concave Slope (%): 0%

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: HAPLAQUOLLS 0-1% clear lake Clay 0-2% NWI classification: Pem

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation +/-, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Paired characterization. V/S/H observations and recovery of data from delineation reflect developed site wetland characters.

VEGETATION – Use scientific names of plants. SMALL WOODLAND AREA included but BROKEN OUT

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus latifolia			FACW
2. Salix sp			FACW?
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: ____)			
1. Phalaris arundinacea			OBL
2. Agrostis pilegium			OBL
3. Rumex crispus			FACW
4. Scirpus			OBL
5. Beckmannia			OBL
6. Juncus (rhoeocephalus ?)			FACW
7. Eryngium sp!			OBL
8.			
9.			
10.			
11. ∝ observed			
	= Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet: for acreage calculations.

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Portions of wetland may be reclaimed as hay (conversation @ ranch hands) and seasonally grazed(?) Observations made from edge of paired - paired inaccessible flooded

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR3/1	70	5YR4/6	30	C	PL/M	cl	
6-16	10YR4/1	80	5YR4/6	20	C	M		

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: Information Recorded from WA-01 7-22-09

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 0"-6"+

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

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

Wetland Hydrology Present? Yes X No _____

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

Remarks: Site Mostly flooded + Ponded

- ALGAL MATS observed in 7/09

PARCEL/UNIT: WATSON-037-250-05 -
- Parcel mostly inaccessible
- Forested unit relatively small and scattered around Parcel - will be removed from Enhancement opportunity

FIELD INSP DATE: 3/3/2004

TOTAL PARCEL AC: 51.1 AC

TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
49.2 AC Pem - 39.7 AC Pf - 9.5 AC	.2 AC UPLAND 1.9 AC	0 AC	39.7 AC	Pf - 9.5 AC .2 AC OW 1.9 AC UPL

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE: Mostly Palustrine emergent seasonally ponded/saturated partially hayed and grazed as pasture

LANDSCAPE POSITION: Floodplain terrace/basin

HYDROLOGY TYPE & DURATION:
- Very long duration seasonal pond ng/sub surface saturation
- Frequently flooded/ponded

HYDRIC SOIL INDICATOR: F6 - Redox Dark Surface
F3 Depleted matrix

SOIL SURVEY MAP UNIT: Hydraquents 0-2%

WETLAND/UPLAND BOUNDARY: Abrupt edge on W. Remainder surrounded by

SLOPE & DRAINAGE: 0-1%

Dominant Species * Common Species+
Phalaris
Cyperus
Beckmannia
Polygonum
Eryngium
Juncus

Fraxinus
Quercus
Salix

NOXIOUS SPECIES: None

GROWTH FORM:
- Herbaceous marsh
- Small woodland + riparian canopy

CURRENT CIRCUMSTANCE DESCRIPTION

SURROUNDING PARCELS:

E, N, S → seasonally flooded marsh / Hayed & Grazed as pasture

W → Hy 1; abrupt steep slope

OBSERVED/INFERRED MODIFICATIONS:

V/ - Portions may be seasonally Hayed for Recruited Grasses & Forbs

- May be Grazed after cutting

S- None

H- None

CHARACTERIZATION:

Very long duration ponded / saturated wet marsh probably unable to support forage grasses. Recruited vegetation for hay and grazed after cutting. Soil and hydrology INTACT.

COMMENTS:

- No observed populations of Li bA or PL ho identified on parcel
- All wetlands on Parcel identified as potential Li bA habitat
- No Project impacts on parcel
- Very long duration ponding (may be > 1' deep) Likely perennial marsh

EXCLOSURE DESCRIPTION/ REFERENCE SITE	WATSON 037-250-05 13 JAN 2011 SOIL SURVEY MAP UNIT: Haplaquepts 0-1%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: None
	HYDROLOGY: None
	VEGETATION CLASS: Mostly Pem seasonally Ponded/saturated open marsh small unit PF/SS woodland
	ESTIMATED SPECIES COMPOSITION CHANGE: Possible increase in scirpus, Fraxinus? Likely little to No change - Already to wet to support pasture grasses (Hay bales taken from area had Beckmania/Polygonum/Eryngium)
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: Remove any management Haying ... Grazing.
	OTHER POTENTIAL ACTIONS: • Remove fences

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

WILDLANDS 108-020-07 7.8 AC

#1

WILDLANDS

CHARACTERIZATION

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: WILDLANDS 108-020-~~06~~ 07 City/County: MENDOCINO Sampling Date: 6 JAN 2004

Applicant/Owner: CALTRANS State: CA Sampling Point: G

Investigator(s): DM, KG / RR / JM Section, Township, Range: _____

Landform (hillslope, terrace, etc.): FLOODPLAIN TERRACE Local relief (concave, convex, none): FLAT / SWALE Slope (%): 0 - 2%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: GEILOW SL 0-5% / FLUVAQUENTS NWI classification: P em

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: PARCEL CHARACTERIZATION. V/S/H OBSERVATIONS REFLECT GENERALIZED WETLAND COMPONENT OF PARCEL

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. SALIX SP			FACW OBL
2.			
3.			
4.			
	____ = Total Cover		

Sapling/Shrub Stratum (Plot size: ____)			
1. [illegible]			
2.			
3.			
4.			
5.			
	____ = Total Cover		

Herb Stratum (Plot size: ____)			
1. Festuca arundinacea			FAC
2. Juncus [illegible]			FAC
3. Alopecurus SP			FACW
4.			
5.			
6.			
7.			
8.			
	____ = Total Cover		

Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

__ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: few scattered trees some willows out of bank. Grazed pasture.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6"	10 YR 4/1	90	7.5 YR 4/6	10	C	PL/M	clay loam	
6-14"	10 YR 4/1	70	7.5 YR 4/6	30	C	PL/M	clay loam	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: Depleted Matrix - No observable AP

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): surface

Water Table Present? Yes ✓ No ___ Depth (inches): surface

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): surface

Wetland Hydrology Present? Yes X No _____

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

Remarks: subsurface saturation - depressions have standing water.

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
WILDLANDS 108-020-~~060~~7	6 JAN 2011	7.8 AC

TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
P-em 2.9	.2 AC UPLAND AC 4.7 AC	0 AC	2.9 AC P-em	.2 AC OW 4.7 AC UPLAND

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE:
palustrine emergent - wet meadow
seasonally saturated @
occassional flooding

LANDSCAPE POSITION:
floodplain terrace
mostly flat - gently sloping

HYDROLOGY TYPE & DURATION:
- very long durations
- subsurface saturation VLD
- occasional flooding

HYDRIC SOIL INDICATOR:
F3
Depleted Matrix
- no Ap

SOIL SURVEY MAP UNIT:
Gerlow sl 0-5%
Fluvaquents

WETLAND/ UPLAND BOUNDARY:
transitions w/ upland riparian woodland

SLOPE & DRAINAGE:
<1% surface water drainage w/ swales

Dominant Species * Common Species+
- Juncus patens
- Festuca
- Alopecurus
- Ranunculus
- Cammasia
- Conium

NOXIOUS SPECIES:
None

GROWTH FORM:
- herbaceous
scattered trees/shrubs

CURRENT CIRCUMSTANCE DESCRIPTION

SURROUNDING PARCELS:

West - agr. pasture
South - ag. pasture
East -> agr. pasture with Davis Creek and riparian woodland
North - agr. pasture

OBSERVED/INFERRED MODIFICATIONS:

V - vegetation management/grazing, in places heavily grazed

S - NONE

H - NONE

CHARACTERIZATION:

Grazed pasture @ managed vegetation and intact hydric soil and very long duration sub surface saturated soil. Area may be subject to occasional flooding.

COMMENTS:

- Small observed LI BA population and mostly designated as potential habitat for CI BA. No PL 40.
- No Project impacts @ in parcel
- Bobcat observed running across edge of parcel.

WILDLANDS - 108-020-0607

EXCLOSURE DESCRIPTION/ REFERENCE SITE	NONE SOIL SURVEY MAP UNIT:
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE
	HYDROLOGY: NONE
	VEGETATION CLASS: palustrine emergent -
	ESTIMATED SPECIES COMPOSITION CHANGE: succession to averques/fraxinus emergent → forested emergent
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: - remove vest management grazing
	OTHER POTENTIAL ACTIONS: - plantings - removal of fencing

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

WETLANDS 108-030-08 8 acres

#2

4.0 AC WET meadow
2.3 AC WET MARSH
.1 AC WET RIPARIAN
1.6 AC UPLAND

CHARACTERIZATION

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: WILDLANDS 108-030-08 City/County: MENDOCINO Sampling Date: 6 JAN 2011

Applicant/Owner: CALTRANS State: CA Sampling Point: ①

Investigator(s): DM, KG / JM / RR Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Floodplain Terrace Local relief (concave, convex, none): FLAT Slope (%): 1%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Gerlow sd 0-5% NWI classification: Pem

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Parcel characterization. S/V/H observations reflect generalization of wetland component of parcel

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Trees along fence line/swale			
2. Fraxinus			
3.			
4.			
	____ = Total Cover		

Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		

Herb Stratum (Plot size: ____)			
1. Festuca arundinacea			FAC
2. Vulpia (bromoides)?			FACW
3. Trifolium sp (repens)?			FACU
4. Ranunculus sp			FACW
5.			
6.			
7.			
8.			
	____ = Total Cover		

Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Heavily grazed pasture. Parcel managed for forage by grazing.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2"	2.5 YR 4/2-4/3	90	7.5 YR 4/6	10	C	PL/M	Sandy loam	
2-16+"	10 YR 4/1	50	7.5 YR 4/6	50	C	PL/M	silt loam	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: Depleted matrix

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 0-2"

Water Table Present? Yes ✓ No ___ Depth (inches): Surface

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): surface

Wetland Hydrology Present? Yes X No _____

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

Remarks: surface water in depressions, very long duration SSS

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
WILDLANDS-108-030-08	6 JAN 2011	8.0

TOTAL WETLAND AC:	OTHER WATER AC:		IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
6.4 AC	0 AC UPLAND AC 1.6 AC	WET MEADOW 6.4 AC WET RIPARIAN .1 AC	0	4.0 AC Pem 2.3 AC Pem marsh	.1 AC Riparian 1.6 AC Upland

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE:
palustrine emergent - wet meadow
Pem SS - Ag - GRAZED

LANDSCAPE POSITION:
floodplain terrace

HYDROLOGY TYPE & DURATION:
very long duration, subsurface saturation
occasional flooding
microdepressions/swales ponded 0"-2"
surface sheet flow during events

HYDRIC SOIL INDICATOR:
F3
Depleted MATRIX
no developed dark ones A or Ap

SOIL SURVEY MAP UNIT:
Ge, Low sl
0-5%

WETLAND/ UPLAND BOUNDARY:
transitional w/ riparian upland

SLOPE & DRAINAGE:
<1%
numerous swales
drainage
surface sheet flow

Dominant Species * Common Species+
Festuca arundinacea
Vulpia (Bromoides)?
Trifolium (Repens)?
Ranunculus sp
→ - cyperus
- chicanum
- Pleuropogon
- gladiated leaf juncus
- Juncus patens
- Rumex
- geranium dissectum
- Lotus corniculatus
- Mentha pulegium

NOXIOUS SPECIES:
None

GROWTH FORM:
Herbaceous; w/some quercus and Fraxinus

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	North - Pasture/Davis Creek West - pasture East - creek w/riparian woodland and pasture South - pasture; heavily grazed
	OBSERVED/INFERRED MODIFICATIONS: V - veg. management; heavy grazing S - No obvious modifications some hoof shear H - No obvious modifications - ineffective ditch remnants along w edge of parcel
	CHARACTERIZATION: Heavily grazed managed pasture on intact hydric soil @ VLD - SSS and micro/swale depressional shallow ponding. Occasional flooding likely during extreme events.
	COMMENTS: • Small observer population of Li ba, most of parcel identified as Li ba potential habitat. No PL ha • No project impacts on parcel

EXCLOSURE DESCRIPTION/ REFERENCE SITE	WILDLANDS 108-030-08 6 Jan 2011 NONE SOIL SURVEY MAP UNIT: Geilow sl 0-5%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE - some TRAMPLING @ hoof shear
	HYDROLOGY: NONE
	VEGETATION CLASS: existing palustrine emergent; agricultural pasture
	ESTIMATED SPECIES COMPOSITION CHANGE: successional change to Juncus/carex; likely avenues and fraxinus. (SCATTERED TREES EXIST IN ANDOMADJ PARCELS @ SAME SOIL UNIT, UNIT LIKELY TO SUPPORT TREES @ OUT MANAGEMENT)
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: - removal of grazing + veg. management
	OTHER POTENTIAL ACTIONS: - removal of fencing, debris

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

WILDLANDS 108-060-01 63.4 AC

#3

CHARACTERIZATION

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: WILDLANDS - 108-060-01 City/County: MENDOCINO Sampling Date: 5 JAN 2011

Applicant/Owner: CALTRANS State: CA Sampling Point: PARCEL BASELINE

Investigator(s): DM KG / JM / RR Section, Township, Range: _____

Landform (hillslope, terrace, etc.): FLOODPLAIN TERRACE Local relief (concave, convex, none): FLAT Slope (%): 0-1%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: FLUVAQUENTS 0-1%, HOPLAQUENTS 0-1% NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation X, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No _____	Is the Sampled Area within a Wetland? Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks: Parcel characterization. V/S/H observations reflect generalization of wetland component of parcel

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: _____)			
1. Festuca arundinacea			FAC
2. Juncus patens			FAC
3. Ranunculus sp			FACW
4. (Alopecurus - common)			OBL
5. Cenomania			OBL
6.			
7.			
8.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: Hayed/Grazed Pasture - Parcel managed for forage species - wetted species mixed @ grasses esp in swales + depressional areas.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
AP 0-2"	10YR 3/1		none				S loam	
2-16"	10YR 4/1	80	7.5YR 4/6	20	C	PL/SM	silt loam	with some clay

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks: Depleted Matrix – No obvious AP

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 0-4"

Water Table Present? Yes ✓ No ___ Depth (inches): 2"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): surface

Wetland Hydrology Present? Yes X No ___

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

Remarks:
- Swales/depressional areas @ Ponded water
- General ground surface @ VLD-555
- Occasional flooding

PARCEL/UNIT: WILDLANDS - 108-060-01			FIELD INSP DATE: 5 JAN 11	TOTAL PARCEL AC: 63.4 AC
TOTAL WETLAND AC: Pem - 40.7 AC	OTHER WATER AC: 1.4 AC UPLAND AC 21.3 AC	IMPACTS IN WETLAND AC: 0 AC	ENHANCEMENT AC: 40.7 AC	PRESERVATION AC: 1.4 AC OW 21.3 AC UPL

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE: palustrine emergent - hayland / ag. pasture

LANDSCAPE POSITION: floodplain terrace.

HYDROLOGY TYPE & DURATION:

- very long duration, subsurface saturation
- shallow surface depressional ponding.
- Davis creek blowout w/ occasion associated flooding.

HYDRIC SOIL INDICATOR: F3

Depleted Matrix - No obvious Ap

SOIL SURVEY MAP UNIT: FLUVAQUENTS 0-1X; Aquaquents 0-1X

WETLAND/ UPLAND BOUNDARY: transitional to riparian uplands

SLOPE & DRAINAGE: <1% 4 w sloping area - surface sheet flow to swales

Dominant Species * Common Species+

Festuca
Juncus mutans
Ranunculus
Commissia

- Alopecurus
- pleuropogon
- Ash trees along riparian [illegible] and scattered in field. Maybe along old Tributary Trace

NOXIOUS SPECIES: None

GROWTH FORM: - herbaceous

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	North - ag. pasture - wooded fence line East - [illegible] fence line - Fraxinus and ag pasture - South - fence line, few Ash, ag. pasture West - Riparian wooded - Fraxinus, [illegible] ag pasture
	OBSERVED/INFERRED MODIFICATIONS: V - Agr. management for grazing, mowed, wetter end species in swales/depressions @ standing water, Juncus clumps scattered throughout S - intact - no observable Ap H - No obvious modifications - VLD - SSS @ standing water in depressions occassional flooding. [Flood channel traces on aerial photos - @ Fraxinus]
	CHARACTERIZATION: Hayed and grazed pasture dominated by Ag grasses. Parcel has VLD - SSS wetland hydrology @ depressional ponding and occassional flooding. Basically, intact hydric soil and wetland hydrology under current conditions @ managed introduced wetland plant community
	COMMENTS: • few populations of Li/ba observed on parcel, No Pl ho. • entire parcel identified as potential Li ba habitat • Davis creek cross parcel from S to N, much of creek has some Riparian cover (Fraxinus / salix) • No project impacts @ in parcel

WILDLANDS - 108-060-01

EXCLOSURE DESCRIPTION/ REFERENCE SITE	NONE SOIL SURVEY MAP UNIT: FLUVAQUENTS 0-1% HAPLAQUEPTS 0-1%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE -
	HYDROLOGY: NONE -
	VEGETATION CLASS: Palustrine emergent likely to support Quercus, Fraxinus possibly carex Palustrine emergent - [illegible]
	ESTIMATED SPECIES COMPOSITION CHANGE: Long term changes would likely shift from AG GRASS to perennial wetter and species as dominants likely Ju pp, Carex, Fraxinus, Quercus, Alopecurus Ranunculus.
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: - eliminate grazing and veg. management allow successional plant development. Accumulate thatch cover.
	OTHER POTENTIAL ACTIONS: [illegible]

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

WICDUNDE 108-060-02 106.8 ac
#4

CHARACTERIZATION

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: WILDLANDS - 108-060-02 UNIT A City/County: MENDOCINO Sampling Date: 5 JAN 2011

Applicant/Owner: East of Berry Creek State: CA Sampling Point: UNIT BASELINE

Investigator(s): DM, KG/RR, JA Section, Township, Range: _____

Landform (hillslope, terrace, etc.): BASIN Local relief (concave, convex, none): CONCAVE Slope (%): 0-1%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: HAPLAQUEPTS 0-1% NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No _____	Is the Sampled Area within a Wetland? Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks: PARCEL UNIT CHARACTERIZATION - V/S/H OBSERVATIONS REFLECT GENERALIZED STATE OF WETLAND UNIT.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	= Total Cover		

Herb Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Festuca arundinacea			FAC
2. Ranunculus sp			FACW
3. Juncus patens			FAC
4. Mentha pulegium			OBL
5. Limnathes bothdoxylossi, bacari			OBL
6. Cammasia			OBL
7. Alopecurus sp			FACW
8.			
	= Total Cover		

Woody Vine Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: PARCEL UNIT APPEARS TO BE GRAZED BUT APPEARS TO SUPPORT MOSTLY WETTER END MARSH/MEADOW SPECIES RATHER THAN AG GRASSES.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6"	10 YR 3/1	100	7.5YR 4/6	5	C	PL/SM	clay loam	
6-12+	10-YR 4/2	80	7.5YR 4/6	20	C	PL/SM	clay loam	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks: F6 + F3 - VED Ponded / sub surface saturated depressional

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 8" +

Water Table Present? Yes ✓ No ___ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes X No ___

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

Remarks: Site appears to flood and retain water as depressional storage. A channelized ditch has flooded from SE corner and Berry Creek has overtopped in 4 or 5 places. Likely no longer managed to prevent frequent flooding

UNIT A

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
wildlands 108-060-02 east of Berry creek	5 JAN 2011	106.8 AC

TOTAL WETLAND AC:	OTHER WATER AC:		IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
101.5 AC	1.2 AC UPLAND AC 4.1 AC	UNIT A → 39.3 AC marsh UNIT B → 61.0 AC meadow Pf 0.6 AC	0 AC	61.0 AC meadow	1.2 AC OWs 4.1 AC UPLAND 0.6 AC Pf 39.3 AC marsh

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE:

emergent palustrine - depressional pond
Appears to be an abandoned Hayland / Shifting from Ag grasses to wet meadow species

LANDSCAPE POSITION:

Basin — Floodplain

HYDROLOGY TYPE & DURATION:

very long duration ponding, very long subsurface saturation
frequent flooding

HYDRIC SOIL INDICATOR: F3 + F6 -

Depleted Matrix or Redox Dark Surface
No identifiable Ap or soil modifications

SOIL SURVEY MAP UNIT:

Haplaquepts 0-1%

WETLAND/ UPLAND BOUNDARY:

transitional w/ riparian Quercus, on western edge

SLOPE & DRAINAGE:

>1%

Dominant Species * Common Species+

- Rumex
- Alisma
- Phaeloris aquatica
- gladiated juncus

→ Festuca
Ranunculus
Juncus
Mentha
Limanthes - douglassia, bakeri
Cammassia
Pleuropogon davii
Alopecurus

NOXIOUS SPECIES:

None

GROWTH FORM:

Herbaceous

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	North - agricultural pasture South - agricultural pasture West - creek w/riparian woods and agricultural pasture East - agricultural pasture, channelized ditch w/water at agr field edge.
	OBSERVED/INFERRED MODIFICATIONS: V - UNIT MAY HAVE SUPPORT Ag GRASSES FOR HAY OR GRAZING BUT APPEARS TO HAVE BEEN ABANDONED. CURRENTLY FREQUENTLY FLOODS AND SUPPORT WET MEADOW SPECIES. H - FREQUENT FLOODED / PONDED BASIN — NONE S - NONE
	CHARACTERIZATION: GRAZED WET MEADOW DOMINATED BY FAC/W/OBL SPECIES @ V⊖ PONDING + SUBSURFACE SATURATIONS. CURRENTLY FREQUENTLY FLOODED.
	COMMENTS: • PARCEL UNIT IS ALMOST TOTALLY AN IDENTIFIED POPULATION OF Li BA. NO PL LO. • NO PROJECT IMPACTS ARE LOCATED @IN UNIT • Berry creek has overtopped and flooded PARCEL UNIT AT 4 OR 5 PLACES @IN PARCEL. AN UNNAMED CREEK/DITCH HAS FLOODED PARCEL AT SE CORNER. • NUMEROUS JUNCUS CLUMPS @IN STANDING WATER • WATER 8" + DEEP IN MIDDLE OF UNIT.

wildlands 108-002-02 east of Bayslink. UNIT A

EXCLOSURE DESCRIPTION/ REFERENCE SITE	NONE SOIL SURVEY MAP UNIT: HYDAQUENTS 0-1%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE
	HYDROLOGY: NONE
	VEGETATION CLASS: NONE - SITE IS WET ENOUGH TO EXCLUDE COMMON AG. GRASSES. - APPEARS TO BE GRAZED AFTER PONDING RECEDES/SUMMER MAY HAVE BEEN ABANDONED TO HAYING.
	ESTIMATED SPECIES COMPOSITION CHANGE: NONE - EXTREME WETNESS OF SITE AND PROLONGED PONDING APPEARS TO BE PRIMARY CONDITIONS FOR WETTER AND PERENNIAL GRASSES/FORBS. POSSIBLE FLOWING/SWALES
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: POTENTIAL TO REMOVE SPOILS IF NEEDED.
	OTHER POTENTIAL ACTIONS: - SOME RIPARIAN PLANTING? OAK/ASH ALONG EDGE OF WEEK ALONG WESTERN SIDE - REMOVE FENCING

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

CHARACTERIZATION

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: WILDLANDS 108-060-02 - B City/County: HUMBOLDT Sampling Date: 5 JUNE 08

Applicant/Owner: West of Bayview Ltd. c/o TIMMONS State: CA Sampling Point: PARCEL BASELINE

Investigator(s): PM, KG/JER, TN Section, Township, Range: _____

Landform (hillslope, terrace, etc.): FLOOD PLAIN TERRACE Local relief (concave, convex, none): FLAT Slope (%): 0-1%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Ferndale silt loam 0-5% / Loleta Variant TS 0-1% NWI classification: P-em

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation X, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X No _____	**Is the Sampled Area within a Wetland?**	**Yes** X **No** _____
Hydric Soil Present?	Yes X No _____		
Wetland Hydrology Present?	Yes X No _____		

Remarks: PARCEL UNIT CHARACTERIZATION. V/S/H observations reflect generalized wetland component of PARCEL UNIT

PARCEL DIVIDED INTO 2 UNITS

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1. _____			
2. _____			
3. _____			
4. _____			
= Total Cover			
Sapling/Shrub Stratum (Plot size: _____)			
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
= Total Cover			
Herb Stratum (Plot size: _____)			
1. Festuca arundinacea			FAC
2. Ranunculus sp			FACW
3. Rubus (bracteatus ?)			FACW
4. Cotula coronopifolia			OBL
5. _____			
6. _____			
7. _____			
8. _____			
= Total Cover			
Woody Vine Stratum (Plot size: _____)			
1. _____			
2. _____			
= Total Cover			

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species _____	x 1 =	_____
FACW species _____	x 2 =	_____
FAC species _____	x 3 =	_____
FACU species _____	x 4 =	_____
UPL species _____	x 5 =	_____
Column Totals: _____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: Grazed / Grazed Pasture – managed for forage grasses – few scattered trees @ N end of field probably along abandoned fenceline. Trees on fenceline @ W edge of PARCEL UNIT.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3"	2.5YR 4/2	100					sil	Remnant Ap ?
3-20+"	10YR 4/2	80	7.5 YR 4/6	20	C	PL/SM	sil	Redox Pore Lings/ Soft masses

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks: F-3 Depleted Matrix – may be remnant indication of Ap. Series of very shallow swales/Remnant Blow outs mostly in S-N orientation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

Water Table Present? Yes ✓ No ___ Depth (inches): surface

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): surface

Wetland Hydrology Present? Yes X No ___

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

Remarks: on slight ridge –

water in swales – 0" to 2"

very long duration subsurface saturation occasional flooding

PARCEL/UNIT: WILDLANDS 108-060-02 - west of Berry creek UNIT B			FIELD INSP DATE: 5 JAN 2001	TOTAL PARCEL AC:
TOTAL WETLAND AC:	OTHER WATER AC:	IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE:
palustrine emergent, wet meadow w/ depressional pools
- remnant high flow channels maybe some of the pools

LANDSCAPE POSITION:
floodplain terrace.

HYDROLOGY TYPE & DURATION:
very long duration, subsurface saturation
standing water in depressional swales
occassional flooding

HYDRIC SOIL INDICATOR: F3 - Depleted MATRIX
- may be remnant Ap

SOIL SURVEY MAP UNIT:
Gerlow sl 0-5%

WETLAND/ UPLAND BOUNDARY:
transitory at creekside, riparian upland.

SLOPE & DRAINAGE:
71%
slight slope to NW.
swales collect and carry sheet flow

Dominant Species * Common Species+ - erratic trees - maybe old fenceline
Festuca, Vulpia, Ranunculus, Lolium
common - Trifolium, Pleuropogon, Limnanthes bakeri, Deschampsia, gladiated-leaf juncus, cammasia, mentha,
Fraxinus and Quercus in center of parcel and at edges
wetter end species mostly in shallow depressional swales.

NOXIOUS SPECIES:
None

GROWTH FORM:
Herbaceous with riparian edges of Oaks and ash.

UNIT B

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	North - agricultural pasture east - Riparian area w/creek and agr. pasture South - agricultural pasture west - riparian area w/creek and ash woodland
	OBSERVED/INFERRED MODIFICATIONS: V - introduced forage grasses through disc/planting, mowing/grazing S - None - Remnant evidence of Ag H - None - current H source appears to be direct ppt @ Runon through swales/infiltration + VLD SSS. occassional flooding
	CHARACTERIZATION: Hayed/Grazed pasture @ managed Ag grasses dominating plant community @ VLD - SSS and occassional flooding. Swales appear to be Remnant scars from Tributary floods.
	COMMENTS: • UNIT B includes multiple small populations of Li bA. Remainder of unit identified as potential habitat for Li bA. • No project impact area @ in unit. • UNITS support erratic trees that may have survived Ag activities because of historic fence line

WILDLANDS 108-060-02 West of Berry creek UNIT B

EXCLOSURE DESCRIPTION/ REFERENCE SITE	NONE SOIL SURVEY MAP UNIT: Gellow sil 0-5%
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE
	HYDROLOGY: NONE - historically altered but currently in normal circumstances - VLD-SSS @ occassional flooding
	VEGETATION CLASS: currently Pem seasonally saturated AG Pasture. Likely support woodland, forest or perennial wet meadow / marsh
	ESTIMATED SPECIES COMPOSITION CHANGE: successional change to carex/juncus community including Quercus/Fraxinus
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: - remove grazing, veg. management allow veg. succession
	OTHER POTENTIAL ACTIONS: - possibly plantings of oak/Ash - fence removal

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

WILDLANDS 108-070-08
#5

64.1 AC

CHARACTERIZATION

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: WILDLANDS 108-070-08 City/County: MENDOCINO Sampling Date: 5/2010

Applicant/Owner: CALTRANS State: CA Sampling Point: PARCEL BASELINE

Investigator(s): DM, KG/RE, JM Section, Township, Range:

Landform (hillslope, terrace, etc.): FLOOD PLAIN/TERRACE Local relief (concave, convex, none): FLAT Slope (%): 1%

Subregion (LRR): A Lat: Long: Datum:

Soil Map Unit Name: FELIZ/FULLAQUENT/COLE NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation X, Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No	**Is the Sampled Area within a Wetland?** Yes X No
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	No	

Remarks: PARCEL CHARACTERIZATION - S/V/H OBSERVATIONS REFLECT GENERALIZATION OF WETLAND COMPONENT OF PARCEL UNDER CURRENT CIRCUMSTANCES.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size:)			
1. LOLIUM PERENNE			FAC
2. RANUNCULUS SP.			FACW?
3. MENTHA PULEGIUM			OBL
4. PLEURIDENDRUM SP.			OBL?
5. LUPINUS DOUGLASII & BARKERI			OBL
6. FESTUCA ARUNDINACEA			FAC
7.			
8.			
= Total Cover			
Woody Vine Stratum (Plot size:)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum % Cover of Biotic Crust

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: (A)

Total Number of Dominant Species Across All Strata: (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- Dominance Test is >50%
- Prevalence Index is ≤3.0[1]
- Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks: HEAVILY GRAZED PASTURE - PARCEL MOWED FOR FORAGE SPECIES

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2"	10YR 3/1	100	2.5YR 4/6	5	C	PL/sm	s-sl/loam	dense roots
3-14+"	10 YR 4/2	80	2.5YR 4/6	20	C	PL/sm	SL	depressional pore lining, pits present

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks: Depleted matrix

No obvious of recent soil manipulations (no bp)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- X Sediment Deposits (B2) (**Nonriverine**)
- X Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 0-2"

Water Table Present? Yes ✓ No ___ Depth (inches): surface

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): surface

Wetland Hydrology Present? Yes X No _____

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

Remarks: standing water in depressions. ▽ - surface. standing water in depressions & swales - 0-3".

VLD-SSS, occasional flooding. LD ponding in swale/depressions

PARCEL/UNIT: wildlands 108-070-08				FIELD INSP DATE: 5 JAN 2004	TOTAL PARCEL AC: 64.1 AC
TOTAL WETLAND AC: Pf 50.8 AC	OTHER WATER AC: 1.5 AC UPLAND AC 11.8 AC	Pem marsh - 4.3 AC Pf - 3.3 AC Pem-wet meadow 43.2 AC	IMPACTS IN WETLAND AC: 0 AC	ENHANCEMENT AC: 43.2 AC 4.3 AC Grazing	PRESERVATION AC: Pf 3.3 AC 1.5 AC OW 11.8 AC uplands

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE: palustrine - emergent, wet meadow seasonally saturated

LANDSCAPE POSITION: floodplain terrace

HYDROLOGY TYPE & DURATION:

very long duration, subsurface saturation
shallow surface ponding in surface depression.

-occassional flooding

HYDRIC SOIL INDICATOR: F-3 depleted matrix

SOIL SURVEY MAP UNIT:

FeC12 LoAM 0-2%

FLUVAQUENTS 0-1%,

Cole clay LoAM 0-2%

WETLAND/ UPLAND BOUNDARY: transitional side slopes of tributaries

SLOPE & DRAINAGE: 2/3% -flowing towards N

Dominant Species * Common Species+

Lolium perenne
Ranunculus sp
Mentha pulegium
Aleuropogon sp
Limnanthes douglasii + bakeri
Festuca arundinacea
Trifolium sp
Ch. chorum intybus

NOXIOUS SPECIES: NONE

GROWTH FORM: herbaceous upland scattered trees

CURRENT CIRCUMSTANCE DESCRIPTION

SURROUNDING PARCELS:

North → tree, gravel road w/creek and open pasture

East → riparian trees, road, ag pasture

south → ag pasture and farm buildings

west → Riparian woodland, Dairy creek

OBSERVED/INFERRED MODIFICATIONS:

- veg managed, heavy grazing
- STAGING / FEEDING PASTURE FOR STOCK
- Soil defoliated by Hoof Shear in portions of Parcel

CHARACTERIZATION:

GRAZED PASTURE @ MANAGED VEGETATION ON INTACT hydric soil @ very long duration sub surface saturation wetland hydrology. Parcel subject to occassional flooding to frequent long duration ponding in swales/depressions.

COMMENTS:

- observed Li BA on Ponded swale/depressions
- Most of Parcel identified as potential Li BA habitat
-
- NO PROJECT impacts on this parcel
- DAVIS Creek bisects Parcel. Riparian community exists along Creek edges on this Parcel. (Quercus, Fraxinus, Salix, Rubus)

WILDLANDS - 108-070-05 (1) - 5 JAN 2006

EXCLOSURE DESCRIPTION/ REFERENCE SITE	NONE SOIL SURVEY MAP UNIT: Felt Pleasanton Cole
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: NONE - soil appears INTACT - some areas of INTENSIVE hoof shear
	HYDROLOGY: NONE - direct ppt / occassional flooding - WL1-555
	VEGETATION CLASS: palustrine emergent -> potential forested/emergent. VoG highly disturbed by GRAZING / MANAGEMENT scattered MATURE trees Likely to succeed to Pf-em seasonally saturated wet meadow
	ESTIMATED SPECIES COMPOSITION CHANGE: shift to -> juncus/carex/grasses/forbs from managed ag pasture
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: Remove GRAZING and VEGETATION MANAGEMENT OR other modifications that interfere @ VEGETATION SUCCESSIONAL development.
	OTHER POTENTIAL ACTIONS: - sap plantings of overgrown forbs - fence removal - trash removal

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

WICOLANDS 108-070-09 121.9AC

#6

CHARACTERIZATION

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: WILDLANDS - 108-0709 City/County: MENDOCINO Sampling Date: 5 JAN 2011

Applicant/Owner: CALTRANS State: CA Sampling Point: ① - Parcel Baseline

Investigator(s): DM, KG / RR / JMF/GS Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Flood plain Terrace Local relief (concave, convex, none): FLAT Slope (%): 1%

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Geilow sl 0-5%, Fluvaquents NWI classification: Pem

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ____	Is the Sampled Area within a Wetland? Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Parcel characterization. V/S/H observations reflect generalizations of wetland component of parcel current circumstances.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Festuca arundinacea			FAC
2. Vulpia (bromoides ?)			FACW
3. Ranunculus sp			FACW?
4. Alopecurus sp			FACW?
5. Pleuropogon sp			obl
6. Mentha pulegium			obl
7. Camassonia sp			obl
8.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

__ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Grazed pasture - Parcel managed for forage species. Appears to be Hayed.

SOIL

Sampling Point: _____

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
Ap 0-6"	10YR 4/1	80	7.5YR 4/6	20	C	PL/M	clay loam	dense roots
6-16"	10YR 4/1	80	7.5YR 4/6	20	C	PL/M	clay loam	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks: Cutans in pore linings Depleted matrix
no obvious or recent soil manipulation that would affect condition.
no dark A. Ap 0-6"

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 0-2"

Water Table Present? Yes ✓ No ___ Depth (inches): surface

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): surface

Wetland Hydrology Present? Yes ✓ No _____

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

Remarks: very long duration subsurface saturation —
shallow standing water in depressions / swales 0"-2"
Pasture appears to be subject to occasional flooding.

PARCEL/UNIT:	FIELD INSP DATE:	TOTAL PARCEL AC:
WILDLANDS-108-070-09	5 JAN 11	121.9 AC

TOTAL WETLAND AC:	OTHER WATER AC:		IMPACTS IN WETLAND AC:	ENHANCEMENT AC:	PRESERVATION AC:
97.3 AC	2.7 AC UPLAND AC 21.9 AC	Pf - 2.0 AC Pem - marsh .4 AC Pem - meadow 94.9 AC	0 AC	Pem marsh .4 AC Pem - meadow 94.9 AC	Pf - 2.0 AC 2.7 AC OW 21.9 AC UPL

CURRENT CIRCUMSTANCE DESCRIPTION

WETLAND TYPE:
palustrine, emergent; wet meadow - Pem
SEASONALLY SATURATED
Ag field - HAY @ GRAZING

LANDSCAPE POSITION:
floodplain terrace -

HYDROLOGY TYPE & DURATION:
- very long duration, subsurface saturation
- MAY be subject to OCCASSIONAL flooding
- surface sheet flow in accumulating in depressions
- surface sheet flow during events

HYDRIC SOIL INDICATOR:
soil has been plowed/disced in past
Ap still identifiable - basically intact
F-3 depleted MATRIX - no dark surface Horizon

SOIL SURVEY MAP UNIT:
Geilow sl 0-5% FLUVAQUENTS

WETLAND/ UPLAND BOUNDARY:
transitional @ Davis creek

SLOPE & DRAINAGE:
less 1%
drainage to NW

Dominant Species * Common Species+
Dominant Species: Festuca, Vulpia, Ranunculus probably occidentalis
common: Mentha, Mesopogon, [illegible], [illegible], [illegible] ?
Alopecurus
QUERCUS/FRAXINUS IN HISTORIC CHANNEL TRACE AND ALONG FENCELINE + RIPARIAN

NOXIOUS SPECIES:
None

GROWTH FORM:
herbaceous

CURRENT CIRCUMSTANCE DESCRIPTION	SURROUNDING PARCELS:
	East - Davis creek and open pasture South - Ditch w/riparian and open pasture West - upland riparian adjacent to Davis creek, open pasture North - continuation of open pasture.
	OBSERVED/INFERRED MODIFICATIONS: S - NO MAJOR SOIL MODIFICATIONS - Ap VISABLE V - veg. management, disced/mowed; not recently grazed dominated by PASTURE GRASSES FESTUCA @ TRIFOLIUM and common wet end species QUERCUS, FRAXINUS along fence line and RIPARIAN H - VLD - SSS @ shallow ponding swales/depressions
	CHARACTERIZATION: Haylands Probably also grazed after cutting. Soil and hydrology intact under current circumstances. Parcel may be subject to occassional flooding.
	COMMENTS: • Li ba observed on parcel and most of parcel identified as potential habitat. • No Project impacts on Parcel • Parcel Disected by Davis(?) Creek

WILDLANDS- 108-070-09

EXCLOSURE DESCRIPTION/ REFERENCE SITE	-Fraceline- is growing. Quercus (oliveta on western side of parcel.
	SOIL SURVEY MAP UNIT: Geilow sl 0-5%. FLUVAQUENT
DEPARTURE FROM NORMAL CIRCUMSTANCE BEST ATTAINABLE STATE:	SOIL: Disced in apparent AP but NO fundamental change in F3 condition - Depleted MATRIX
	HYDROLOGY: -no major departure - normal current condition of very long duration subsurface saturation; subject to occasional flooding; surface sheet flow -ponding in microdepressions.
	VEGETATION CLASS: -palustrine emergent; agricultural land -to palustrine forest -> successional climax Likely species to include perennial Juncus, carex Quercus, Fraxinus
	ESTIMATED SPECIES COMPOSITION CHANGE: successional climax species. restuca/vulpia -> carex/juncus with Quercus on edges FRAXINUS
	MANAGEMENT/MODIFICATIONS TO ACHIEVE BEST ATTAINABLE STATE: -eliminate grazing, discing, mowing -allow successional plant development
	OTHER POTENTIAL ACTIONS: • removal of old barrels. • Remove fencing • Riparian plantings if appropriate

CRAM SCORE:		RELATED REFERENCE:
HYDROLOGY STUDIES:	DESCRIPTION:	
VEGETATION STUDIES:	DESCRIPTION:	
COMMENTS:		
FUNCTIONAL EQUIVALENT INDEX:		
	UNIT ENHANCEMENT:	

Appendix J Wetland Hydrology and Soil Analysis for Offsite Wetland Establishment Areas

Memorandum

Date:	July 29, 2010
To:	Dave Wickens U.S. Army Corps of Engineers - San Francisco District 1455 Market Street San Francisco, CA 94103-1398
Cc:	Laurie Monarres, U.S. Army Corps of Engineers Melissa Scianni, U.S. Environmental Protection Agency Jeremiah Puget, North Coast Regional Water Quality Control Board Craig Martz, California Department of Fish and Game
From:	Shanna Zahner California Department of Transportation
Subject:	**Willits Bypass Project – Hydrology at Proposed Wetland Establishment Sites in Little Lake Valley**

1 Introduction

The Willits Bypass Project (bypass project) has several compensatory mitigation components, including wetland establishment. As part of the Clean Water Act (CWA) Section 404 individual permit process for the bypass project, the U.S. Army Corps of Engineers (Corps) has requested information related to hydrology at the six offsite mitigation parcels where wetland establishment is proposed. (Corresponding information on soils and vegetation has also been requested by the Corps and will be provided under separate cover.) Table 1 lists the offsite mitigation parcels and the wetland establishment habitat type and acreage proposed at each parcel.

Table 1. Proposed Wetland Establishment Sites at the Offsite Mitigation Parcels

Offsite Mitigation Parcel	Assessor's Parcel Number	Proposed Wetland Establishment Habitat Type	Proposed Wetland Establishment at Parcel (acres)
Ford	108-010-06	Mixed marsh and wet meadow	2.85
Goss/MGC Plasma Middle/MGC Plasma North	103-230-02/ 103-250-14/ 103-230-06	Wet meadow	7.47
Niesen	108-040-02	Mixed marsh and wet meadow	5.66
Watson - Eastern	037-221-30	Wet meadow	8.33 (north area is 4.42 and south area is 3.91)
		Total	24.31

Attachment 1, "July 9, 2010, letter from Corps to California Department of Transportation (Caltrans)," lists the Corps' minimum information necessary to make a permit decision for the bypass project. This technical memorandum addresses Items 4a(1) and 4a(2) on pages 2 and 3 in Attachment 1 – hydrology at each proposed wetland establishment site. At the July 12 and 13, 2010, meeting between resource agencies (i.e., Corps, U.S. Environmental Protection Agency [USEPA], North Coast Regional Water Quality Control Board [RWB], and California Department of Fish and Game [CDFG]) and Caltrans, each of the items in the July 9, 2010 letter were discussed. With respect to Items 4a(1) and 4a(2), Caltrans indicated that site specific data on field-measured hydrology indicators for each proposed wetland establishment site were limited and that these data limitations would affect Caltrans ability to respond to Items 4a(1) and 4a(2) at the level of detail indicated in the July 9, 2010 letter. As an example, groundwater monitoring wells have been installed at the Goss and MGC Plasma North parcels (as part of Caltrans' study of North Coast semaphore grass) in the vicinity of the proposed wetland establishment sites but have not been installed at the other parcels where wetland establishment sites are proposed. As a result, groundwater availability at these parcels has been determined based on qualitative (non-field measured) information and extrapolated from valley-wide data. The Corps and USEPA agreed that some site specific hydrology data that was not available (e.g., existing wetland hydroperiod information) would need to be collected during the appropriate time of the year and would therefore not be included as part of this submittal.

This technical memorandum presents information on the following items for each proposed wetland establishment site per the July 9, 2010 letter:

- Site specific functions being replaced.
- Existing hydrologic conditions at wetland monitoring reference sites.
- Groundwater availability.
- Existing wetland hydroperiod information (i.e., frequency of flooding, depth, duration, timing of inundation, percent of open water).
- Historical hydrology of wetland establishment site if different from current conditions.
- Acres of contributing drainage areas.
- Water budget for wet and dry years that includes water sources (i.e., precipitation, surface runoff, groundwater, and stream flow).

A seventh item, results of water quality analysis (i.e., surface water, groundwater, redox, nutrients, organic content, suspended matter, dissolved oxygen, and heavy metals), was requested in the July 9, 2010 letter. Field measurements and laboratory analyses of these water quality constituents is slated to begin in late August 2010 and continue through June 2011 (or until ground disturbance and/or vegetation removal occurs as part of bypass project construction) to document baseline conditions at the offsite mitigation parcels. These data were not available prior to the submittal of this technical memorandum but will be provided as they become available.

2 Site Specific Functions and Values Being Replaced

Table 2 lists the target functions and values being replaced by wetland establishment at the proposed establishment sites. Please see Chapter 2 (pages 2-16 through 2-23) in the bypass project's Mitigation and Monitoring Proposal (Caltrans 2010a) for a description of each function and value listed in Table 2.

Table 2. Target Functions to be Replaced at Proposed Wetland Establishment Sites

Offsite Mitigation Parcel	Assessor's Parcel Number	Proposed Wetland Establishment Habitat Type	Target Functions and Values Replaced
Ford	108-010-06	Mixed marsh and wet meadow	Groundwater recharge, nutrient removal, wildlife diversity, and aquatic diversity
Goss/MGC Plasma Middle/MGC Plasma North	103-230-02/ 103-250-14/ 103-230-06	Wet meadow	Groundwater recharge, nutrient removal, wildlife diversity, and uniqueness
Niesen	108-040-02	Mixed marsh and wet meadow	Groundwater recharge, nutrient removal, wildlife diversity, and aquatic diversity
Watson - Eastern	037-221-30	Wet meadow	Groundwater recharge, nutrient removal, wildlife diversity, and uniqueness

Note:

a. MMP = Willits Bypass Project Mitigation and Monitoring Proposal (Caltrans 2010a).

3 Existing Hydrology at Wetland Monitoring Reference Sites

Currently, wetland monitoring reference sites have been identified for each proposed wetland establishment site and are located on the same offsite mitigation parcel as the proposed establishment site (MMP Appendix C, sheets C-30, C-54, C-69, C-77, and C-87). As such, the hydrology for the wetland monitoring reference site is the same as the hydrology for the proposed establishment site. Information on the hydrology of the wetland monitoring reference sites and proposed wetland establishment sites is described in Section 6. Please note that the wetland monitoring reference sites may be adjusted per Corps and USEPA direction.

4 Groundwater Availability

Site specific data on field-measured groundwater availability for each proposed wetland establishment site are limited. Groundwater monitoring wells have been installed at the Goss and

MGC Plasma North offsite mitigation parcels (as part of Caltrans' study of North Coast semaphore grass) in the vicinity of the proposed wetland establishment sites at these parcels but groundwater monitoring wells have not been installed at the other offsite mitigation parcels where wetland establishment sites are proposed. As a result, groundwater availability at some of the proposed wetland establishment sites has been determined based on qualitative (non-field measured) information and extrapolated from valley-wide data. Section 8, as part of the water budget discussion, presents information on groundwater availability at the proposed wetland establishment sites. Specifically, Sections 8.1.2 and 8.1.3 address groundwater availability.

5 Existing Wetland Hydroperiod Information

The July 9, 2010 letter requests that hydroperiod data for existing wetlands include frequency of flooding, depth, duration, timing of inundation, and percent of open water. Site specific field-measured data for the hydroperiod of existing wetlands occurring adjacent to the proposed wetland establishment sites are limited. As a result, existing wetland hydroperiod data at some of the proposed wetland establishment sites have been determined based on qualitative (non-field measured) information and extrapolated from valley-wide data. Qualitative information on existing wetland hydroperiod for each offsite mitigation parcel where wetland establishment is proposed is presented in Sections 6.2 through 6.5.

6 Historical and Current Hydrology

Historical and current hydrology for the offsite mitigation parcels where wetland establishment is proposed is provided below. Information on seasonal precipitation patterns is also included to provide context for environmental conditions.

6.1 Seasonal Precipitation Patterns

Precipitation data are available for Little Lake Valley from the Western Regional Climate Center (WRCC) for the Willits 1 NE station located just north of the City of Willits. Missing values were filled in with data from nearby stations, mostly with data from the California Data Exchange Center (CDEC) station WIL, located approximately 5 miles south of the City of Willits. Precipitation data from water years 2008 through 2010, which corresponds to wetland studies and site visits to the offsite mitigation parcels made by Caltrans and the Corps during wetland delineation efforts for the bypass project, are presented in Table 3. Seasonal precipitation patterns influenced observations of wetland hydrology on the mitigation parcels.

Table 3 shows the seasonal amount of precipitation from water years 2008 through 2010. Seasonal precipitation patterns for water years 2008 and 2009 were significantly below average and below average for the months of February through June, the months when most wetland data-points and field observations occurred. Seasonal precipitation patterns for water year 2010 were close to

average, with nearly average or above average precipitation for the months of February through June.

Table 3. Precipitation Data from Water Years 2008 through 2010 from Western Regional Climate Center Willits 1NE Station

Water Year	Precipitation (inches)	Percentile	Percent of 50th Percentile
2008	38.6	26%	75%
2009	29.7	2%	57%
2010	47.4	43%	92%
1961 – 2010 Average	51.2		
1961 – 2010 50th Percentile	51.8		

6.2 Ford Offsite Mitigation Parcel

Wetland delineations on the Ford parcel were conducted by Wildlands, Inc., and wetland boundaries have been field verified by the Corps. Caltrans has access to ArcMap Shapefiles for jurisdictional wetland and other waters features but does not have access to the wetland datasheets and the information provided therein. This parcel was observed by Caltrans, Corps, USEPA, CDFG, RWB, Willits Environmental Center (WEC), and Caltrans (including contractor ICF International) on July 26, 2010. Figure 1 shows the Ford parcel.

The Ford parcel is situated in the flat section at the toe of the slope that forms the western border of the Little Lake Valley. The existing Highway 101 (US 101) and the Northwestern Pacific Railroad is located at the toe of this slope and the fill terraces associated with these features form the western boundary of the Ford parcel. A wide fill terrace occurs at the northern end of the Ford parcel (the area proposed for wetland establishment). The Ford parcel lies at the bottom of the Valley, in the area where "Little Lake" historically formed. Early soil survey information (Dean 1920) indicates that a lake historically formed at the northern end of Little Lake Valley during the rainy season, even during very low rainfall years. At the end of a series of heavy rainfall events in February 1915, the lake extended over 1,875 acres and was 12 feet deep over a 300-acre area. At that time, the high water mark of the lake was at the 1,330-foot contour, which would have covered all but the southernmost tip of the Ford parcel.

Old Outlet Creek forms the eastern boundary of the Ford parcel, and flows from southwest to northeast. Oat Canyon Creek, an intermittent stream, enters at the western boundary of the parcel. Oat Canyon Creek originates in the hillsides to the west of the Ford parcel and crosses the center of the parcel travelling from west to east before merging with Old Outlet Creek on the east side of the parcel. Additionally, it appears that another un-named drainage originating from hills to the west of the Ford parcel may have historically entered this parcel approximately 1,000 feet to the north of Oat Canyon Creek. Analysis of the USGS 7.5-minute quadrangle indicates that this system is now impounded off of the Ford parcel by a dam that forms a pond approximately 1,000 feet west of existing US 101. Evidence of this former channel on the Ford parcel to the east of US 101 is provided by a deep swale-like feature that supports mixed marsh vegetation, and flows to the northeast,

eventually merging with Outlet Creek. Additional surface water flows, including highway stormwater discharges, are conveyed through culverts crossing US 101 from west to east. Although some surface subsurface water is probably entering the Ford parcel from the hillsides to the west (as evidenced by the placement of highway and railroad culverts and the flow of Oat Canyon Creek), observations of drainage patterns onsite indicate that surface and subsurface flows are generally moving from south to north and roughly parallel Outlet Creek.

Based on field observations on July 26, 2010, and based on the hydrologic patterns observed in adjacent and nearby parcels (Watson - West, Jacobs, Lusher, and Brooke), it appears that wet meadow and riparian wetlands on the Ford parcel most likely display soil saturation within 12" of the surface, or above surface inundation, depending upon site topography, between approximately November (based on precipitation patterns) and March in most years. Based on the observation of ½" of surface water and saturated soils in the lowest area of the marsh located on the parcel, surface water may persist in the marsh areas of the parcel until April or May, and soils in this area may remain saturated until late May or early June in most years.

6.3 Goss/MGC Plasma Middle/MGC Plasma North Offsite Mitigation Parcels

Analysis of the Willits United States Geological Survey (USGS) 7.5-minute quadrangle indicates that that an unnamed intermittent tributary of Davis Creek historically traversed the MGC Plasma Middle, MGC Plasma North, and Goss parcels from southeast to northwest and continued onto the adjacent parcel to the west (Arkelian parcel; Figure 2). The former channel indicated on the Willits USGS quadrangle is no longer distinguishable on the Goss or MGC Plasma parcels; a stand of mature riparian forest on the Goss parcel and a swale-like strip of wet meadow on the MGC Middle and MGC North parcels indicates the general area of the former stream channel. The Willits USGS 7.5-minute quadrangle also indicates a historical tributary to this stream which flows from east to west across the MGC Plasma North parcel, merging with the first historic stream at the western edge of the MGC Plasma North parcel. This former channel is also no longer distinguishable on the parcel. The presence of wetlands along these former stream channels may indicate that subsurface flows may still be occurring in these areas.

The eastern boundary of the MGC Plasma Middle parcel is bounded by a small hill situated at the toe of the hills forming the eastern boundary of Little Lake Valley. The toe of this hill supports a seasonal spring discharge. Surface water seeping from this hillside enters an artificial drainage ditch that has been constructed in the area of the historic northwest-flowing creek channel and is directed to the northwest toward, and onto, the MGC Plasma North parcel. This artificial drainage ditch runs for approximately 450 feet before it becomes indistinguishable from the wet meadow on the MGC Plasma North parcel.

Hydrology on the Goss and MGC Plasma North parcels is currently influenced by a series of artificial drainage ditches that appear to have been created to drain surface water away from the center of each parcel in order to drain these parcels to produce hay. Linear drainage swales form the west, south, and eastern boundaries of the Goss parcel generally direct surface water flows in a south to

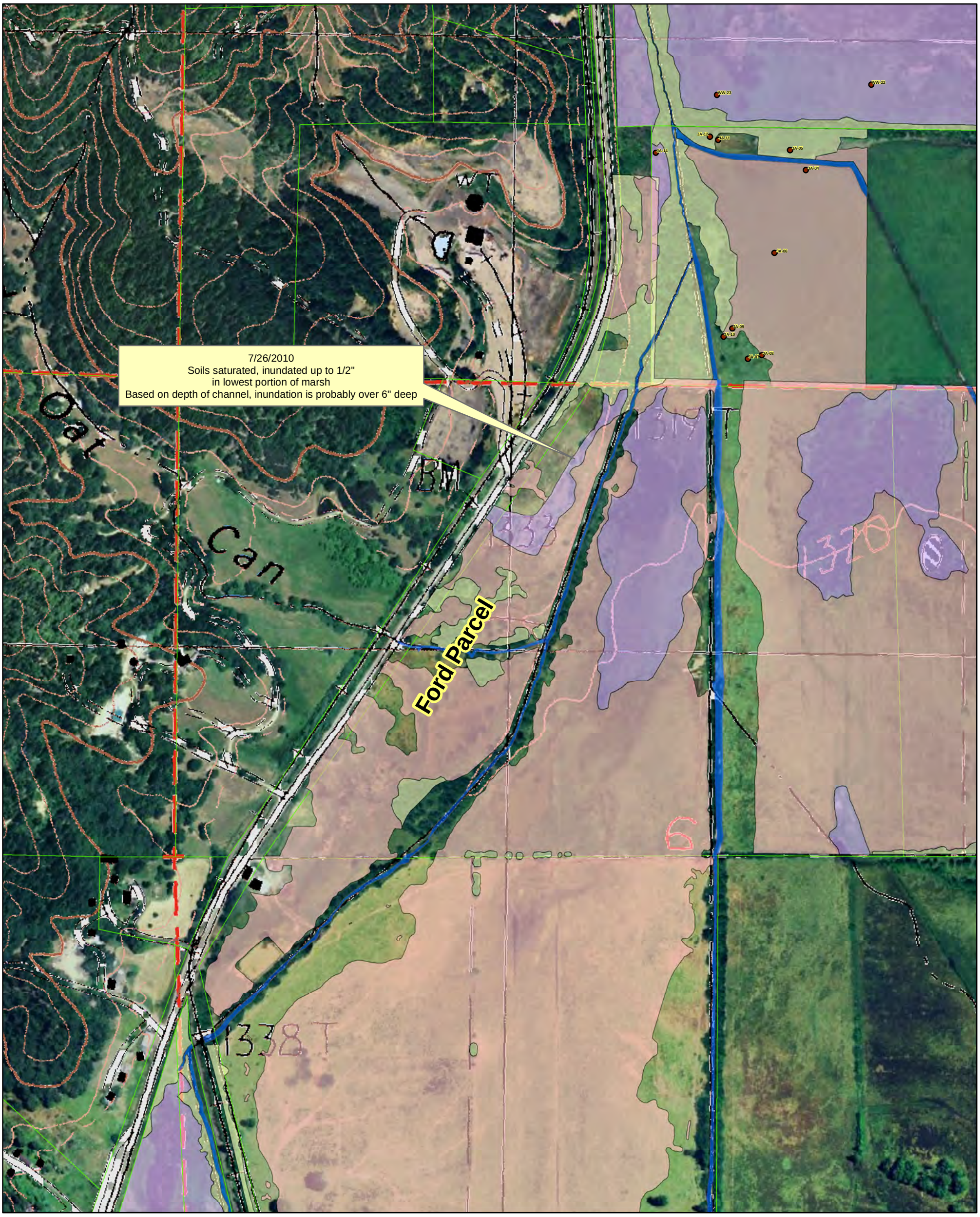


Figure 1
Ford
Caltrans Willits Bypass Project
State Route 101
EA: 01-26200

In: Tributaries to the Eel River
At: Little Lake Valley and the City of Willits
County of Mendocino, State of California

Layout View Delineation Map Prepared By:
Jason Meigs, Caltrans Associate Biologist
2800 Gateway Oaks Drive
Sacramento, CA 95833
July 28, 2010

Legend

- Parcel Boundaries
- Mixed Marsh
- Other Waters
- Riparian Scrub
- Riparian Woodland
- Swale
- Wet Meadow

0 125 250 500 750 1,000 1,250
Feet

1:6,000
1 inch = 500 feet

N
W E
S

Datum/Projection:
NAD 1983 California State Plane Zone 2

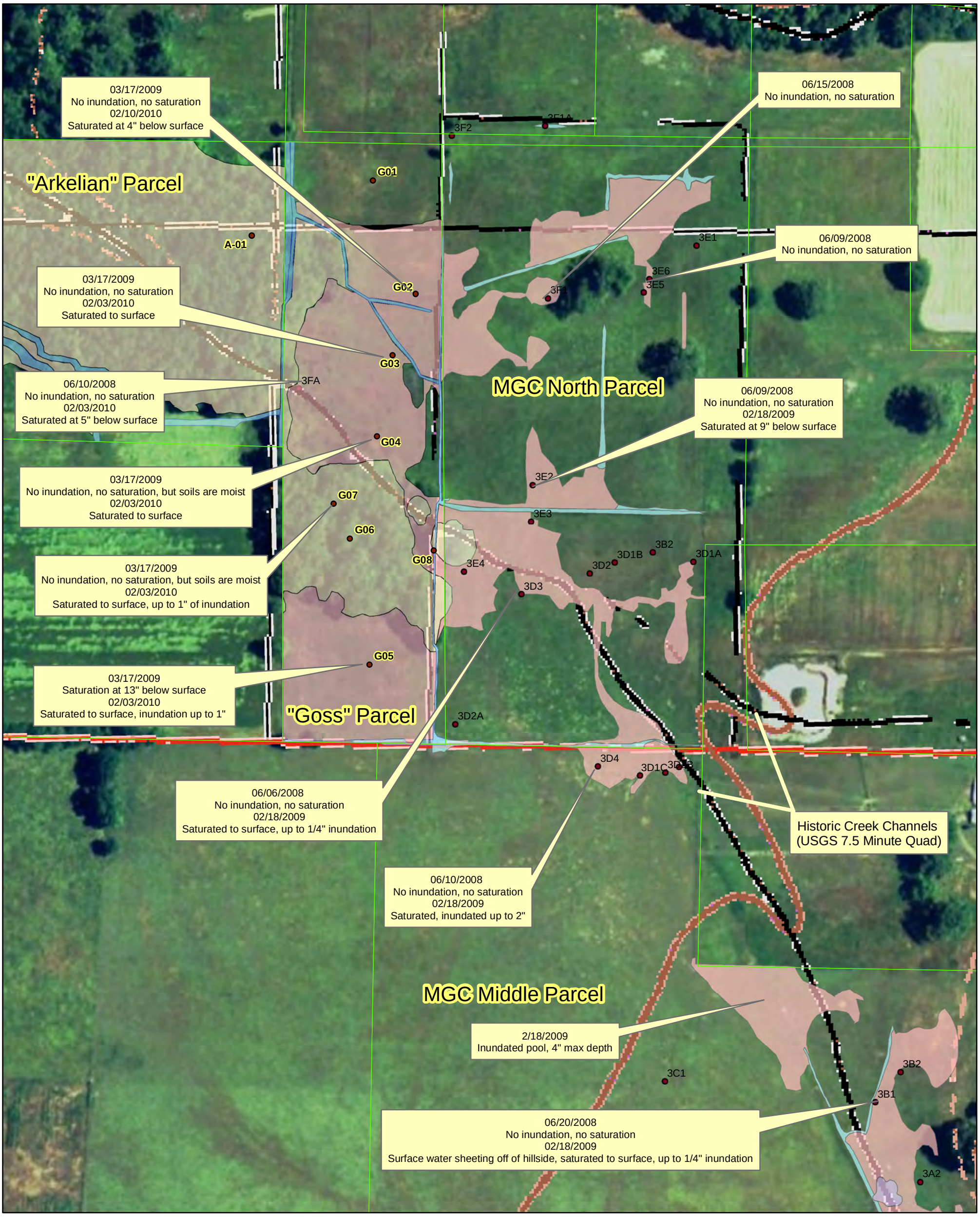


Figure 2
Goss/MGC Plasma
Caltrans Willits Bypass Project
State Route 101
EA: 01-26200

In: Tributaries to the Eel River
At: Little Lake Valley and the City of Willits
County of Mendocino, State of California

Layout View Delineation Map Prepared By:
Jason Meigs, Caltrans Associate Biologist
2800 Gateway Oaks Drive
Sacramento, CA 95833
On July 28, 2010

Legend

- Parcel Boundaries
- Mixed Marsh
- Other Waters
- Riparian Scrub
- Riparian Woodland
- Swale
- Upland
- Wet Meadow

0 50 100 200 300 400 500 Feet

1:2,400

1 inch = 200 feet

N W E S

Datum/Projection:
NAD 1983 California State Plane Zone 2

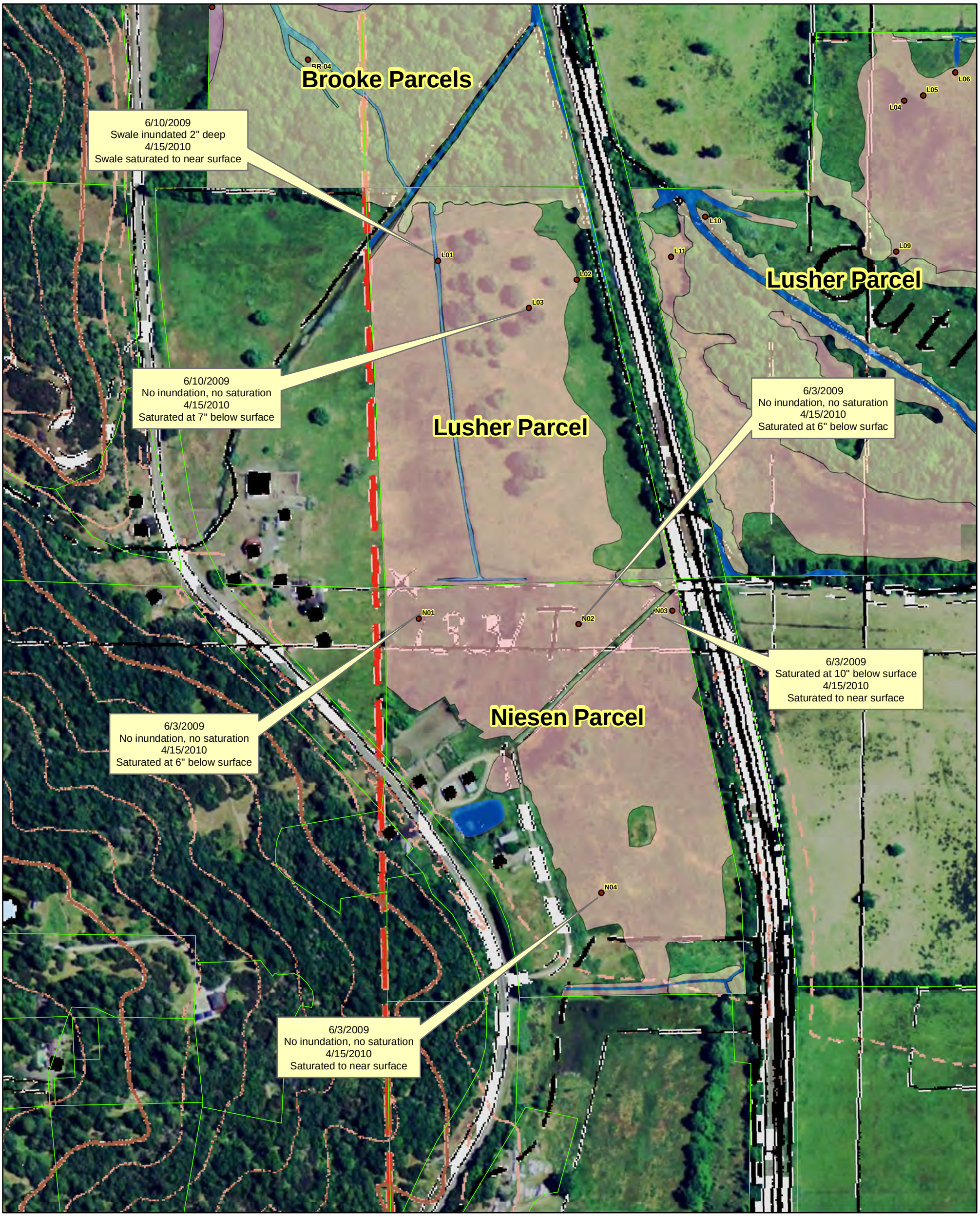


Figure 3
Niesen
Caltrans Willits Bypass Project
State Route 101
EA: 01-26200

In: Tributaries to the Eel River
At: Little Lake Valley and the City of Willits
County of Mendocino, State of California

Layout View Delineation Map Prepared By:
Jason Meigs, Caltrans Associate Biologist
2800 Gateway Oaks Drive
Sacramento, CA 95833
On July 28, 2010

Legend

- Parcel Boundaries
- Mixed Marsh
- Other Waters
- Riparian Scrub
- Riparian Woodland
- Swale
- Upland
- Wet Meadow

0 75 150 300 450 600 750 Feet

1:3,600

1 inch = 300 feet

N
W E
S

Datum/Projection:
NAD 1983 California State Plane Zone 2

northwest direction. An additional artificial drainage ditch bisects the Goss parcel and drains surface water from the southeast to northwest, and includes a corrugated metal culvert that allows equipment to access the south end of the parcel for mowing. It appears as if the excavation of this additional drainage ditch has allowed the northern part of the Goss parcel to develop into, or to remain, as uplands.

Wetland data for the MGC Plasma North and MGC Plasma Middle parcels were collected on June 5-16, 2008, and were field verified by the Corps on February 18, 2009. Data collected in June 2008 indicate that surface water and groundwater within 12"-18" of the soil surface were not available, even in the wettest sections (e.g., center of swales, bottom of ditches). Wetland datasheets were not filled out during the Corps verification in February 2009 and the descriptions above of "spring time" hydrologic conditions are based on personal observations (Meigs pers. comm.) across the four site visits to these parcels conducted between June 2008 and July 2010.

Based on field observations, it appears that wet meadow, swale, and riparian wetlands on the Goss and MGC Plasma North parcels display soil saturation within 12" of the surface, or above surface inundation, depending upon site topography, between approximately November (based on precipitation patterns) and March (based on wetland delineation datasheets and personal observations [Meigs pers. comm.]) in most years.

6.4 Niesen Offsite Mitigation Parcel

Based on a 1956 aerial photograph, the topography, and presumably the hydrology, on the Niesen parcel appears to have been altered some time during or just prior to 1956 for the production of hay or irrigated pasture, as evidenced by linear patterns that appear as berms on the aerial photograph. The current hydrology of the Niesen parcel, which is situated in the flat land at the toe of the slope that forms the western border of the Little Lake Valley, is dominated by a seasonal high water table.

Existing Highway 101 (US 101), which is located at the toe of the slope that forms the western border of Little Lake Valley, forms the western boundary of the Niesen Parcel (Figure 3). Surface water flows, including US 101 storm water discharges, are conveyed through a series of culverts crossing US 101 from west to east. The Northwestern Pacific Railroad line and its associated drainage ditch forms the eastern boundary of the parcel. Water in the railroad ditch flows from south to north, eventually discharging into Upp Creek approximately 1,500 feet to the north on the Brooke parcel. The southern boundary of the Niesen parcel is bound by the presence of an upland berm that mostly separates the majority of the parcel from an artificial drainage ditch that flows from west to east, discharging into the railroad ditch system on the eastern boundary of the site. Although some surface subsurface water is probably entering this parcel from the hillsides to the west (evidenced by the presence of the southern drainage ditch), observations of drainage patterns onsite indicate that surface and subsurface flows are generally moving from south to north, roughly paralleling the railroad ditch system, and are eventually concentrated into an artificial drainage to the north (on the Lusher parcel) that discharges into Upp Creek.

The Niesen parcel is relatively flat. An elevated overburden area has been constructed on the western side of the parcel, apparently to build structures that would be protected from damage due

to seasonal ponding of the adjacent wetlands or occasional flooding of the parcel. A small artificial stock pond currently exists on the upland overburden area. It is unknown if this pond is filled naturally (precipitation and/or groundwater) or artificially (water pumps), but its position on the elevated overburden area suggests that the pond is filled artificially. The earthen dam of the pond is subject to some leakage, discharging into the adjacent wet meadow system.

No named streams or mapped un-named streams appear to enter or influence the hydrology of this parcel; the hydrology of the Niesen parcel appears dominated by the presence of a seasonal high water table. Small micro-topographic depressions are subject to shallow ponding.

Wetland data for the Niesen parcel were collected in June 2009 and field verified by the Corps in April 2010. Data collected in June 2009 indicate that surface water and groundwater within 12"-18" of the soil surface were not available, except in the northeastern corner of the parcel, where subsurface water was observed at 10" below the soil surface. Wetland datasheets were not filled out during the Corps field verification in April 2010 and the descriptions above of "spring time" hydrologic conditions are based on personal observations (Meigs pers. comm.) across the three site visits to this parcel conducted between April 2009 and July 2010.

Based on field observations, it appears that wet meadow wetlands on the Niesen parcel display soil saturation within 12" of the surface, or above surface inundation, depending upon site topography, between approximately November (based on precipitation patterns) and March (based on wetland datasheets and personal observations [Meigs pers. comm.]) in most years.

The following information on post-construction hydrology at the Niesen parcel is being provided in response to questions from the Corps and USEPA during the July 26, 2010 field visit to the proposed wetland establishment sites. The current hydrology on the Niesen parcel will be altered as part of project construction and wetland establishment actions. The land surface at the proposed wetland establishment site will be lowered to match the elevation of the existing adjacent wet meadow. The land surface will slope gently to the north from the southern parcel boundary. A culvert will enter the southwest corner of the established wetland and flow north to south across the wetland. In addition, another culvert will enter the parcel midway along its western boundary and flow across the established wetland from west to east and eventually drain into the existing wetland on the east side of the bypass through a culvert under the bypass embankment.

6.5 Watson (East and West) Offsite Mitigation Parcels

The Watson parcels are situated at the toe of the hills forming the northern rim of Little Lake Valley. The eastern edges of the Watson East parcel has areas of alluvium originating from the hills above and slopes gently to the west. The Watson West parcel lays at the bottom of the Valley, in the area where "Little Lake" historically formed. Early soil survey information (Dean 1920) indicates that a lake historically formed at the northern end of Little Lake Valley during the rainy season, even during very low rainfall years. At the end of a series of heavy rainfall events in February 1915, the lake extended over 1,875 acres and was 12 feet deep over a 300-acre area. At that time, the high water mark of the lake was at the 1,330-foot contour, which includes the western half of the Watson East parcel and the entirety of the Watson West parcel.

According to the USGS 7.5-minute quadrangle, the modern soil survey (Howard and Bowman 1991), and an historical soil survey (Dean 1920), Berry Creek enters the southern boundary of the Watson East parcel (Figure 4). The USGS quadrangle shows Berry Creek continuing northward through the parcel as a channelized ditch. Aerial photographs show a line of riparian trees following the path of the ditch indicated by the USGS quadrangle, demonstrating that flows from Berry Creek were historically discharged into this channel. Flows from this stream currently enter the southeastern corner of the Watson East parcel and quickly dissipate into an alluvial fan. Review of the aerial photography indicates that some of the flows from Berry Creek are diverted westward into an artificial east-west drainage ditch just south of the southern boundary of the Watson East and Watson West parcels.

Surface and groundwater are generally travelling from east to west across the parcels. A series of three ephemeral streams originating from the hills to the east enter the Watson East parcel through culverts crossing Reynolds Highway. These streams are incised as they travel eastward across the alluvial terrace but quickly lose stream characteristics and become wet meadow wetlands as they dump their sediment loads where the grade begins to flatten out. These three streams were observed with water in the channel during April 1, 2009 and February 3, 2010 site visits. Generally, the Watson parcels exhibit a groundwater and surface water gradient from drier to wetter from east to west as the topography gradually flattens out from east to west.

Wetland types range from marginal wet meadow (on the alluvial terrace, groundwater within 12" of the soil surface, but no surface water, and supporting hydric vegetation during the spring season) to wet meadow (near border of Watson East and Watson West parcels, surface water ½ -4 inches deep during winter and potentially deeper pools or swales), to mixed marsh (Watson East parcel, surface water greater than 4 inches during spring).

Areas on the Watson East parcel experiencing inundation during the spring season are indicated on Figure 4. The large inundation zone observed along the southwestern and northwestern portion of the parcel is likely the result of flooding from the major creeks in Little Lake Valley (e.g., Outlet and Davis Creeks).

Wetland data for the Watson parcels was collected in August 2009, and were field verified by the Corps in April 2010. Data collected in August 2009 indicate that surface water and groundwater within 12"-18" of the soil surface were not available, even in the wettest sections (mixed marsh habitat on the Watson West parcel). Some wetland data was collected on the northern-most section of the Watson East parcel during delineation of the adjacent Taylor parcel on April 1, 2009. Wetland datasheets were not filled out during the Corps field verification in February 2010 and the descriptions above of "spring time" hydrologic conditions are based on personal observations [Meigs pers. comm.] across the five site visits to this parcel conducted between April 2009 and July 2010.

Based on the field observations, it appears that wet meadow, swale, and riparian wetlands on the Watson parcels display soil saturation within 12" of the surface, or above surface inundation, depending upon site topography, between approximately November (based on precipitation patterns) and March (based on wetland datasheets and personal observations [Meigs pers. comm.]) in most years. Surface water may persist in the Watson West parcel until April or May, and soils in this area may remain saturated until late May or early June in most years.

7 Contributing Drainage Areas

Five sub-watersheds drain into the offsite mitigation parcels in Little Lake Valley where wetland establishment is proposed. These sub-watersheds, and the offsite mitigation parcels that occur in the sub-watersheds, are shown in Figure 5. The largest sub-watershed is Davis Creek, at 9,875 acres, and it includes the Goss/MGC Plasma Middle/MGC Plasma North parcels. Berry Creek sub-watershed is next in size, at 5,780 acres, and it includes the Watson – East parcel. Outlet Creek sub-watershed is 2,625 acres and it includes most of the Ford parcel. Wild Oat Canyon Creek sub-watershed is 590 acres and it includes a small section of the Ford parcel. Upp Creek sub-watershed is 1,135 acres and it includes the Niesen parcel.

8 Water Budget

To further evaluate the potential success of established wetlands, this technical memorandum presents a water budget for the proposed wetland establishment sites at the offsite mitigation parcels.

Existing wetlands in Little Lake Valley do not have a simple pattern of filling and draining. Preliminary data from the July 2010 soil suitability assessment of the proposed wetland establishment sites (see Section 8.1.1.4) and other sources of soils data indicate that existing wetlands in Little Lake Valley primarily result from a seasonally high water table. As a result of precipitation, the underlying aquifer rises in response to surface and subsurface inflow from the encircling mountains as well as from local infiltration on the Valley floor.

Wetland hydrology may also be influenced by the lateral movement of water, either subsurface flow, sheet flow, or overbank flow. In general the water in the aquifer slowly flows downhill towards the Valley floor and then north in the direction of the Valley's main waterways. With winter rains, however, lateral movement may increase near and above the soil surface as soil becomes saturated and moves downhill and drains to surface waterways. In the lowest portion of the northern part of the Valley, some wetlands may receive significant inflow from flooding by the major creeks.

This water budget assessment reviews data collected in Little Lake Valley that is pertinent to the evaluation of wetland hydrology at the wetland establishment sites. Available data were used to estimate wetland water elevations for a range of precipitation levels. This was necessary as field measurements of the hydroperiod of existing wetlands are not available. The water budget is based on the hypothesis that the established wetlands are expected to behave in a manner similar to the adjacent existing wetlands because soil types and depths to the aquifer are similar.

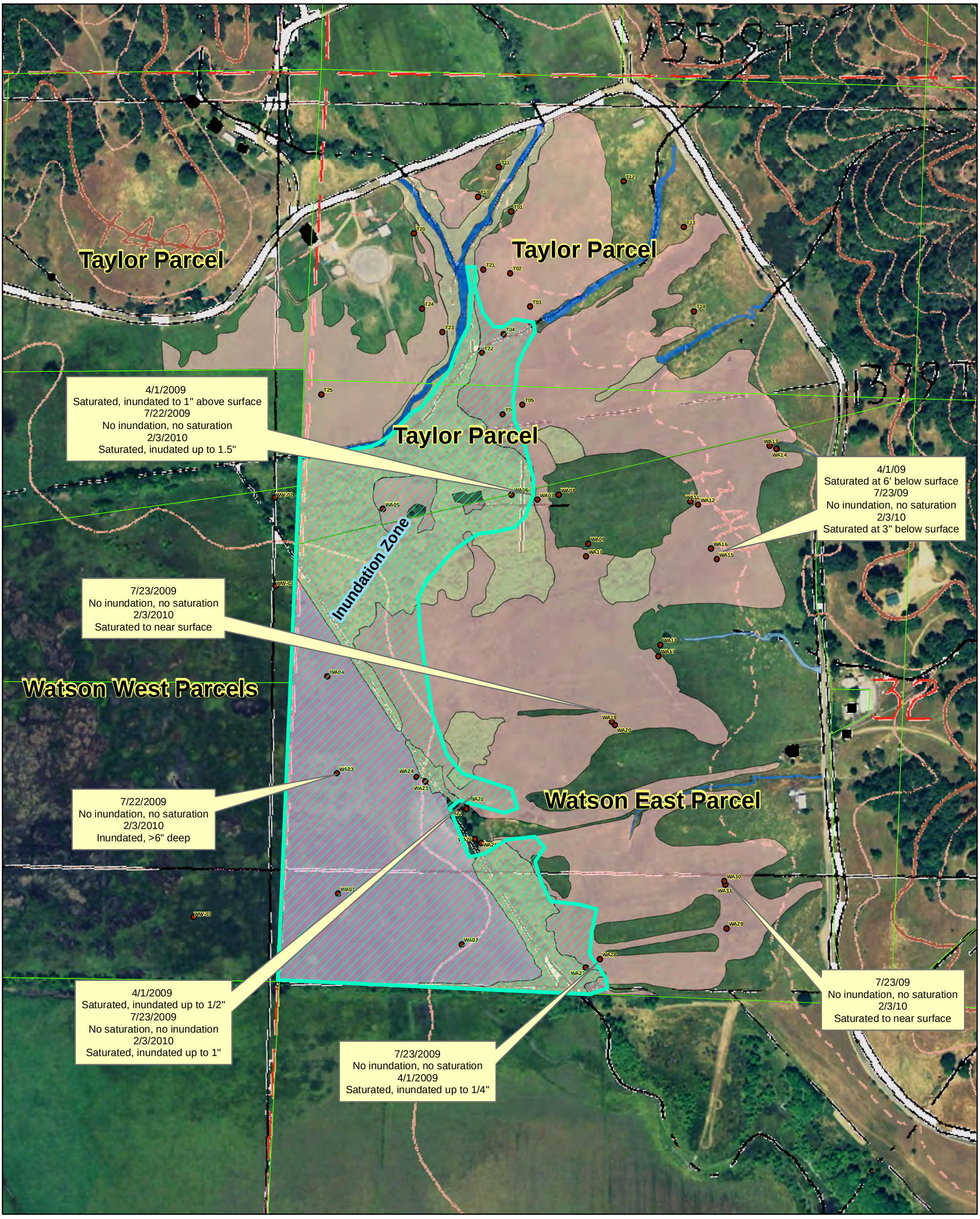


Figure 4
Watson
Caltrans Willits Bypass Project
State Route 101
EA: 01-26200

In: Tributaries to the Eel River
At: Little Lake Valley and the City of Willits
County of Mendocino, State of California

Layout View Delineation Map Prepared By:
Jason Meigs, Caltrans Associate Biologist
2800 Gateway Oaks Drive
Sacramento, CA 95833
On July 28, 2010

Legend

- Parcel Boundaries
- Mixed Marsh
- Other Waters
- Riparian Scrub
- Riparian Woodland
- Swale
- Upland
- Wet Meadow

0 100 200 400 600 800 1,000 Feet

1:4,800

1 inch = 400 feet

N
W E
S

Datum/Projection:
NAD 1983 California State Plane Zone 2

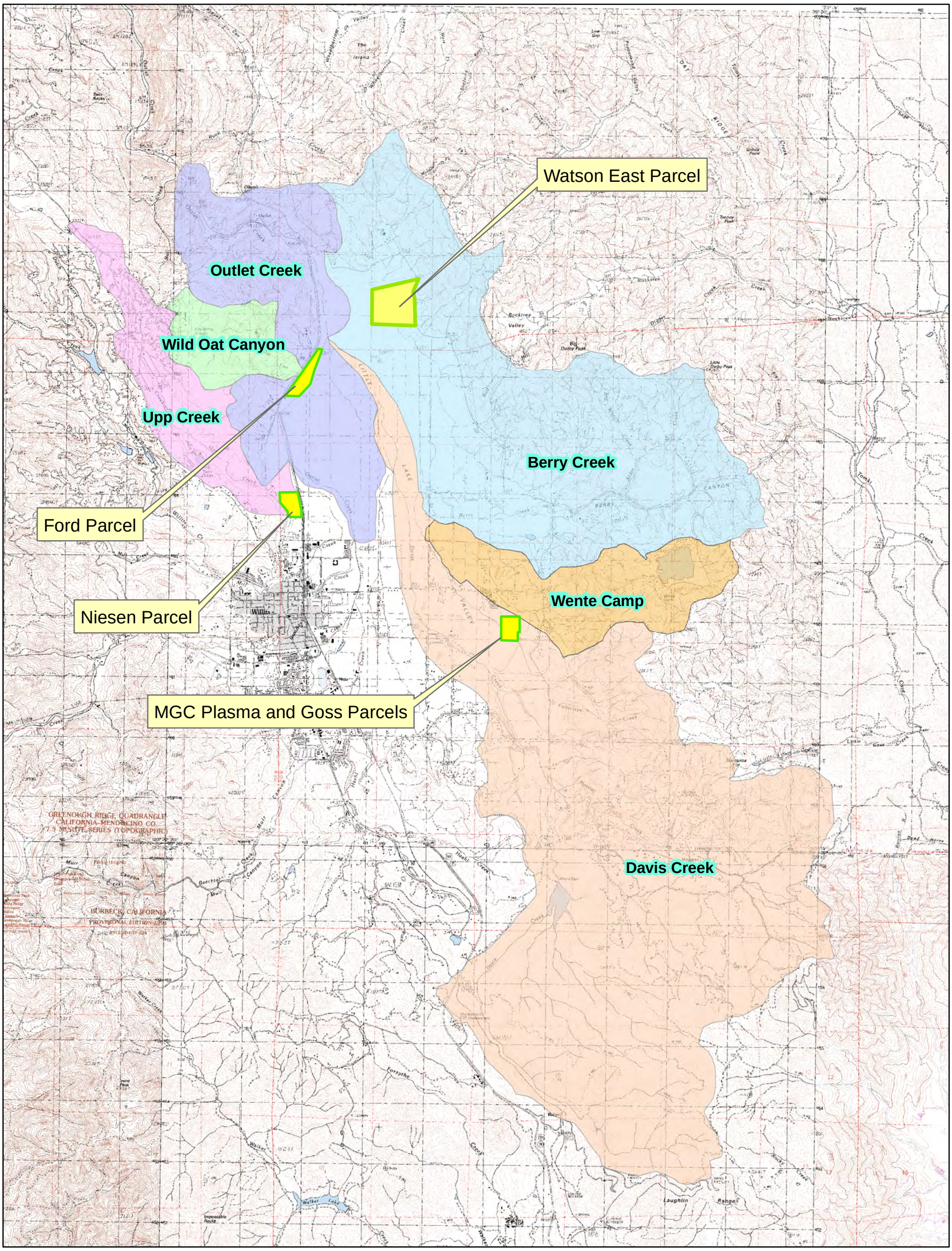


Figure 5
Sub-Watersheds Associated With Wetland Establishment Parcels

In: Tributaries to the Eel River
At: Little Lake Valley and City of Willits
County of Mendocino, Sate of California

Layout View Map Prepared By:
Jason Meigs, Caltrans Associate Biologist
2800 Gateway Oaks Drive, Sacramento, CA 95833
On July 28, 2010

Legend

- Berry Creek
- Davis Creek
- Outlet Creek
- Upp Creek
- Wente Camp
- Wild Oat Canyon

0 1,250 2,500 5,000 7,500 10,000 Feet

1:60,000

1 inch = 5,000 feet

N W E S

Datum/Projection:
NAD 1983 California State Plane Zone 2

8.1.1 Soil Types

8.1.1.1 Natural Resources Conservation Service (NRCS) Soil Surveys

As shown in the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soil survey for Mendocino and Trinity Counties (Howard and Bowman 1991), the soils in Little Lake Valley are generally not strongly developed, such that the surface, subsurface, and subsoil layer textures do not differ markedly within a given profile. The soils formed under well to poorly drained conditions, but in some areas the internal drainage has been increased as a result of stream incision and drainage ditch construction to more quickly remove water from the parcels as a way of improving pasture land. Table 4 provides a summary of USDA NRCS soil survey results for Little Lake Valley at the offsite mitigation parcels where wetland establishment is proposed (Ford, Goss/MGC Plasma North/MGC Plasma Middle, Niesen, and Watson).

Table 4. Characteristics of Soils in Little Lake Valley as Mapped by USDA NRCS Soil Survey[a]

Soil Map Symbol	Soil Map Unit Name	Landform	Natural/ Existing Drainage Class	Generalized Typical Profile (Surface, Subsurface, and Subsoil)	Parcel Occurrence
112	Clear Lake clay, 0 to 2% slopes	basins	poor/partially drained	clay over clay loam	Goss, MGC Plasma North, MGC Plasma Middle
115	Cole clay loam, 0 to 2% slopes	alluvial plains and basins	somewhat poor/ somewhat poor	clay loam over clay loam	MGC Plasma North, MGC Plasma Middle, Niesen, Watson
123	Feliz loam, 0 to 2% slopes	alluvial plains and fans	well/well	loam over clay loam	Watson
126	Feliz clay loam, gravelly substratum, 2 to 8 percent slopes	alluvial plains and fans	well/well	clay loam over gravelly sandy clay loam	Watson
127	Fluvaquents, 0 to 1% slopes	floodplains	poor and very poor/poor and very poor	very fine sandy loam over silt loam[b]	Ford, Watson
128	Gielow sandy loam, 0 to 5% slopes	alluvial plains and fans	somewhat poor/somewhat poor	sandy loam and loam over sandy loam and fine sandy loam	Goss, MGC Plasma North, Niesen, Ford

Table 4. Continued

Soil Map Symbol	Soil Map Unit Name	Landform	Natural/ Existing Drainage Class	Generalized Typical Profile (Surface, Subsurface, and Subsoil)	Parcel Occurrence
133	Haplaquepts, 0 to 1% slopes	basins and floodplains	poor/poor	clay loam over silty clay loam over silty clay[b]	Ford, Watson
178	Pinole gravelly loam, 2 to 8% slopes	terraces	well/well	gravelly loam over clay loam over sandy clay loam	Ford, Watson

Notes:

a. The characteristics described above for each soil map unit do not cover map unit inclusions where drainage class and profile characteristics may be different from the primary soil component of the map unit.

b. Because of their variability, fluvaquents and haplaquepts have no typical profile. The profile described is one that commonly occurs in the USDA soil survey area.

Source: Howard and Bowman 1991.

8.1.1.2 Soil Texture at Wetland Delineation Sites

As part of wetland delineations, soil texture data is collected from soil sample pits. The texture data indicates the permeability of the soil. Table 5 provides a summary of the soil texture data that were collected as part of the wetland delineations for the proposed wetland establishment parcels. Clay loam and loam (or variants thereof) were the most abundant soil types detected. As discussed below, these soils are probably too permeable to create wetland conditions without a high water table or other external source of water. A limited number of sites had soils with clay or silty clay texture, which are better able to retain water (3 out of 35 at Watson, 2 out of 9 at MGC Plasma Middle, and 1 out of 12 at MGC Plasma North).

Table 5. Soil Texture Data Collected during Wetland Delineations at the Proposed Wetland Establishment Sites (soil textures with slow or very slow permeability are highlighted)

Texture of Least Permeable Soil Type in Pit	Number of Sites with Similar Texture		
	Upland	Wetland	Total
Watson			
clay		3	3
clay loam	2	9	11
gravelly clay loam	1		1
gravelly loam	7	6	13
gravelly sandy loam	1		1
loam	2	2	4
sandy loam	1		1
very gravelly loamy sand	1		1
Total	15	20	35

Table 5. Continued

Texture of Least Permeable Soil Type in Pit		Number of Sites with Similar Texture		
		Upland	Wetland	Total
Plasma Middle				
clay			1	1
clay loam		1	2	3
sandy clay			1	1
sandy clay loam		2		2
sandy loam			1	1
silty clay		1		1
	Total	4	5	9
Plasma North				
clay			1	1
clay loam		1	5	6
loam		1		1
sandy clay		1		1
sandy clay loam		2		2
sandy loam		1		1
	Total	6	6	12
Goss				
clay loam		1	6	7
loam			1	1
	Total	1	7	8
Ford				
loam		3	5	8
sandy loam		1		1
	Total	4	5	9
Niesen				
clay loam			4	4

8.1.1.3 Spring 2010 Soil Surveys at North Coast Semaphore Grass Study Sites

During the spring of 2010, soils were assessed in the vicinity of North Coast semaphore grass (*Pleuropogon hooverianus*; PLHO) populations as part of an ongoing Caltrans study of the special-status plant in Little Lake Valley.

Surface layer soil textures within PLHO populations were observed to be loamy to fine-loamy, generally ranging from loam to silty clay loam. Surface and subsurface layer soil textures in soils located outside of PLHO populations were observed to be similar to that of PLHO populations, generally ranging from loam to silty clay loam. Relatively few areas had surface layer soils that were

outside of this textural range. These included gravelly clay loam, sandy loam, silt loam, and silty clay. Subsurface soil layer textures were also generally loamy to fine-loamy.

Table 6 summarizes the soil surface textures that were found. The soil texture for the majority of soil samples were clay loam or loam, which are generally assumed to have moderately slow to moderate permeability. Of the parcels evaluated, two (Goss and MGC Plasma North) are also proposed wetland establishment sites. On these parcels, clay loam texture was present at 11 soil sites out of 29 and only two soil samples had potential to be less permeable, one with silty clay and the other with clay. A more complete description of this survey was provided in a May 28, 2010 technical memorandum (Caltrans 2010). As described below, the soils detected at these sites are fairly permeable for wetland, suggesting that the wetlands are sustained by exogenous sources of water (a high water table being most likely) and not local precipitation.

Table 6. Summary of Soil Surface Layer Texture in Soil Sample Pits in the Vicinity of North Coast Semaphore Grass in Little Lake Valley

Texture	Number of Sites with Similar Texture
City of Willits and Huffman Parcels	
Clay loam	11
Loam	3
Silt loam	1
Silty clay	1
Lusher Parcel	
Loam	4
Sandy loam	2
Evans and Frost Parcels	
Clay loam	3
Gravelly clay loam	1
Hebrard Parcel	
Clay loam	2
Loam	5
Arkelian Parcel	
Clay loam	6
Silty clay	1
Goss and MGC Plasma North Parcels	
Clay loam	11
Loam	8
Silty clay	3
Silty clay loam	6
Clay	1

8.1.1.4 July 2010 Soil Surveys at Wetland Establishment Sites

Soils at the proposed wetland establishment sites were evaluated in July 2010 to further address soil information requirements in the July 9, 2010 letter (Item 4b on page 3). For this evaluation, 24-inch pits were dug in the proposed wetland establishment sites on Goss/MGC Plasma Middle/MGC Plasma North and Watson and up to 6-foot pits were dug in the proposed wetland establishment sites on Ford and Niesen. Preliminary results from 19 pits for the Goss/MGC Plasma Middle/MGC Plasma North proposed wetland establishment site (6 in wetlands, 12 in uplands, and 1 in a wetland-upland transition) show evidence that the average seasonal high level of soil saturation is within the top foot of the soil surface at all test pits (as evidenced by the presence of redoximorphic soil features). Soil texture from the pits was mostly clay loam, loam, and silty clay loam regardless of whether the pit was located in an existing wetland or an upland area. Soil from a few pits were less permeable; one of the six wetland pits contained a layer of fine silty clay and five of the twelve upland pits contained layers of clay, silty clay, or very gravelly heavy clay. As described below, the majority of the soils detected at these sites are fairly permeable for wetlands, suggesting that the wetlands are sustained by external sources of water (a high water table being most likely) and not local precipitation.

Once the July 2010 soil surveys at the wetland establishment sites are complete, a full discussion of the survey results will be provided to the Corps and USEPA. This is expected by August 2, 2010.

8.1.1.5 Permeability

The majority of the soils found on the wetland establishment sites were clay loam or loam. Soils with this texture are considered to have permeability that is moderately slow. Only a few sites had soil with lower permeability. Table 7 shows the estimated conversion between soil texture and saturated hydraulic conductivity. Saturated hydraulic conductivity is an indication of how quickly water may percolate downward. The saturated hydraulic conductivity is approximately equal to the infiltration rate of water on the soil surface when the water is fully saturated (Bedient and Huber 1992). The Food and Agricultural Organization of the United Nations (FAO) reports (2010) that clay loam has a basic infiltration rate (infiltration rate when the soil is saturated) of 5-10 mm/hour or an average value of about 7 inches per day. This is not much different than the 9.6 inches per day shown in Table 7.

The soil permeability labels are for general characterization of all soil types and are not wetland specific. In order for soil to retain precipitation for a sufficiently long duration to sustain a wetland, it generally needs to have very slow permeability or an alternate water source. Because the wetlands in Little Lake Valley generally have “moderately slow” permeability, they are most likely sustained by a high water table. Overbank and subsurface flow may also contribute at some locations. A further consequence of soil type and permeability in Little Lake Valley is that most precipitation is likely to infiltrate the soil and, as a result, the size of the sub-watershed around a wetland is unlikely to be important to wetland success.

Table 7. Estimated Conversion between Soil Texture and Saturated Hydraulic Conductivity

Permeability	Example Soil Texture	Saturated Hydraulic Conductivity (inches/hour)	Estimated Average Conductivity (inches/day)
Very slow	Clay	0.06 – 0.2	2.2
Slow	Silty clay	0.06 – 0.2	3.1
Moderately slow	Clay loam	0.2 – 0.6	9.6
Moderate	Loam	0.6 – 2.0	31.2
Moderately rapid	Gravelly loam	2.0 – 6.0	96.0

8.1.2 Aquifer

Little Lake Valley is underlain by a layer of Holocene alluvium that is estimated to be a maximum of 250 feet deep. The alluvium is composed of silt, clay, gravel, and sand. A layer of continental basin deposits is located under the alluvium and Franciscan Complex bedrock is located under the continental basin deposits.

The alluvium layer is the most productive aquifer for groundwater wells because it generally has relatively high porosity and permeability (Farrar 1986). The presence of sheets of fine-grained sediments in the alluvium causes much of the aquifer to be confined or semiconfined (California Department of Water Resources 2004). While the City of Willits obtains its water from Morris Reservoir, groundwater wells are used for agriculture and residential use outside of Willits (Farrar 1986).

8.1.2.1 California Department of Water Resources Wells

The California Department of Water Resources (DWR) maintains records on groundwater elevations from seven wells in Little Lake Valley. The approximate locations of these wells are shown in Figure 6. The water elevations measured in these wells tend to peak at about 1340-1350 feet, although there were some exceptions (Figure 7). Measurements of depths to groundwater (Figure 8) indicate that groundwater is close to the ground surface. This shallow groundwater supports many depressional wetlands that occur throughout Little Lake Valley.

Groundwater levels measured in wells represent piezometric water surface levels. For an unconfined aquifer, the well elevations are roughly the same as the elevation of the top of the aquifer, but for confined aquifers, well elevations may be higher than the elevation at the top of the aquifer. Given the abundance of wetlands in Little Lake Valley, along with the moderately permeable soil, it seems likely that the top of the groundwater aquifer is close to the soil surface during the rainy season.

The presence of groundwater discharge at a large marsh at the north end of the Valley, located where water leaves the valley via Outlet Creek, further indicates that groundwater levels are close to the soil surface. During particularly wet winters, the marsh becomes a shallow lake as a result of both groundwater and surface water inflow. (Farrar 1986).

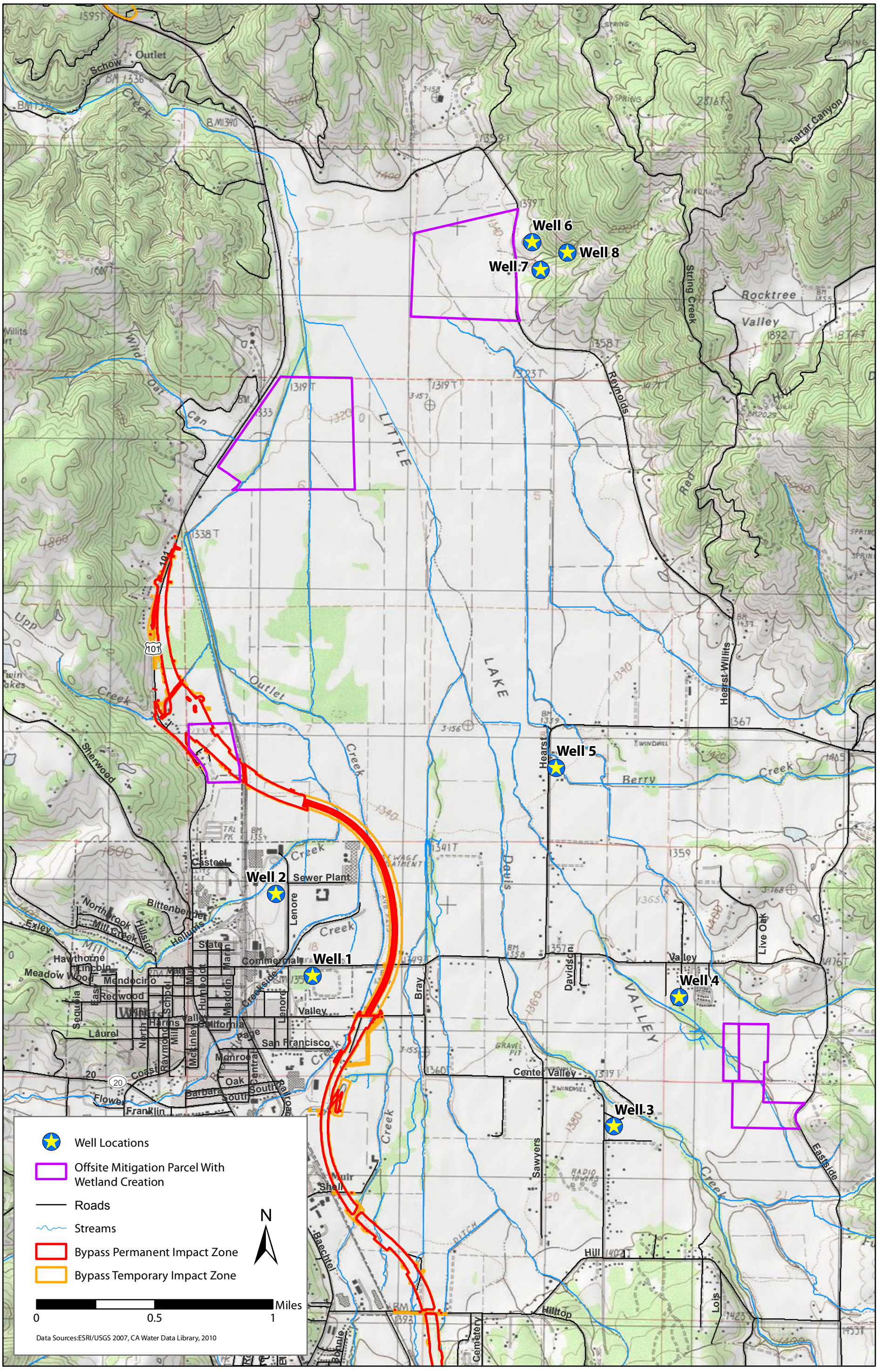


Figure 6
Location of DWR Groundwater Monitoring Wells in Little Lake Valley

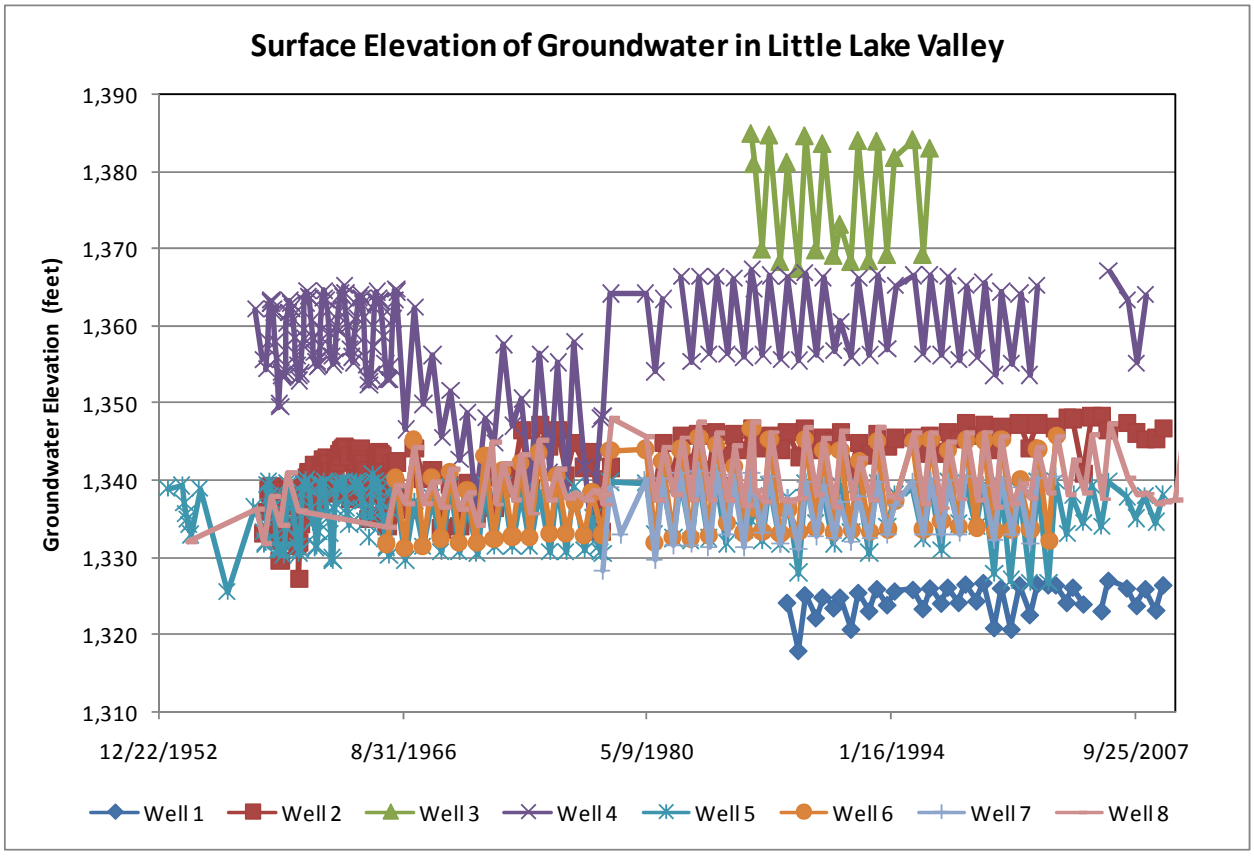
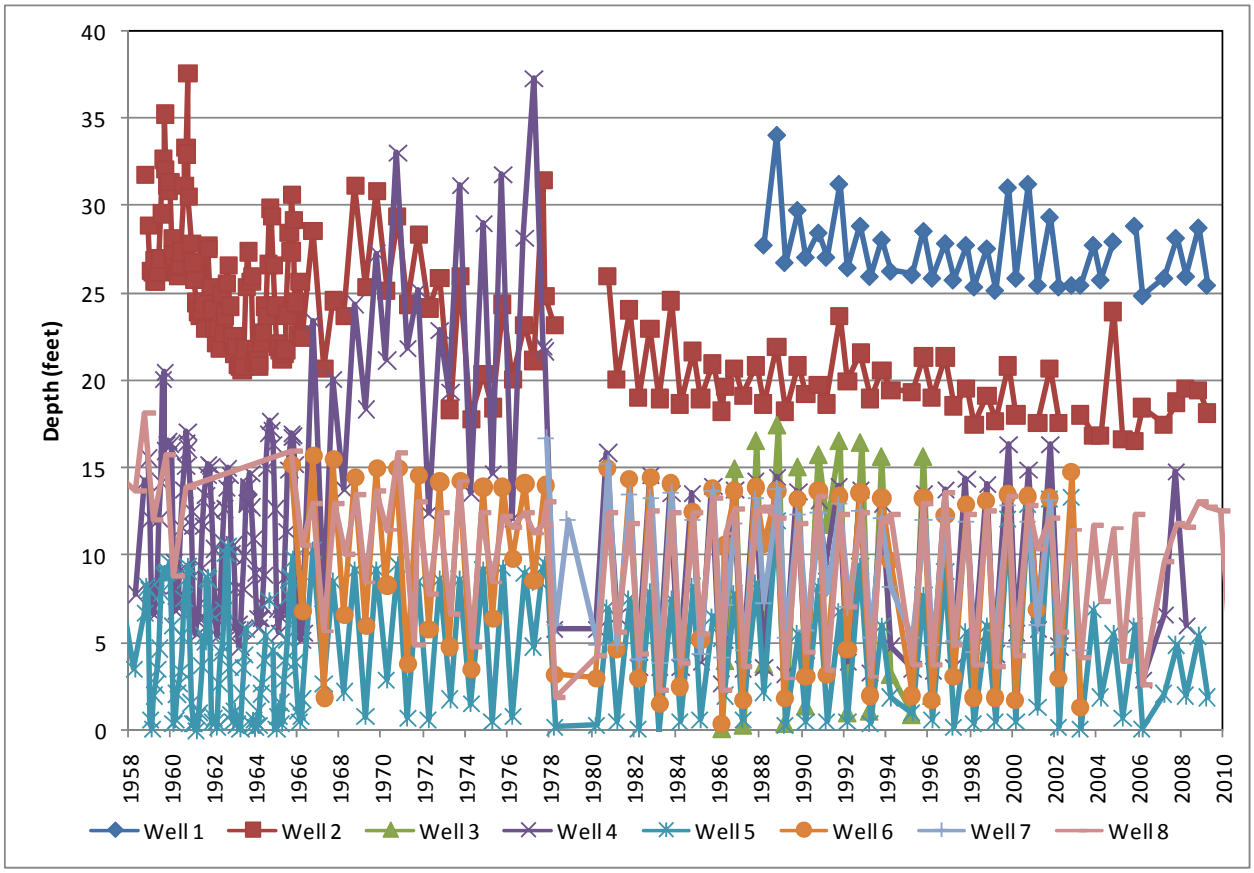


Figure 7. Groundwater Elevations Measured in Seven Department of Water Resources Wells Located in Little Lake Valley



Data source: California Department of Water Resources 2010

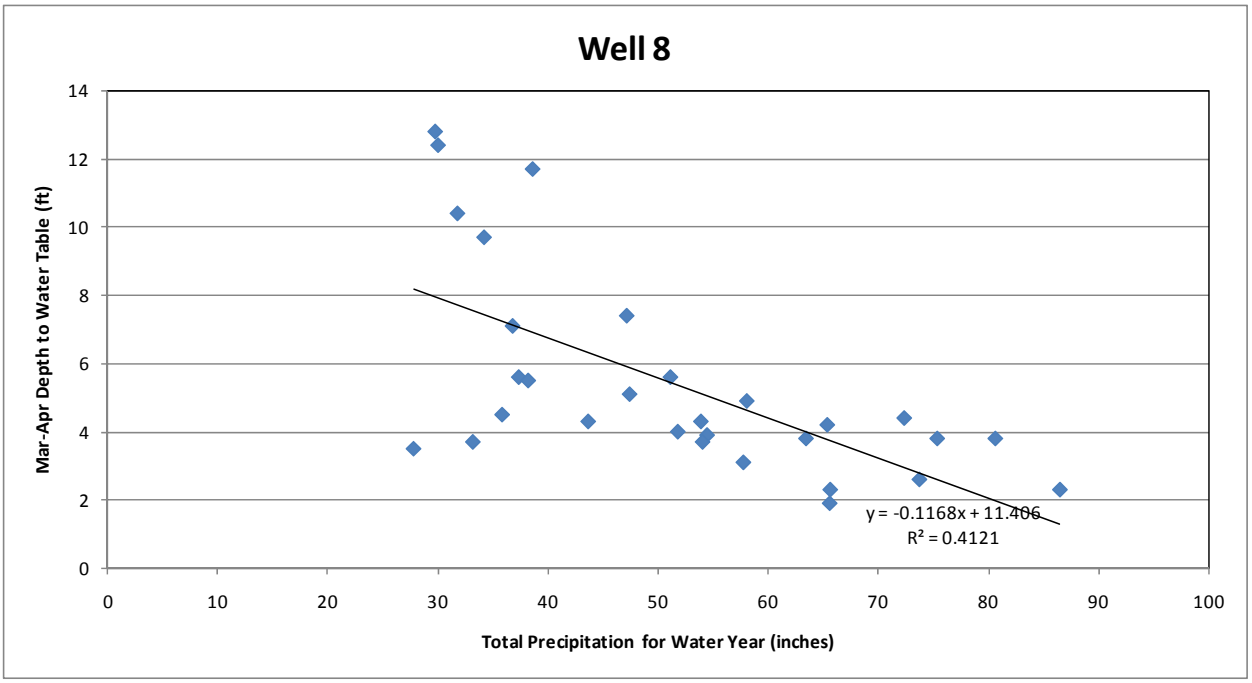
Figure 8. Depth to Groundwater Measured in Seven Department of Water Resources Wells Located in Little Lake Valley

The DWR well data indicate that groundwater elevations may fluctuate seasonally from 5 to 15 feet (Figures 7 and 8). Seasonal fluctuations in groundwater level result primarily from pumping and precipitation (Farrar 1986), although other factors such as groundwater movement to and from streams, evapotranspiration, and recharge from irrigation play a role. Wells 2, 3, 4, 6, and 8 are no longer in use; fluctuations in their water levels are not a result of pumping by these wells, although pumping at other wells could be affecting the levels in Wells 2, 3, 4, 6, and 8.

The DWR well data also indicate that groundwater levels in the Valley may decrease slightly during periods of drought. For example, well-level recovery was slightly reduced in some wells during some dry winters such as 1977. However, it appears that in general there has been little change in well levels from year to year.

Portions of the aquifer that are most likely to support wetlands are those areas where the aquifer is close to the soil surface. It appears that during most years, there is sufficient rainfall to bring the water table close to the soil surface at some locations such as well 5. Once the aquifer approaches the surface, lateral runoff to surface waters is more likely to occur. Figure 9 shows a comparison of spring well elevations versus precipitation for a well with elevations close to the surface and a well

with deeper water (Well 5 versus Well 8). It appears that total precipitation has more of an effect on spring aquifer elevations in well 8 than in well 5. For well 5, there is generally enough water to bring the aquifer close to the surface, which indicates that there is usually enough water to have a high water table at the lower elevations in Little Lake Valley. For both wells, there are other sources of year-to-year variability such as rain pattern and the particular timing of the measurements.



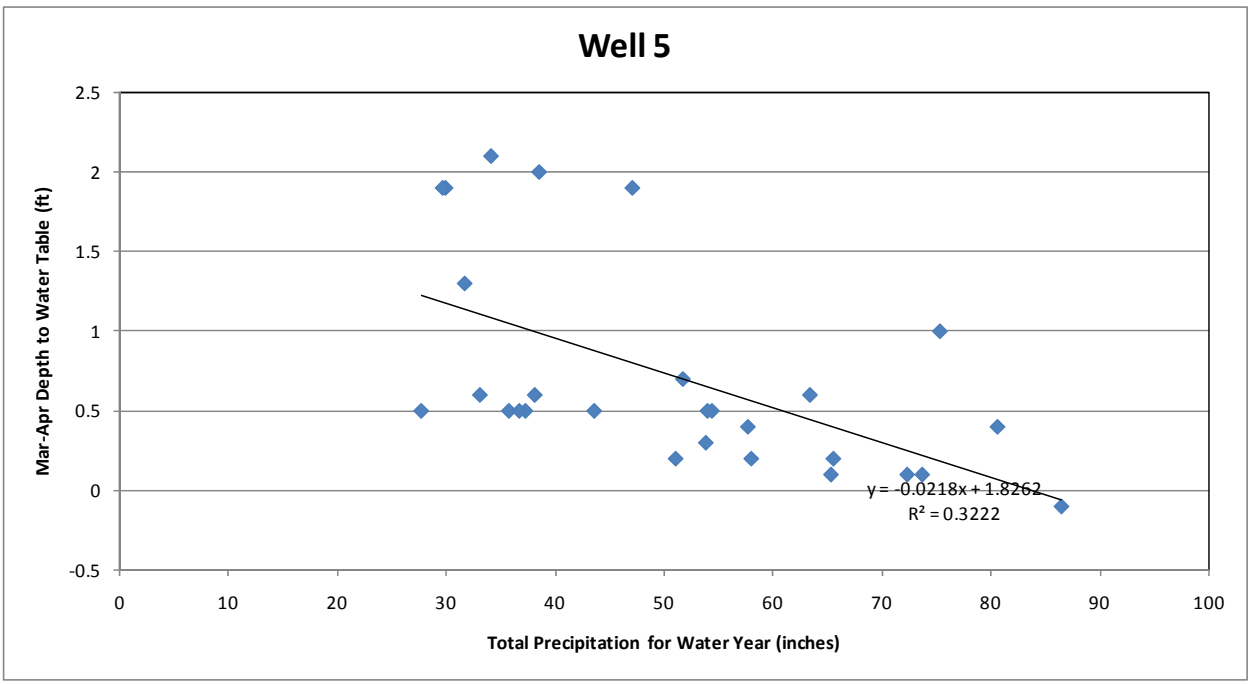


Figure 9. Comparison of Total Precipitation to Spring Well Elevations in a Well with Water Levels Close to the Soil Surface (within 2 feet, Well 5) and in a Well where the Elevations are Further from the Soil Surface (Well 8)

8.1.2.2 Aquifer Drawdown Rates

If a wetland is dependent on an aquifer, the ability of the wetland to be sustained in the spring will depend on how long the aquifer remains at high elevations and then how rapidly the water table declines.

Most of the DWR well measurements were collected twice a year, once in the spring when the aquifer is high and once in the fall, when the aquifer is low. During the early 1960s, however, data were collected approximately monthly in wells 4 and 5. These data show that the aquifer tends to remain high starting sometime between the beginning of December and mid February and then declines rapidly between March and mid May depending on rainfall patterns.

The DWR well data for the spring and fall were used to estimate aquifer drawdown rates for wells 4 through 8 for all data starting in 1978 (data from wells 1 and 2 were not used because the depth to the aquifer was too great to be representative of a portion of the aquifer that might be supporting wetlands and the data from well 3 was not used because the period of record was too short). The average drawdown rates for each well varied between about 0.4 and 0.6 inches per day, with an overall average of 0.5 inches per day.

8.1.3 Hydrologic Monitoring of North Coast Semaphore Grass Populations

As part of the evaluation of North Coast semaphore grass habitat in Little Lake Valley, 30-inch deep groundwater monitoring wells were installed in the vicinity of PLHO habitat in both wetlands (8 wet meadow sites and 5 riparian woodland sites) and uplands (7 sites). These wells are located on the Arkelian Parcel (2 sites), Frost Parcel (2 sites), Goss Parcel (6 sites), Huffman Parcel (6 sites), Lusher Parcel (2 sites), and MGC Plasma North Parcel (2 sites). Of these, only the Goss and MGC Plasma North parcels are proposed for wetland establishment. However, the data from the other parcels may be indicative of the variation in hydrology that might be expected at other establishment sites that do not have groundwater monitoring wells. Water levels were monitored intermittently in the wells between April 24, 2010 and June 27, 2010.

Data from these wells indicate that most wells behaved in a similar manner in response to rainfall and drain rates (Figure 10). Water elevations generally:

- increased between April 24, 2010 and April 29, 2010 (precipitation = 2.24 inches);
- decreased between April 29, 2010 and May 19, 2010 (precipitation = 1.15 inches);
- increased again between May 19, 2010 and June 7, 2010 (precipitation = 2.41 inches); and
- decreased after June 7, 2010.

There were exceptions to this pattern. Most notably, water levels in a few wells (e.g., Arkelian 3, Huffman 2, and Goss 9) continued to decline instead of increase between May 19 and June 7. A speculative explanation for this difference is that the groundwater aquifer at these sites may have declined such that drainage rates were increased and rainfall no longer could fill the wells in those

sites. Surface water was only present briefly (as indicated by water depths greater than 30 inches) and only at a few sites.

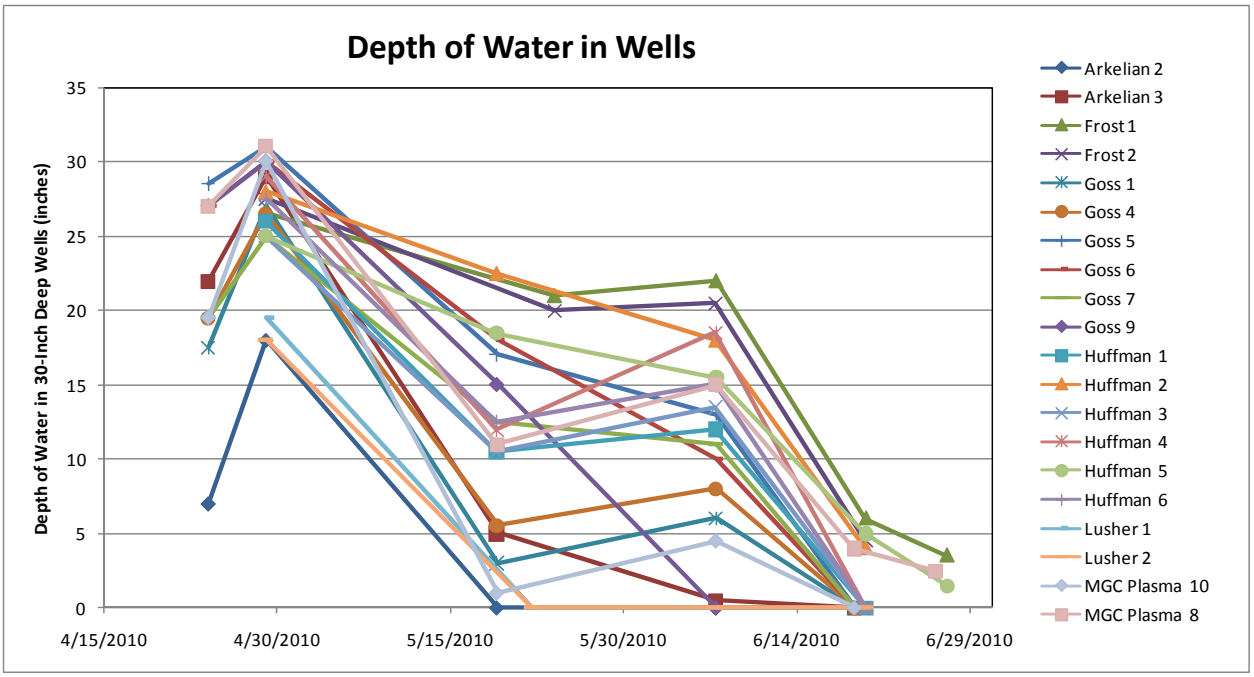


Figure 10. Depth of Water in Hydrologic Monitoring Wells near North Coast Semaphore Grass Populations

Precipitation data (from the WRCC for the Willits 1 NE site) was used along with the well data to algebraically estimate the effect of rainfall on water depths in the wells (the rainfall multiplier) and the drainage rates. These values can be estimated for each set of 3 surveys with most water depths greater than zero (April 24-April 29-May 19 and April 29-May 19-June7). The results of these calculations are shown in Table 8.

Table 8. Drainage Rates and Effect of Rainfall on Depth of Water in Wells (Rainfall Multiplier) Calculated from Precipitation and Depth of Water in Wetland Monitoring Wells

	Drain Rate (inches/day)	Rainfall Multiplier	Drain Rate (inches/day)	Rainfall Multiplier
Site	Results Derived from Surveys 1 -3		Results Derived from Surveys 2 - 4	
Arkelian 3	1.58	6.66	2.00	13.89
Frost 1			0.41	3.18
Frost 2			0.51	3.67
Goss 1	1.66	7.94	2.33	19.58
Goss 4	1.41	6.27	2.03	17.04
Goss 5	0.88	3.07	1.11	7.06
Goss 6	0.78	3.07	0.75	2.58
Goss 7	0.88	4.42	1.08	7.87
Goss 9	0.95	3.46		
Huffman 1			1.48	12.31
Huffman 2			0.31	0.55
Huffman 3			1.46	12.73
Huffman 4			1.84	17.19
Huffman 5			0.46	2.41
Huffman 6			1.48	12.71
MGC Plasma 10	1.97	9.09	2.81	23.57
MGC Plasma 8	1.27	4.61	2.00	17.46
Average	1.26	5.40	1.38	10.86
Average for Uplands	1.43	6.75	1.52	12.75

Notes:

Wells with insufficient data or that were dry on June 7, 2010 were not used in the analysis.

Upland sites used in the calculations were Goss 7, Huffman 3-6, and MGC Plasma 10.

An inch of rainfall may result in an increase of multiple inches of soil moisture. This can be seen clearly in the differences between the first and second survey. For example, the well elevations at site Arkelian 2 increased about 11 inches between April 24 and 29 even though it only rained about 2.2 inches. The primary explanation for this effect is that only a fraction of the soil volume is empty space available to be filled with water. The ratio between increase in groundwater level and precipitation could also be increased by local effects of water moving laterally into a wetland area. For the water budget discussed below, this multiplier is assumed to directly result from the limited amount of space available for water to fill the soil. A direct consequence of this value is that for an inch of surface water to infiltrate the soil, the water in the soil must be moving downward at a much faster rate that is estimated as the infiltration rate times the observed ratio.

The drain rates were relatively low, with an overall average of 1.3 to 1.4 inches per day, considerably lower than the estimated average basic infiltration rate or saturated hydraulic conductivity of 7-9.6 inches per day for clay loam soil. For 7 to 9.6 inches of surface water to move through the soil in a day, the water must move through the soil much faster because of limited soil space available for the water. There was little difference between the overall average values and the average values for the upland sites.

8.1.4 Water Budget Methods

In order to evaluate the potential for wetland establishment success, a water budget analysis was performed using a range of precipitation and hydrologic assumptions, including variable aquifer conditions and soil percolation and lateral movement drainage rates.

Water elevations were estimated with and without a high water table. If the water table is low, water in the wetlands must be perched on a semi-permeable soil layer and the water budget is dependent mostly on precipitation and soil permeability. If the water table is high, local precipitation may be retained by either the semi-permeable soil layer or by the presence of the aquifer. If water is retained by the presence of the aquifer, it becomes the upper portion of the aquifer. For the case of a high water table, three types of water levels were evaluated: the base aquifer elevation, the elevation of water perched on a semi-permeable soil layer, and the elevation of rainfall that may have percolated through the soil and become perched on top of the aquifer.

8.1.4.1 Precipitation

Daily precipitation data from 1960 to 2010 was obtained from the WRCC for the Willits 1 NE station located just north of the City of Willits. Missing values were filled in with data from nearby stations, mostly with data from the CDEC station WIL, located approximately 5 miles south of the City of Willits. Average annual precipitation for this dataset is 51.2 inches. Data from water years 1987 and 2006 were chosen to represent relatively dry (10th percentile, with 33.1 inches of precipitation) and wet (90th percentile, with 73.7 inches of precipitation) conditions. Data from water year 2010 (47.4 inches of precipitation) were also used in order to compare estimated water elevations with those that were measured in the PLHO wetland monitoring wells.

8.1.4.2 Evapotranspiration

Evapotranspiration was not explicitly included in the analysis. The effect of evapotranspiration is minimal compared to the permeability of the soils that are most abundant in the Valley (i.e., evapotranspiration would have little effect on the amount of water perched on the wetland soils). Furthermore, the drain rates used for the water perched on the aquifer were measured empirically (with the PLHO wetland monitoring wells) and therefore include any effects of evapotranspiration. Evaporation can have some affect on the aquifer as a whole if the top of the aquifer is located near the soil surface. However, aquifer elevations used in this water budget assessment are based on the measured DWR well data, which already include evaporation effects.

8.1.4.3 Elevation of Precipitation Perched on Wetland Soils

Elevation of local precipitation perched on the semi-permeable wetland soils is dependent on precipitation, the permeability of the soil (the basic infiltration rate), and the depth to the most restrictive soil layer. In addition, because much of the soil volume is occupied by the soil material itself as well as moisture, an inch of rain results in much more than an inch of saturated soil in the absence of infiltration. This ratio of inches of saturated soil to inches of precipitation is labeled here as the rainfall multiplier and is expected to be similar to 1 divided by the specific yield of the soil. However, it may also be affected other things. For example, lateral movement of water could increase or decrease this value. The elevation of local precipitation perched on wetland soils is estimated with the following equation in MicroSoft Excel:

$$EPS_t = \min(\ Emax, \text{if } (\text{or}(EPS_{t-1}>EL, Precip=0), EPS_{t-1,}\ EL) + RainMult * Precip - Infilt*RainMult)$$

Where:

EPS_t	=	Top elevation of water perched on wetland soils for current day
EPS_{t-1}	=	Top elevation of water perched on wetland soils for previous day
Emax	=	maximum elevation of water allowed before water would flow off site (assumed to be 10 inches)
EL	=	Elevation of least permeable soil
Precip	=	precipitation in inches for current day
RainMult	=	Conversion between inches of precipitation and inches of saturated soil
Infilt	=	Estimated infiltration rate for water on the soil surface (inches/day)

Note: Elevation of water above the soil surface is converted to actual elevations by dividing by RainMult.

8.1.4.4 Elevation of Aquifer

In the water balance assessment, the aquifer was assumed to either be deep enough that it would not affect wetlands or be relatively shallow. For the shallow aquifer scenario, the aquifer was assumed to behave in a manner similar to DWR's well #5, which frequently has a top elevation that approaches the soil surface during the rainy season. The regression equation in Figure 9 was used to estimate the elevation for the top of the aquifer. The elevation for the top of the aquifer was estimated in Excel with the following equation:

$$EA = \text{if } (PCum>15, AC + AMult * PCum, -50) + Drop$$

Where:

EA = Elevation of aquifer in inches

PCum = cumulative precipitation for the rainy season (inches)

AC = Aquifer constant, from regression for spring elevation for well 5 shown in Figure 9

AMult = Aquifer coefficient, from regression for spring elevation for well 5 shown in Figure 9

Drop = Decline in aquifer level, assumed to begin after March 1 when precipitation for the past 20 days has been less than 3 inches. The aquifer drain rate was assumed to be 0.4 inches per day based on the Well 5 data.

8.1.4.5 Elevation of Water Perched on Aquifer

The equation for estimating the aquifer level described above is an estimate of the general regional level. As the aquifer approaches the soil surface recent rain events could temporarily place additional water on top of the aquifer. In a sense, this water would be perched on the main body of the aquifer. Because of its high elevation, it would likely drain more rapidly than the main aquifer either into adjoining surface waters. The surface elevation of this temporary top layer of the aquifer was estimated with the following Excel equation:

$$EPA_t = EA + ETA_{t-1} + RainMult*Precip - drain$$

Where:

EPA_t = Elevation of the water perched on the aquifer for the current day. This value is not allowed to exceed Emax

Drain = Estimated water drainage rate for water level within the soil (inches/day)

Note 1: precipitation is only allowed to contribute to this layer when the aquifer elevation is greater than -24 inches, otherwise precipitation is assumed to contribute directly to the main aquifer.

Note 2: Elevation of water above the soil surface is converted to actual elevations by dividing by RainMult.

8.1.4.6 Scenarios

Two basic types of scenarios were evaluated:

1. High Water Table Scenario: An estimate of most likely hydrologic conditions, which includes a relatively high aquifer and a higher more realistic level of soil permeability.
2. Low Water Table Scenario: An estimate of hydrologic conditions that would be more favorable for soil-perched wetlands, which includes a relatively low aquifer and a very slow soil permeability.

Both of these scenarios were evaluated with precipitation data from 2010, 1987 (10th percentile), and 2006 (90th percentile).

8.1.4.6.1 High Water Table Scenario

For this scenario, the following assumptions were used:

Aquifer:

Depth to water table was assumed to be similar to the depth to water table measured at DWR well 5. During the winter and early spring, the water table was set to rise to within 3 to 18 inches of the soil surface.

Water perched on soil:

- An infiltration rate of 7 inches per day was used to represent clay loam, one of the most abundant soil textures found in the wetland areas.
- The clay loam was assumed to first occur at a depth of 5 inches.
- The rainfall multiplier was set to 5.4 based on the measurements at the test wells. This value is multiplied by the infiltration rate to estimate the speed that the water moves through the soil.

Water perched on aquifer:

- The rainfall multiplier was set to 5.4 based on the measurements at the test wells.
- The drain rate was set equal to 1.4 inches per day based on the measurements at the test wells. Note: this value is not multiplied by RainMult because it was a direct measurement of the decrease in water level within the soil.

8.1.4.6.2 Low Water Table Scenario

For this scenario, the following assumptions were used:

Aquifer:

Depth to water table was assumed to be at least 50 inches

Water perched on soil:

In this scenario the parameters for water perched on soil were chosen to be most favorable.

- An infiltration rate of 2 inches per day was used to represent clay. Of the 19 soil pits dug at the Goss and MGC Plasma parcels for the wetland soils evaluation, three (all located in uplands) contained clay or very gravelly heavy clay soil that was estimated to have very slow permeability.
- The clay was assumed to first occur at a depth of 1 inch (as occurred at one of the 19 soil pits).
- The rainfall multiplier was set to 3. A low multiplier helps retain water perched on soil because the multiplier is used to estimate how fast the water must move through the soil in order to

attain a certain infiltration rate. For example, an infiltration rate of 2 inches per day implies that the water must be moving through the soil at 6 inches per day if the rainfall multiplier is 3 (i.e., 1 inch of surface water fits into 3 inches of soil). A rainfall multiplier of 3 implies that the specific yield of the soil would be about 33% (i.e., 33% of the volume of saturated soil would contain extractable water). A low rainfall multiplier reduces the elevation increase associated with rainfall, but this effect is smaller than the reduced elevation associated with infiltration.

Water perched on aquifer:

Because of the depth to the aquifer, water was assumed not to become perched on the aquifer.

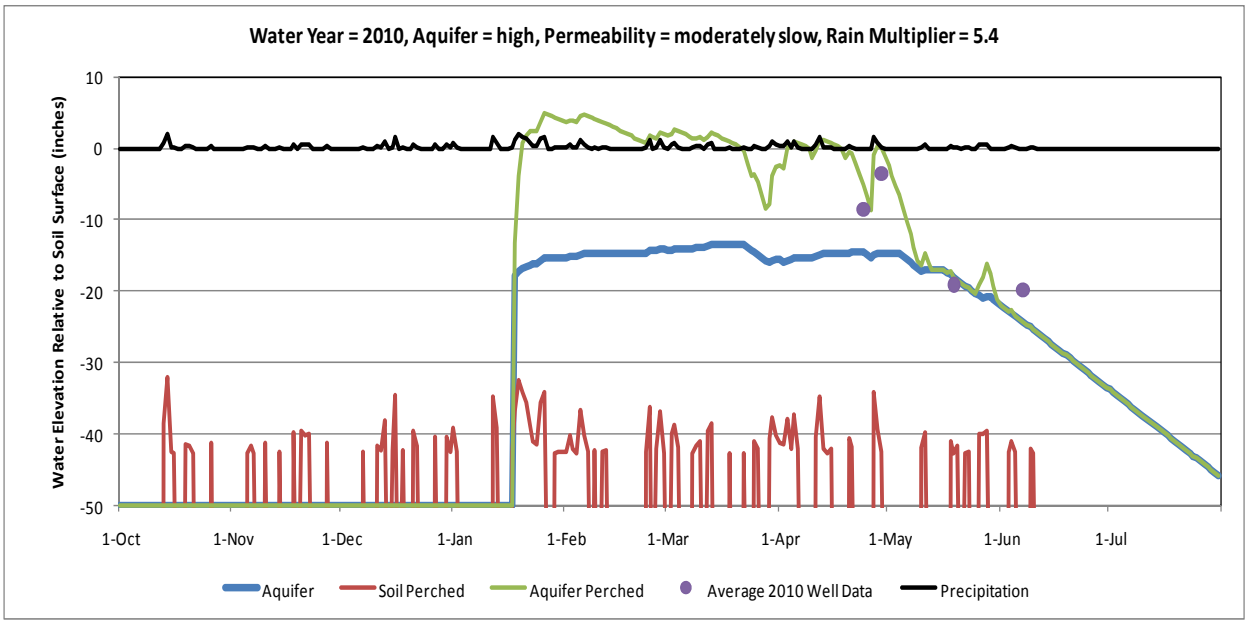
8.1.5 Results and Discussion

Water budget results are shown in Figures 11 through 13 for 2010, 1987, and 2006, respectively. Each figure shows the high water table scenario at the top (the most likely hydrologic scenario) and the low water table scenario at the bottom (the most optimistic parameter values for water perched on soil). All results are presented in terms of elevation in inches relative to the soil surface.

The results for 2010 precipitation show that both the high water table and low water table scenarios have elevations that are similar to those observed in the test wells. The average well elevation data shown in the graphs are a fairly close match to either the elevation of the water perched on the aquifer for the high water table scenario or the elevation of the water perched on the wetland soil for the low water table scenario. However, because the parameter values chosen for the low water table scenario were fairly extreme and not representative of the majority of the data, it is likely that most wetlands in Little Lake Valley exist as a result of the presence of a high water table. Under the high water table scenario, wetland water elevations were estimated to be much higher (frequently above the soil surface) than under the low water table scenario (elevations generally 4 inches or more below the soil surface.

The results for 1987 precipitation (Figure 12) show that during relatively dry years, wetland functionality would be limited, although much better under the high aquifer scenario than under the low aquifer scenario. One of the requirements of a wetland is that there be saturation within 12 inches of the surface for at least 2 consecutive weeks during the year. This condition is not quite met under the low aquifer scenario with 1987 precipitation.

The results for 2006 precipitation (Figure 13) show that both scenarios may produce wetland conditions, although the high water table scenario would generate much more water above the soil surface than the low water table scenario.



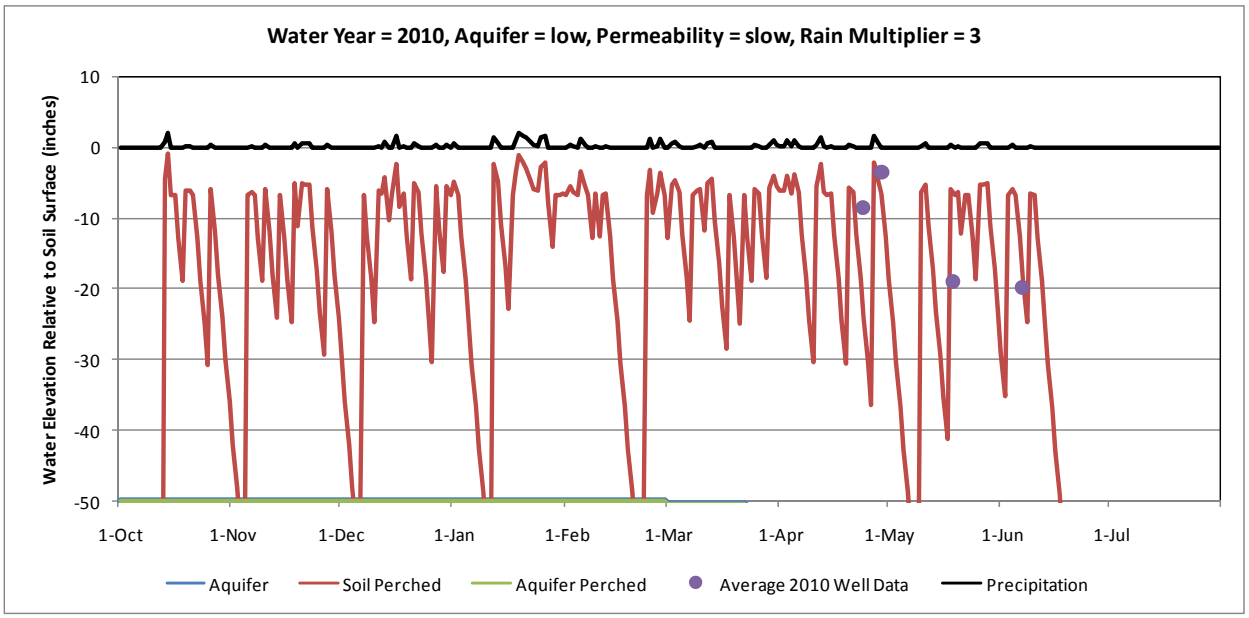
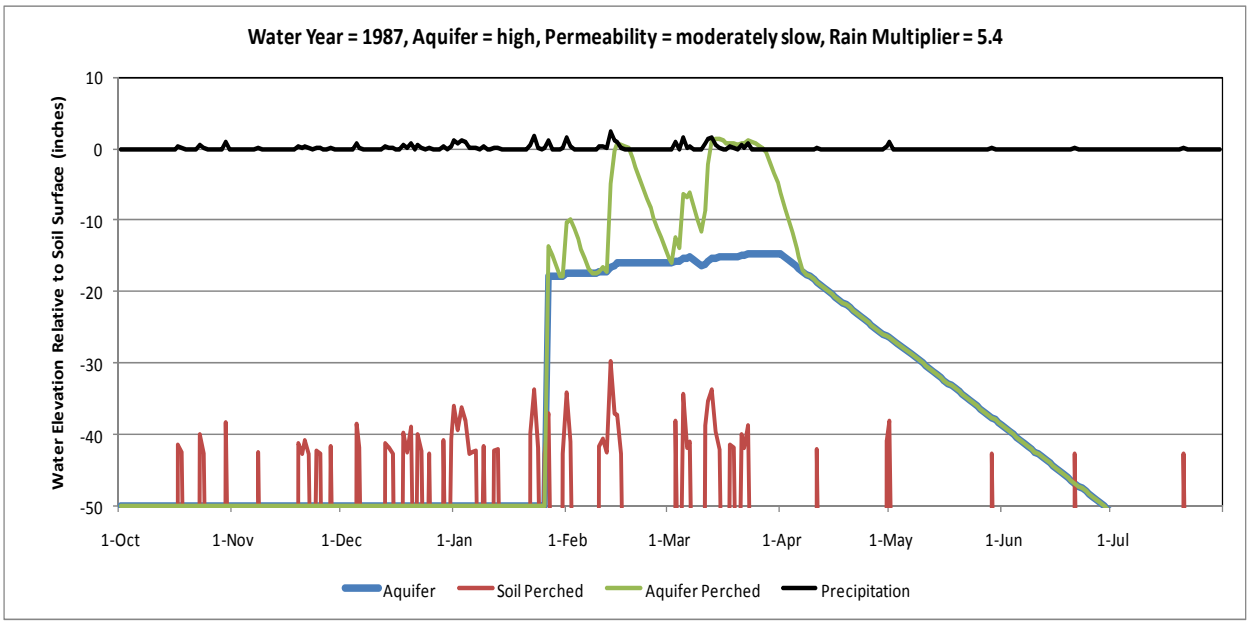


Figure 11. Estimated Water Surface Elevations for a High Aquifer and Low Aquifer Scenario with 2010 Precipitation



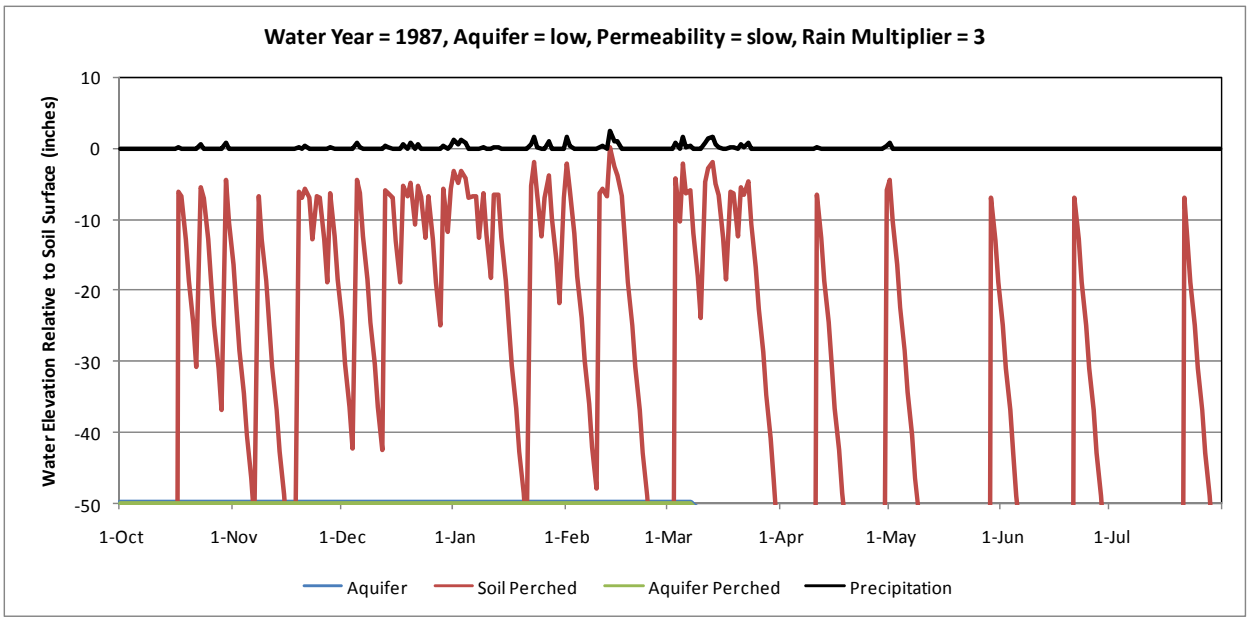
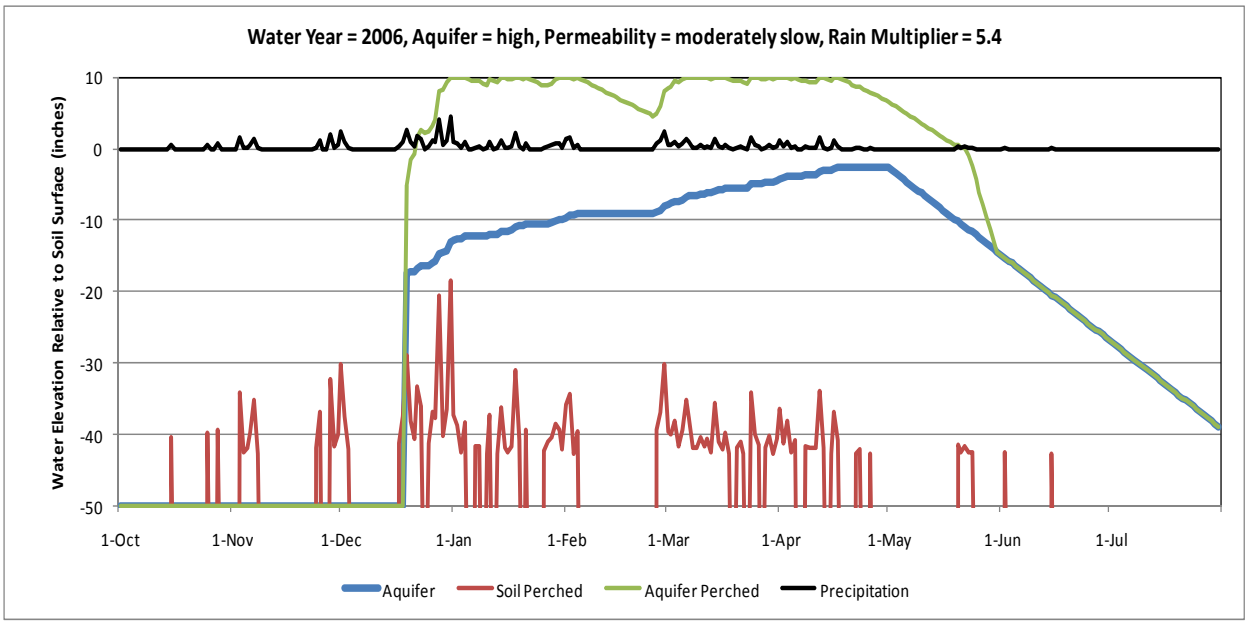


Figure 12. Estimated Water Surface Elevations for a High Aquifer and Low Aquifer Scenario with 1987 Precipitation



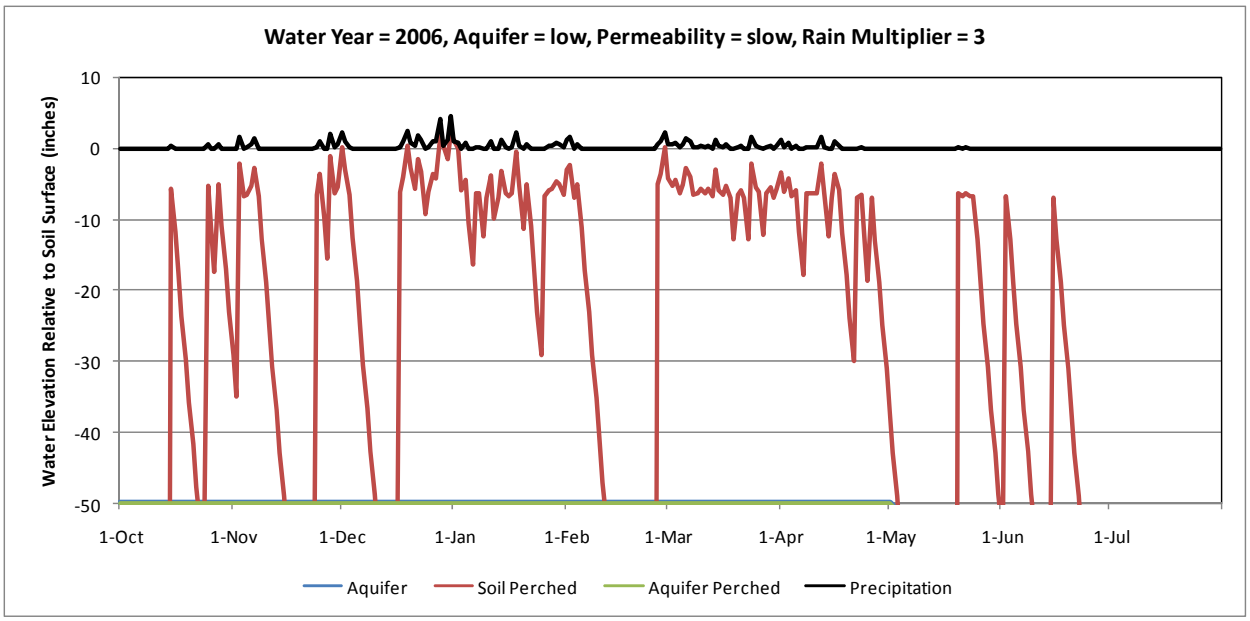


Figure 13. Estimated Water Surface Elevations for a High Aquifer and Low Aquifer Scenario with 2006 Precipitation

Based on existing soils data, it seems likely that most wetlands in Little Lake Valley could not be sustained merely by soils retaining local precipitation. It seems likely that the wetlands are sustained by the presence of a high water table or other sources of inflow.

There is limited data available to distinguish the potential differences between proposed wetland establishment sites in terms of the water budget assessment. Table 9 summarizes the available site specific data.

Table 9. Hydrologic and Soil Texture Information for Offsite Mitigation Parcels where Wetland Establishment is Proposed

Establishment Site	Water Elevation Data from Monitoring Wells for PLHO Study	Soil Texture Data from PLHO Soil Surveys and Wetland Delineations	Soil Texture and Redoximorphic Data from July 2010 Soil Surveys of Proposed Wetland Establishment Sites	Approximate Elevation of Soil Surface (feet above msl)	Field Observations
Ford Parcel 108-010-06		mostly clay loam and loam		1320 - 1330	Located at the bottom of the valley where Little Lake historically formed. Outlook Creek, Oat Canyon Creek, and an unnamed drainage present. Mixed marsh area near wetland establishment site had shallow inundation in July 2010.
Goss	√ [a]	mostly clay loam and loam	mostly clay loam and loam, redoxymorphic soil features generally within the top foot of the soil surface	1394	Presence of wetlands along former stream channels may indicate subsurface flows. Shallow inundation in winter.
MGC Plasma North	√ [a]	mostly clay loam and loam	mostly clay loam and loam, redoxymorphic soil features generally within the top foot of the soil surface	1394-1402	Presence of wetlands along former stream channels may indicate subsurface flows. Spring discharge carried by a ditch seeps into the soil at this site. Shallow inundation in winter.

Table 9. Continued

Establishment Site	Water Elevation Data from Monitoring Wells for PLHO Study	Soil Texture Data from PLHO Soil Surveys and Wetland Delineations	Soil Texture and Redoximorphic Data from July 2010 Soil Surveys of Proposed Wetland Establishment Sites	Approximate Elevation of Soil Surface (feet above msl)	Field Observations
MGC Plasma Middle		mostly clay loam and loam		1398-1402	Presence of wetlands along former stream channels may indicate subsurface flows. Shallow inundation in winter.
Nieson		mostly clay loam and loam		1344	Railroad ditch conveys water north through the site. Saturated soil during April 2010.
Watson 037-221-30		mostly clay loam and loam	a small area of clay pan detected	1330-1340	Receives seepage from ephemeral drainages. Floodwaters from the major creeks (e.g., Davis and Outlet Creeks) contribute to large area of winter inundation on the western (lower) portion of the site.

[a] MGC Plasma North tended to have higher drain rates and rainfall multipliers than Goss, but there were only two sample sites for MGC Plasma North and the wetland to be created on the Goss, MGC Plasma North, and MGC Plasma Middle will be contiguous.

There is little data available that distinguishes the proposed wetland establishment sites, although the soil surveys at the wetland establishment sites have not yet been completed. Because there is very little soil with very low permeability (e.g., clay), it is likely that wetlands are controlled by local aquifer conditions. Field observations of local drainages and topographic conditions suggest that a few of the wetland sites may benefit from lateral movement of surface and subsurface waters.

Based on available information, there is little hydrologic difference between upland sites and nearby wetlands in terms of soil permeability and well hydrology. It seems that the main difference between existing wetlands and nearby upland establishment sites is the ground surface elevation, which would be lowered for wetland establishment.

9 Citations

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California Department of Transportation (Caltrans). 2010b. Willits Bypass Technical Memorandum: Soil and Hydrology Site Characterization Monitoring Methods (Work Plan Task 4-4.1). May 28, 2010. District 3 North Region Environmental Division. Sacramento, CA.

10 Personal Communications

Meigs, Jason. Associate Biologist. California Department of Transportation. July 28, 2010 - notes provided on field observations at the offsite mitigation parcels where wetland establishment is proposed.

Attachment 1

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94103-1398

JUL - 9 2010

REPLY TO
ATTENTION OF

Regulatory Division

SUBJECT: File Number 1991-19474N

Mr. Charlie Fielder
District 1 Director
California Department of Transportation
P.O. Box 3700
Eureka, California 95502

Dear Mr. Fielder:

Per our District Commander's June 29, 2010 e-mail communication to you, we are hereby providing you with the list of items Caltrans must provide to the Corps by August 15, 2010, in order for us to come to a permit decision by August 30, 2010. To adequately address the three items specified by the District Commander, including the 401 Certification, a complete long-term management plan, and complete endowment calculations broken down by parcel (must use spreadsheet provided by the Corps by e-mail on June 2, 2010 for **each parcel**), you must provide the following 6 items to meet the spirit and intent of our commitments.

These items are a subset of the larger list provided today to you by the RWQCB representing the complete information needs of the Corps, the RWQCB, and the EPA. The list below represents the minimum information necessary for us to complete our public interest review, ensure compliance with mandatory "no net loss" policy, and ensure compliance with our Mitigation Regulations (33 CFR Part 332). To date, you have only proposed 23 acres of wetland establishment (creation) and have not shown how you will effect "no net loss" of the 83 acres of fill that is proposed.

1. A **clear accounting** of existing conditions on each mitigation parcel specific to waters of the U.S. including aquatic resource type (you must specify either wetlands, non-wetland waters of the U.S., OR riparian buffer) and acreage in a table with associated drawings. We also require a clear accounting of proposed conditions (i.e. climax community) on each mitigation parcel specific to waters of the U.S. including proposed aquatic resource types and acreages.

2. Compensation types must be clarified throughout the Mitigation and Monitoring Plan (MMP) and only Corps-recognized definitions are to be used. "Protection" is not a recognized Corps definition per 33 CFR Part 332 and any mitigation parcel areas

classified under this term **must be reclassified** according to one of the Corps-recognized definitions. The word "protection" may not be used in the final MMP.

You have counted returning areas that will be temporarily impacted to their original contours as "restoration". "Restoration" is not defined per 33 CFR Part 332 as "areas temporarily affected by onsite or offsite construction activities that will be restored to pre-project conditions." Any areas classified this way within the MMP **must be removed** from the mitigation totals, as the Corps does not recognize them as "restoration" areas.

3. As specified in our April 23, 2010 letter, information justifying areas proposed for preservation must be provided pursuant to 33 CFR Part 332.3(h).

4. Each and every area proposed for **establishment** must have the following details and baseline information: 1) Caltrans needs to describe the process used in selecting each site. 2) Caltrans needs to clearly define the purpose of each establishment site. What functions and values are being replaced at the establishment site? Performance standards and success criteria will be based on this. 3) Caltrans needs to provide **fully developed** construction plans: existing contours, proposed contours, planting plans, construction sequence. 4) Caltrans needs to clearly define the location and the size of each mitigation site (not give us the size of the actual parcel, we need to know the size of the mitigation site). 5) Caltrans must have a corresponding reference site for each establishment site. The enhancement plans must contain the following information:
   a. Hydrology. The following information is needed for each proposed wetland establishment site:
      1) Current conditions information:
         - Analysis of existing hydrologic conditions in reference sites.
         - Hydrologic testing of the mitigation sites. Testing must include:
            - Examination of the groundwater availability.
            - Hydroperiod Information: the frequency of flooding, depth, duration, timing of saturation or inundation, percent of open water.
            - Historical hydrology of mitigation site if different from present conditions.
            - Acres of contributing drainage areas.
            - Results of water quality analysis: data on surface water, groundwater, redox, nutrients, organic content, suspended matter, DO, heavy metals.
      2) Information to estimate proposed hydrological conditions:
         - A reliable water budget must be presented. You must be able to show that net inflows are greater than net outflows. Water budget must include: water source(s): precipitation, surface runoff, groundwater, stream. Water losses.

- Provide a water budget for wet years and dry years.
- Modification of the hydrologic characteristics should be kept to a minimum.
- Site should be hydrologically self sustaining.

b. Soil Characteristics. The following information is needed for each wetland establishment site:
   1) Soil profile. The MMP provided the soil survey information. Caltrans needs to locate those soils on site. Submit a report of soil samples with a map showing data sample points.
   2) Standard soil analysis: percent organic matter, structure, texture, permeability.
   3) What will be the source of the soils? (e.g., existing soil, imported hydric soil from impact site).
   4) Also need: erosion and soil compaction control measures.

c. Vegetation.
   1) Existing conditions: We generally have a list of the species that occur on site from the delineations that were completed. For each wetland establishment site we need:
      - Species characteristics such as: densities, age, health, natives/non natives.
      - Percent cover.
      - Community structure (canopy stratification).
      - Map showing the correct location of plant communities with representative site photos.
      - Proposed site should be located adjacent to existing waters of the U.S. or a high functioning buffer adjacent to waters of the U.S. to create a wildlife corridor. Provide documentation of this connectivity.

d. Watershed context/surrounding land use for each wetland establishment site:
   1) Impairment status and impairment type of aquatic resources.
   2) Description of watershed land uses (percent agriculture, forested, wetland, developed).
   3) Size of natural buffers (show on map and do not call them "riparian").
   4) Description of landscape connectivity: proximity and connectivity of existing aquatic resources and natural upland areas (and show on map).
   5) Relative amount of aquatic resource area that the impact site represents for the watershed and/or ecoregion (by individual type and by overall resources).

e. Goals of each wetland establishment site:
   1) Types and areas of habitat to be established.
   2) Specific functions of the habitat types.
   3) Time lapse between jurisdictional impacts of the project and mitigation site success.

4) Total cost of the establishment site: site preparation, planting, maintenance, monitoring.
5) Overall watershed improvement to be gained by the wetland establishment site.

f. Wetland Establishment Site Implementation:
   1) For each establishment site Caltrans must:
      - Provide a rationale for expecting implementation success.
      - Name responsible parties.
      - Provide financial assurance information.
      - Provide a construction schedule.
      - Provide a site preparation plan.
      - Provide a planting plan. The planting plan design must emulate a reference site in terms of plant species and spacing. Planting design must place plants relative to the water source supporting them specific to what the optimal condition would be for that species.
      - Prior to planting the site soil conditions must be confirmed: soil moisture, ph, salinity, organic matter, nitrogen, soil type. Be advised that the native soils must support the proposed wetland establishment. Clay liners or other artificial barriers are not permitted.
      - Provide as-builts within 45-days of construction of establishment wetland site.

g. Maintenance Activities During Monitoring Period for each wetland establishment site:
   1) Provide the list of maintenance activities
   2) Responsible parties
   3) Schedule

h. Monitoring Plan for each wetland establishment site:
   1) Target dates for performance standards and success criteria
   2) Target functions
   3) Target hydrological regime. Hydrologic functions must be compared to what is occurring at the reference site.
   4) Target mitigation acreage of establishment
   5) Monitoring method and schedule
   6) Annual monitoring report

i. Completion of each Mitigation Site:
   1) Written notification is required
   2) Agency confirmation will be required before mitigation is considered complete.

j. Contingency Measures for each mitigation site:

1) Initiation Procedures. Circumstances necessitating the initiation of contingency measures must be described.
2) Funding mechanism (See item 5. below)
3) Responsible parties

5. The Corps requires a performance bond or other Corps-approved financial assurance mechanism payable at the direction of the District Engineer to his designee or to a standby trust agreement. This financial assurance mechanism shall be posted **within 30 days of permit issuance** or else the Corps permit will be revoked. In order to determine the appropriate assurance amount, Caltrans must provide **sufficient and itemized calculations** by August 15, 2010 for the cost of the following: collection of all necessary baseline information, parcel-specific mitigation plan preparation based on a watershed approach, land acquisition, planning and engineering, legal fees, mobilization, construction, and monitoring, and a contingency fund for any necessary remediation.

6. As specified in our April 23, 2010 letter, the Corps believes discharge of fill for project construction should be carried out concurrently with project phase construction. Caltrans must provide us with the fill amount associated with Phase I alone, the additional fill amount associated with Phase II, and the associated drawings demonstrating the two separate Phases as described by Dave Kelley in our May 10, 2010 conference call.

These items collectively are the minimum information necessary (to be supplied by August 15, 2010) for the Corps to complete the application evaluation process.

Should you have any questions regarding this matter, please call me at (415) 503-6771. Please address all correspondence to the Regulatory Division and refer to the File Number at the head of this letter.

Sincerely,

Jane M. Hicks

Jane M. Hicks
Chief, Regulatory Division

Copy Furnished:

US EPA, San Francisco, CA (Attn: A. Strauss/J. Brush/ M. Scianni)
CA RWQCB, Santa Rosa, CA (Attn: C. Kuhlman/J. Puget)
California Department of Transportation, Sacramento, CA (Attn: R. Land)
California Transportation Commission, Sacramento, CA (Attn: J. Earp)

Memorandum

Date:	August 10, 2010
To:	Dave Wickens U.S. Army Corps of Engineers - San Francisco District 1455 Market Street San Francisco, CA 94103-1398
Cc:	Laurie Monarres, U.S. Army Corps of Engineers Melissa Scianni, U.S. Environmental Protection Agency Jeremiah Puget, North Coast Regional Water Quality Control Board Craig Martz, California Department of Fish and Game
From:	Shanna Zahner California Department of Transportation
Subject:	**Willits Bypass Project—Soil Characteristics at Proposed Wetland Establishment Sites in Little Lake Valley**

1 Introduction

The Willits Bypass Project (bypass project) has several compensatory mitigation components, including wetland establishment. As part of the Clean Water Act (CWA) Section 404 individual permit process for the bypass project, the U.S. Army Corps of Engineers (USACE) has requested information related to soils at the six offsite mitigation parcels where wetland establishment is proposed. (Corresponding information on hydrology and vegetation has also been requested by the Corps; the hydrology information was provided on July 29, 2010 (Caltrans 2010a) and the vegetation information and will be provided on August 10, 2010.) Table 1 lists the offsite mitigation parcels and the wetland establishment habitat type and acreage proposed at each parcel.

Table 1. Proposed Wetland Establishment Sites at the Offsite Mitigation Parcels

Offsite Mitigation Parcel	Assessor's Parcel Number	Proposed Wetland Establishment Habitat Type	Proposed Wetland Establishment at Parcel (acres)
Ford	108-010-06	Mixed marsh and wet meadow	2.854
Goss	103-230-02		
MGC Plasma Middle	103-250-14	Wet meadow	7.477
MGC Plasma North	103-230-06		
Niesen	108-040-02	Wet meadow	5.666
Watson—Eastern	037-221-30	Wet meadow	8.336 (north area is 4.420 and south area is 3.916)
		Total	**24.31**

Attachment 1, "July 9, 2010, letter from Corps to California Department of Transportation (Caltrans)," lists the Corps' minimum information necessary to make a permit decision for the bypass project. This technical memorandum addresses Items 4b(1-4) on page 3 in Attachment 1 – soil characteristics at each proposed wetland establishment site. At the July 12 and 13, 2010, meeting between resource agencies (i.e., USACE, U.S. Environmental Protection Agency [USEPA], North Coast Regional Water Quality Control Board [RWB], and California Department of Fish and Game [CDFG]) and Caltrans, each of the items in the July 9, 2010 letter were discussed. With respect to Item 4b(2), the resource agencies agreed that that site specific soils data on percent organic matter and permeability could be inferred from field conditions and did not require laboratory analysis.

This technical memorandum presents information on the following items for each proposed wetland establishment site per the July 9, 2010 letter:

- Soil profile (see discussion below).
- Standard soil analysis for percent organic matter, structure, texture, and permeability; see discussion below).
- Source of soils for wetland establishment. The source for topsoil for wetland establishment will be onsite salvage of topsoil at the Ford, Goss/MGC Plasma Middle/MGC Plasma North, and Niesen offsite mitigation parcels. The source for topsoil at the Watson East offsite mitigation parcel will be 1-2 inches of topsoil and plant duff harvested together within the bypass project alignment where Baker's Meadowfoam (*Limnanthes bakeri*) populations have been observed and will be impacted by the bypass project (Caltrans 2010c).

A fourth item, soil erosion and compaction measures, was requested in the July 9, 2010 letter. This information was previously provided to the USACE on August 3, 2010, as part of the construction drawings submittal.

1.1 Importance of Soil Characteristics to Wetland Establishment Suitability

The suitability of a proposed site for wetland establishment is controlled by its hydrologic characteristics and by its soil characteristics. With regard to the hydrologic *suitability of th*e proposed sites, a hydrology suitability assessment, including a water budget, was prepared and provided to the resource agencies on July 29, 2010 (Caltrans 2010a). Because discussion of soil characteristics is somewhat inseparable from discussing hydrologic characteristics, there is overlap in the information presented in this technical memorandum and the information presented in the hydrology technical memorandum (Caltrans 2010a). The soil characteristics most important to determining the suitability of a site for wetland establishment, as used in this evaluation, are soil texture (i.e., the proportions of sand-, silt-, and clay-sized particles) and redoximorphic ("redox") features (i.e., features formed by the processes of reduction, translocation, and/or oxidation of iron and manganese oxides [formerly called mottles and low-chroma colors] [USDA Natural Resources Conservation Service 2010]). Soil texture is the most important factor in controlling soil permeability. Permeability affects infiltration capacity, the rate of lateral groundwater movement, and the potential for a shallow perched water table to occur. Unless the soil has been drained, redox

features are widely used as an indication of the depth at which prolonged soil saturation occurs, such as that caused by a seasonal high water table (USDA Natural Resources Conservation Service 2010). Redox features also can be used as an indication of surface water ponding/flooding. The use of redox features not only can provide an indication of long term average depths to the water table, but they are particularly useful when the soil is being evaluated during the dry season when the water table depth cannot be directly observed, such as in the present evaluation.

Other soil morphological characteristics useful in evaluating the suitability of wetland establishment include soil structure and organic matter content. Soil structure (or the lack thereof) affects water and gas permeability and root penetration. Soil organic matter content affects soil structure, water- and nutrient-holding capacity, nutrient cycling, and other processes (Donahue et al. 1983). In the context of wetland establishment, soil organic matter exerts a greater effect on vegetation growth than on controlling the presence or absence of saturated soil conditions necessary for wetland hydrologic conditions.

1.2 Wetland Establishment Parcel Descriptions

1.2.1 Landforms and Topography

1.2.1.1 Ford Offsite Mitigation Parcel

The Ford offsite mitigation parcel is proposed for 2.854 acres of wetland establishment (Figure 1). Based on field observations, the wetland establishment site on this parcel exists in the general vicinity of a floodplain landform.

The proposed wetland establishment site is elevated approximately four to five feet above the adjoining floodplain that exists to the north, south, and east. As evidenced by soil profile observations made for the present evaluation, the establishment site consists of fill material. The slope shape is planar to broadly convex, but one depressional area exists in the south-central part of the site. Sideslopes of the fill are approximately 2:1 horizontal:vertical.

The existing, adjoining wetlands have slope shapes that are mostly planar; some areas are slightly hummocky, which may be a result of the nearby fill placement. Slope gradients are 0 to 2%.

1.2.1.2 Goss/MGC Plasma Middle/MGC Plasma North Offsite Mitigation Parcels

The Goss/MGC Plasma Middle/MGC Plasma North offsite mitigation parcels are proposed for 7.477 acres of wetland establishment (Figure 2). Based on the soil survey map units and on field observations, the proposed wetland establishment site exists in the vicinity of alluvial fan, alluvial plain, and basin landforms.

The topography of these parcels appears to be comparatively similar. The slope shape is usually planar, but a few areas are slightly convex. The establishment site overall slopes downward westerly at gradients ranging from 0 to 3%.

The existing, adjoining wetlands have slope shapes that are planar or slightly concave and have slope gradients that are 0 to 3%.

1.2.1.3 Niesen Offsite Mitigation Parcel

The Niesen offsite mitigation parcel is proposed for 5.666 acres of wetland establishment (Figure 3). Based on the soil survey map units and field observations, the proposed wetland establishment site exists in the vicinity of alluvial fan and alluvial plain landforms.

The wetland establishment site is elevated up to approximately 9 feet above the adjoining alluvial plain that exists to the north, south, and east. As evidenced by soil profile observations made for the present evaluation, most of the establishment site consists of fill material, but some areas appear to have fill material mixed in with the surface layer of the native soil. Because the site has been highly altered, slopes are complex. Sideslopes of the fill are approximately 3:1 to 5:1 horizontal:vertical.

The existing, adjoining wetlands have slope shapes that are mostly planar. Slope gradients are 0 to 2%.

1.2.1.4 Watson East Offsite Mitigation Parcel

The Watson East offsite mitigation parcel is proposed for 8.336 acres of wetland establishment (Figure 4). Based on the soil survey map units and field observations, the proposed wetland establishment sites (two establishment sites are proposed in the north [4.420 acres] and south [3.916 acres] areas of the parcel, respectively) exist in alluvial fan and alluvial plain landforms.

The topography of both sites suggests that no fill material that has been placed in either site.

The slope shape of the north establishment site varies locally between planar and slightly convex, but as a whole it is broadly convex. The establishment site overall slopes downward westerly at gradients ranging from 0 to 3%.

The slope shape of the south establishment site is overall planar, but a slightly convex area occurs in the central part. The establishment site overall slopes downward westerly at gradients ranging from 0 to 3%.

The existing wetlands adjoining the north site are planar to broadly concave. The existing wetlands adjoining the south site are planar to slightly concave. The wetlands adjoining both sites have slope gradients that are 1 to 3%.

1.3 Natural Resources Conservation Service Soil Survey Mapping

The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soil survey for parts of Mendocino and Trinity counties (Howard and Bowman 1991) provides the most recent mapping of soils at the offsite mitigation parcels. Table 2 summarizes the NRCS soil survey information for those soil map units that occur at the offsite mitigation parcels.

As mapped by the NRCS, the soils at the offsite mitigation parcels generally are weakly to moderately developed, such that in many cases the surface, subsurface, and subsoil layer textures do not differ markedly within a given profile. None of the mapped soil series and other soils mapped at the subgroup taxonomic level have profiles that usually contain a well-defined subsurface restrictive layer, such as a claypan or a duripan. Claypans and duripans are commonly found in most California vernal pools and some seasonal wetlands[1]. Among the soil series mapped at the wetland establishment sites and their adjoining wetlands, the most strongly developed soils are the Cole and Pinole series, which are both Argixerolls, indicating that they have an argillic (subsoil) horizon with a minimum 20% increase in clay content relative to the overlying horizon.[2] However, in the modal pedon (i.e., most commonly occurring profile) described for the Cole and Pinole series, the argillic horizons have only a clay loam texture, which would be too permeable to cause a shallow perched water table. For the Cole series, the NRCS soil survey indicates that in some areas the argillic horizon subsoil may be silty clay or clay, which could cause a perched water table to form and persist for an undetermined period. (The presence of such a clayey subsoil in the Cole series was observed in profiles described in a few of the existing wetlands at all of the wetland establishment sites.)

The soils that occur at the establishment sites and their adjoining wetlands formed under well to poorly drained conditions, but in some areas the internal drainage has been changed as a result of stream incision and drainage ditch construction (Howard and Bowman 1991).

Table 2. Characteristics of Soils at the Offsite Mitigation Parcels as Mapped by USDA NRCS Soil Survey[a]

Soil Map Symbol	Soil Map Unit Name	Landform	Natural/ Existing Drainage Class	Generalized Typical Profile (Surface, Subsurface, and Subsoil)	Parcel Occurrence
112	Clear Lake clay, 0 to 2% slopes	basins	poor/partially drained	clay over clay loam	Goss, MGC Plasma Middle, MGC Plasma North
115	Cole clay loam, 0 to 2% slopes	alluvial plains and basins	somewhat poor/ somewhat poor	clay loam over clay loam	MGC Plasma Middle, MGC Plasma North, Niesen, Watson East
123	Feliz loam, 0 to 2% slopes	alluvial plains and fans	well/well	loam over clay loam	Watson East
126	Feliz clay loam, gravelly substratum, 2 to 8 percent slopes	alluvial plains and fans	well/well	clay loam over gravelly sandy clay loam	Watson East

[1] Although the Clear Lake series soil (map unit 112) does not have a claypan or a duripan, it is typically clay to the surface, which could cause ponding to occur in depressional areas.

[2] For reference, Haplaquepts may contain subsoil layers and substrates that are silty clay or clay. These layers appear to be depositional, rather than pedodenic layers and therefore do not indicate strong soil development.

Soil Map Symbol	Soil Map Unit Name	Landform	Natural/ Existing Drainage Class	Generalized Typical Profile (Surface, Subsurface, and Subsoil)	Parcel Occurrence
127	Fluvaquents, 0 to 1% slopes	floodplains	poor and very poor/poor and very poor	very fine sandy loam over silt loam[b]	Ford, Watson East
128	Gielow sandy loam, 0 to 5% slopes	alluvial plains and fans	somewhat poor/somewh at poor	sandy loam and loam over sandy loam and fine sandy loam	Goss, MGC Plasma North, Niesen, Ford
133	Haplaquepts, 0 to 1% slopes	basins and floodplains	poor/poor	clay loam over silty clay loam over silty clay[b]	Ford, Watson East
178	Pinole gravelly loam, 2 to 8% slopes	terraces	well/well	gravelly loam over clay loam over sandy clay loam	Ford, Watson East

Notes:

[a] The characteristics described above for each soil map unit do not reflect map unit inclusions, whose drainage class and profile characteristics may be different from the primary soil component of the map unit.

[b] Because of their variability, Haplaquepts and Fluvaquents have no typical profile. The profiles described are those that commonly occur in the soil survey area.

Source: Howard and Bowman 1991.

The NRCS soil survey also provides information on the type, depth, and timing of a seasonal high water table that typically occurs in the soil map units. Table 3 shows water table information for those soil map units in the offsite mitigation parcels where wetland establishment is proposed and that are subject to a seasonal water table within six feet of the surface. Those soil map units that occur in the offsite mitigation parcels that are not shown in the table have a seasonal high water table depth that is deeper than six feet below grade in most areas of the soil map unit.

Table 3. Water Table Characteristics of Selected Soil Map Units that Occur in the Offsite Mitigation Parcels

Soil Map Symbol	Soil Map Unit Name	Depth to Seasonal High Water Table (ft.)	Kind of Water Table[1]	Months of Water Table Presence[4]
112	Clear Lake clay, 0 to 2% slopes	1.5–3.0	Perched[3]	Dec.–Mar.
115	Cole clay loam, 0 to 2% slopes	1.5–3.0	Apparent	Nov.–May
128	Gielow sandy loam, 0 to 5% slopes2	1.5–3.0	Apparent	Dec.–Mar.

[1] "Apparent" refers to the stabilized level of water in a fresh, unlined borehole; "perched" refers to a water table that lies above an unsaturated layer (Schoenberger et al. 2002).

[2] Although the NRCS soil survey shows the Gielow series to be an Argixeroll, the official series description for the Gielow series shows the soil is classified as an Endoaquoll (Soil Survey Staff 1991). Soils in the "endo" taxonomic subgroup are saturated with water in all layers from the upper boundary of saturation to a depth of six feet or more from the soil surface. This is opposed to soils subject to "epi" saturation, in which the soil is saturated with water in one or more layers within six feet of the soil surface of the surface and also has one or more unsaturated layers, with an upper boundary above a depth of six feet, below the saturated layer (i.e., a perched water table) (Soil Survey Staff 1999).

[3] The perched water table indicated for the Clear Lake series appears to refer to the ponding that may occur at the soil surface, since the restrictive layer begins at the surface (i.e., clay-textured topsoil layer.)

[4] The NRCS does not regard saturated zones lasting for less than one month to be a "water table". Accordingly, any soils that have a rapidly fluctuating, shallow water table would not be included in this table, although the minimum length of time (14 consecutive days of saturation) for wetland hydrology may be present.

Source: Howard and Bowman 1991.

Most of the soil map units occurring in the offsite mitigation parcels where wetland establishment is proposed contain soils that formed under hydric conditions, although the hydric soils may occur only as inclusions (a soil that is dissimilar from the primary soil of the map unit and occupying up to 15% of the mapped body of the soil). Table 4 provides the hydric soil information for the map units occurring at the offsite mitigation parcels where wetland establishment is proposed.

Table 4. Hydric Soil Information for the Map Units Occurring in the Offsite Mitigation Parcels

Soil Map Symbol	Soil Map Unit Name	Map Unit Component	Landform	Hydric Status
112	Clear Lake clay, 0 to 2% slopes	Clear Lake	Basin floors	Yes
		Cole loam, drained	(not specified)	No
		Cole loam	(not specified)	No
		Feliz	(not specified)	No
		Gielow	(not specified)	No
		unnamed	(not specified)	No
115	Cole clay loam, 0 to 2% slopes	Cole	Alluvial fans	No
		unnamed	Depressions	Yes
		Clear Lake	Basin floors	Yes
		Cole	(not specified)	No
123	Feliz loam, 0 to 2% slopes	Feliz	Alluvial fans	No
		Unnamed	Depressions	Yes
		Cole	(not specified)	No
		Pinnobie	(not specified)	No
		Pinole	(not specified)	No
		Russian loam	(not specified)	No

Soil Map Symbol	Soil Map Unit Name	Map Unit Component	Landform	Hydric Status
		Talmage	(not specified)	No
		Xerofluvents	(not specified)	No
126	Feliz clay loam, gravelly substratum, 2 to 8 percent slopes	Feliz	Alluvial fans	No
		Unnamed	(not specified)	Yes
		Cole	(not specified)	No
		Pinole	(not specified)	No
		Russian	(not specified)	No
127	Fluvaquents, 0 to 1% slopes	Fluvaquents	Floodplains	Yes
		Cole	(not specified)	No
		Gielow	(not specified)	No
		Haplaquepts	Basin floors	Yes
128	Gielow sandy loam, 0 to 5% slopes	Gielow	Alluvial flats, floodplains	Yes
		Clear Lake	Basin floors	Yes
		Cole	(not specified)	No
		Feliz	(not specified)	No
		Russian	(not specified)	No
		Talmage	(not specified)	No
		unnamed	(not specified)	No
133	Haplaquepts, 0 to 1% slopes	Haplaquepts	Basin floors	Yes
		Cole clay loam	(not specified)	No
		Gielow sandy loam	Alluvial flats	Yes
		Fluvaquents	Floodplains	Yes
178	Pinole gravelly loam, 2 to 8% slopes	Pinole	Terraces	No
		Yokayo	Terraces	No
		unnamed	(not specified)	No
		Pinnobie	Terraces	No

Source: Soil Survey Staff 2010.

Owing to the texture and thicknesses of the surface, subsurface, and upper subsoil horizons (where the majority of the plant roots are concentrated), the soils at the proposed wetland establishment sites and in the adjoining existing wetlands generally have relatively high available water holding capacities (Donahue et al. 1983). As mapped in the NRCS soil survey (and as observed in the present evaluation), the soil textural classes of loam, silt loam, and clay loam are the most common textures in the upper 18 inches of the profile at the establishment sites and in the adjoining existing wetlands. For all the sites, these textural classes, low gravel content, and lack of a root-restrictive layer generally provide an abundant reservoir of plant-available soil-water to sustain perennial hydrophytic plant species.

1.4 Soil and Hydrologic Characteristics at Wetland Delineation Areas

Soil characteristics and hydrologic characteristics were also recorded from shallow soil pits as part of wetland delineations conducted on the offsite mitigation parcels. Those characteristics recorded that are relevant to this suitability evaluation are soil texture, depth to redox features, and depth to the water table. Table 5 provides a summary of the soil texture data that were collected as part of the wetland delineations. Clay loam and loam (or variants thereof) were the most common soil textures observed. As discussed below, these loamy to fine-loamy soils are too permeable to cause a perched water table to form, indicating that most of the delineated wetlands probably are supported by a high water table from an unconfined aquifer, rather than by a perched water table from a subsurface restrictive layer.

Table 5. Soil Texture Data Collected during Wetland Delineations at the Proposed Wetland Establishment Sites

Texture of Soil Horizon with Slowest Permeability in Pit	Number of Sites with Similar Texture		
	Upland	Wetland	Total
Ford			
loam	3	5	*8*
sandy loam	1		*1*
Total	*4*	*5*	*9*
Goss			
clay loam	1	6	*7*
loam		1	*1*
Total	*1*	*7*	*8*
MGC Plasma Middle			
clay		1	*1*
clay loam	1	2	*3*
sandy clay		1	*1*
sandy clay loam	2		*2*
sandy loam		1	*1*
silty clay	1		*1*
Total	*4*	*5*	*9*
MGC Plasma North			
clay		1	*1*
clay loam	1	5	*6*
loam	1		*1*
sandy clay	1		*1*
sandy clay loam	2		*2*
sandy loam	1		*1*
Total	*6*	*6*	*12*

Texture of Soil Horizon with Slowest Permeability in Pit	Number of Sites with Similar Texture		
	Upland	Wetland	Total
Niesen			
clay loam		4	*4*
Watson East			
clay		3	*3*
clay loam	2	9	*11*
gravelly clay loam	1		*1*
gravelly loam	7	6	*13*
gravelly sandy loam	1		*1*
loam	2	2	*4*
sandy loam	1		*1*
very gravelly loamy sand	1		*1*
Total	*15*	*20*	*35*

1.5 Spring 2010 Soil Evaluations at North Coast Semaphore Grass Study Sites

During the spring of 2010, soil and hydrologic conditions were assessed in the vicinity of North Coast semaphore grass (*Pleuropogon hooverianus*; PLHO) occurrences as part of an ongoing Caltrans study of the special-status plant in Little Lake Valley. PLHO's wetland indicator status is facultative wetland (FACW), and accordingly, PLHO usually occurs in wetlands. In the PLHO soil evaluations, the plant was nearly always observed to be associated with a wet meadow or riparian woodland wetland. Accordingly, the discussion of the soils in this section generally can be regarded as also pertaining to the soil characteristics found in existing wetlands.

Surface layer soil textures within the PLHO occurrences were observed to be loamy to fine-loamy, generally ranging from loam to silty clay loam.

Table 6 summarizes the soil surface textures that were found during the spring 2010 PLHO soil evaluations. The texture for the majority of the soil surface layers was clay loam or loam, which are generally regarded as having moderately slow to moderate permeability. Of the parcels evaluated, two (Goss and MGC Plasma North) are also proposed wetland establishment sites. On these parcels, clay loam texture was present at 11 soil sites out of 29 and only two sites had a potential to be more slowly permeable, one with silty clay and the other a clay texture. A more complete description of this survey was provided in a May 28, 2010 technical memorandum from Caltrans to CDFG and USFWS (Caltrans 2010b). Most of the soils observed at these sites are generally moderately to moderately slowly permeable, suggesting that the wetlands supporting PLHO are sustained by a high water table from an unconfined aquifer and not by a shallow perched water table.

Table 6. Summary of Soil Surface Layer Texture in Soil Pits in the Vicinity of North Coast Semaphore Grass Occurrences in Little Lake Valley

Soil Texture	Number of Sites with Similar Texture
City of Willits and Huffman Parcels	
Clay loam	11
Loam	3
Silt loam	1
Silty clay	1
Lusher Parcel	
Loam	4
Sandy loam	2
Evans and Frost Parcels	
Clay loam	3
Gravelly clay loam	1
Hebrard Parcel	
Clay loam	2
Loam	5
Arkelian Parcel	
Clay loam	6
Silty clay	1
Goss and MGC Plasma North Parcels	
Clay loam	11
Loam	8
Silty clay	3
Silty clay loam	6
Clay	1

2 Methods

The July 2010 soil evaluation to determine proposed wetland establishment site suitability was conducted on July 19 and 27-30 by a soil scientist. Soil pits were excavated at the wetland establishment site, the adjoining existing wetlands, and near the wetland reference monitoring site (Figures 1-4 and Appendix B-1) on the offsite mitigation parcels where wetland establishment is proposed: Ford, Goss/MGC Plasma Middle/MGC Plasma North, Niesen, and Watson East.

The number and location of the soil pits to be evaluated were determined in advance of the field work by considering the size and shape of the wetland establishment site, the type(s) of existing wetlands in the vicinity of the wetland establishment site, and the range of soils as mapped by the NRCS occurring within the establishment site and vicinity. Upon field review of conditions, the number and locations of the pits were adjusted to ensure that the pits would be representative of the range of conditions in the proposed wetland establishment sites and adjoining existing wetlands.

At a given establishment site, the existing wetland pits were excavated and described before the establishment site pits in order to provide a basis for assessing the suitability of the upland pit sites for wetland establishment.

The pits were excavated either using a sharpshooter shovel or a backhoe. The sharpshooter pits were excavated to 20 to 28 inches depth. The backhoe pits were excavated to 24 to 104 inches depth, with the deeper pits being excavated on the Ford and Niesen parcels where fill material was present on top of the native soil.[3] Table 7 summarizes the types and locations of pits excavated. The depth of excavation was based on the grading plan depth for the wetland establishment sites, plus an additional 12 more to assess soil characteristics below the targeted finish grade (Appendix D in June 2010 Mitigation and Monitoring Proposal [Caltrans 2010c]).

Table 7. Summary of Soil Pits Excavated In Wetland Establishment Sites and Adjoining Existing Wetlands

	Number of Pits	
Parcel	Wetland Establishment Sites	Existing Wetlands
Watson East		
Northern site	6 (all backhoe)	3 (all backhoe)
Southern site	6 (all backhoe)	5 (all backhoe)
Goss		
MGC Plasma Middle	13 (all sharpshooter)	6 (all sharpshooter)
MGC Plasma North		
Ford	4 (all backhoe)	4 (all sharpshooter)
Niesen	10 (all backhoe)	5 (all backhoe)
Total	**39**	**23**

Note: Included in the pits at the Goss/MGC Plasma Middle/MGC Plasma North parcels were two detailed soil profiles (numbers 18 and 19) that were described for the spring 2010 soil evaluations (PLHO study).

The following information was recorded for the soil profiles exposed in the soil pits on data forms developed specifically for this soil suitability study (Appendix A): horizon type and thickness; texture; structure; organic matter content (inferred)[4]; redoximorphic feature abundance, size, contrast, type, and location; and permeability (inferred). The soil organic matter content was inferred based on color, abundance of very fine roots, and presence of granular structure. Soil permeability was inferred by correlating texture to the saturated hydraulic conductivity range provided in the USDA soil survey (Howard and Bowman 1991), which was then correlated to the (qualitative) permeability class using the previous version of the Soil Survey Manual (Soil Survey

[3] Before excavation, Underground Service Alert (USA) was contacted to determine the possible presence and location of underground utilities at the Niesen and Ford wetland establishment sites due to the depth of soil pit excavation.

[4] The organic matter content ratings of low, medium, and high as used in this evaluation should be regarded as approximate and relative to other soils occurring at the wetland establishment sites.

Staff 1951).[5] Table 8 shows the inferred relationships between soil texture, saturated hydraulic conductivity, and permeability.

Table 8. Estimated Conversion between Soil Texture and Saturated Hydraulic Conductivity

Soil Texture	Saturated Hydraulic Conductivity (inches/hour)	Inferred Permeability Class
Clay	0.06–0.2	Very slow
Silty clay	0.06–0.2	Slow
Clay loam	0.2–0.6	Moderately slow
Loam	0.6–2.0	Moderate
Gravelly loam	2.0–6.0	Moderately rapid

Note: Not all textural classes observed during the field evaluation are shown.

Source: Howard and Bowman 1991, Soil Survey Staff 1951.

In addition to the soil profile descriptions, the following site characteristics were recorded on the data forms: land surface shape, landform, slope gradient, whether the pit was located in an existing wetland or in wetland establishment site, depth to soil saturation, presence of a biotic crust and drift lines, proximity to existing wetlands, and other characteristics that may have provided further indications as to the suitability for wetland establishment at the site.

Lastly, the following information was also recorded on the data forms: soil map unit as mapped in the NRCS soil survey, soil series observed, and digital image code for representative soil profiles. Digital images were taken at soil pits with representative soil profiles (Appendix B) and GPS coordinates were taken for each soil pit.

The above soil, hydrologic (as evidenced by redox features and other indirect indicators of wetland hydrology), and site characteristics, as well as the composition of the existing vegetation, were considered in evaluating the likelihood that wet meadow and/or mixed marsh habitat will establish in the immediate vicinity of each pit as a result of implementing the grading plan provided in the MMP (Caltrans 2010c). Each soil pit was given a suitability rating of low, medium, or high, or rated at intermediate levels between these primary ratings. The suitability rating is qualitative and based on professional judgment. Rather than using a fixed set of quantitative suitability criteria that would be applied to all the establishment sites, each evaluation was instead made on a site-by-site basis, in which the observed soil and site characteristics in wetlands adjacent to a given establishment site were used as points of reference only to the pits in the adjoining wetland establishment site. This was done in recognition of the fact that each establishment site differs with respect to the type and degree of influence of wetland hydrology, a primary factor in determining wetland establishment suitability (Caltrans 2010a).

[5] Since approximately 2003, the NRCS has used saturated hydraulic conductivity (expressed in inches per hour) as the primary way of describing the rate at which liquids, gases, and plant roots move through a soil layer. However, the term “permeability” is used in this technical memorandum for ease of use.

3 Results and Discussion

The soil pit locations are shown in Figures 1-4. The data forms are provided in Appendix A. Representative digital images taken at the pits are provided in Appendix B.

3.1 Ford Offsite Mitigation Parcel

3.1.1 Existing Wetlands

The wetlands that occur adjacent to the establishment site at the Ford offsite mitigation parcel occur on an overall planar floodplain. The wetlands exist below the elevated "bench" of the establishment site.

Based on the four pit excavations made in the existing wetlands, the subsoils range from sandy loam to silty clay and show the stratification expected in the floodplain environment in which the soils formed. All of the soils had redox features beginning within three inches of the surface and all had redox features in the subsoil, suggesting the presence of a seasonal high water table. These wetlands had been delineated as mixed marsh and wet meadow.

The existing wetlands appear to be sustained by a high water table and shallow flooding, based on the presence of redox features throughout the profile, a biotic crust, and sediment deposits.

3.1.2 Wetland Establishment Site

The four soil pits excavated in the establishment site show that the fill material consists of a heterogeneous mixture of gravelly loam, lumber waste, tree bark, and ash approximately 52 to 80 inches thick. (Appendix B-7). The native soil beneath the fill material was clay loam or silty clay loam. The upper boundary of the native soil appeared to be roughly level with that of the surrounding, existing wetlands. Redox features were observed in only one of the underlying native soils; however, this may be a result of the soil being permanently anerobic under the fill material, which would tend to produce the more gleyed-like colors observed. (Appendix B-8). Based on the lack of soil structure that is normally associated with a surface layer in the native soil material, it is possible that the upper part of the native soil profile was first removed before placement of the fill material, exposing a substrate layer without redox features.

Groundwater was observed in two of the pits, at 60 and 98 inches depth, respectively.

3.1.3 Suitability Evaluation

All the soil pits were rated as having a "medium-high" suitability because native alluvial, marsh-type soil material exists at the elevation of the proposed finish grade. Further, the buried native soils were saturated or very moist to the depth excavated. It is expected that once wetland construction is complete, the established wetland will be supported primarily by a high water table that will lead to moist soil conditions in the root zone of plants. Occasional overbank flows from Outlet Creek are expected to also provide hydrology to the site, based on the wetland hydrology indicators described above for the existing wetlands.

3.2 Goss/MGC Plasma Middle/MGC Plasma North Offsite Mitigation Parcels

3.2.1 Existing Wetlands

The wetlands that occur adjacent to the establishment site on the Goss/MGC Plasma Middle/MGC Plasma North offsite mitigation parcels occur on an overall planar alluvial fan and alluvial plain. Some of the wetlands occur on locally planar surfaces, others occur in subtle shallow depressions, while the remainder occur in swales. The wetlands exist upgradient, lateral to, and downgradient of the establishment site.

Based on the six pit excavations made in the existing wetlands, all but one had a clay loam or silty clay loam subsoil. The other soil had a fine sandy clay subsoil in which the upper boundary is approximately 13 inches beneath the surface. Most of the soils had redox features in the surface layer and all had redox features in the subsoil (Appendices B-2 and B-5), suggesting the presence of a seasonal high water table.

Depending on microtopographic location, the wetlands appear to be sustained by a high water table, sheetflow runoff (into depressional and planar areas), and locally, the slowly permeable subsoils.

3.2.2 Wetland Establishment Site

The soils in the establishment site had subsoil textures ranging from gravelly clay loam to clay. Of the 13 soil pits excavated, redox features were present in the surface layer of approximately half the pits. This suggests that saturation presently occurs at the soil surface at these sites and could be the result of soil compaction caused by livestock. Redox features were present in the subsoils in all but one of the soils (Appendix B-11), which suggest the presence of a water table at this depth. One soil profile (soil pit number 5) was clay nearly to the surface (Clear Lake clay) (Appendix B-6) and was the only Vertisol observed during the evaluation.

3.2.3 Suitability Evaluation

All the sites were rated as having a “medium” or higher suitability because one or more of the following characteristics were present at each pit site: favorable microtopograpy, redox features either at the surface or at depth, a restrictive layer, and hydrophytic species. It is expected that once wetland construction is complete, the established wetland will be sustained by a combination of a high water table (either the local water table or a perched water table), and local surface water from incident precipitation and upslope runoff contributions, depending on the location within the establishment site.

3.3 Niesen Offsite Mitigation Parcel

3.3.1 Existing Wetlands

The wetlands that occur adjacent to the establishment site at the Niesen offsite mitigation parcel occur on an overall planar alluvial fan and alluvial plain. The wetlands exist below the elevated "bench" of the establishment site.

Based on the five pit excavations made in the existing wetlands, the subsoils are mostly clay loam; one had a clay subsoil in which the upper boundary is 12 inches beneath the surface. All of the soils had redox features beginning within three inches of the surface (Appendix B-4) and all had redox features in the subsoil, suggesting the presence of a seasonal high water table.

The wetlands appear to be primarily sustained by a high water table.

3.3.2 Wetland Establishment Site

Gravelly to loamy fill material, ranging from 6 to 99 inches thick, was observed in most of the pits excavated in the establishment site. (Appendices B-9 and B-10). Two pits had fill material mixed into the surface layer of the native soil and in two pits, no fill material was detected. The native soil beneath the fill material ranged from silt loam to silty clay loam. The depth to the upper boundary of the native soil appeared to be roughly level with that of the surrounding, existing wetlands. Redox features were observed in most of the native soils below the fill material.

In the pit located downslope of the stock pond, groundwater was observed 40 inches depth. It is assumed that this water was a result of seepage from the pond.

3.3.3 Suitability Evaluation

All the sites were rated as having a "medium" or higher suitability because native alluvial, marsh-type soil exists at the elevation of the proposed finish grade, most of which have redox features in the buried topsoil layer. It is expected that once wetland construction is complete the established wetland will be sustained primarily by a high water table.

3.4 Watson East Offsite Mitigation Parcel

3.4.1 Watson East—North Establishment Site

3.4.1.1 Existing Wetlands

The existing wetland that adjoins the north establishment site on the Watson East offsite mitigation parcel occurs in a broad swale that begins east of the establishment site and continues along the southern boundary of the establishment site. The swale is roughly 1 to 1.5 feet below the existing grade of the north establishment site.

Based on the three soil pit excavations made in the existing wetland, the soils all have a slowly permeable subsoil ranging from a silty clay to a light clay, whose upper boundary is 9 to 24 inches beneath the surface. Redox features were present in the surface layer (Appendix B-3), but were absent in one pit below nine inches depth and absent in part of the subsoil in another pit. It is unknown whether the absence of redox in some of the subsoils of these pits was due to the fact the wetlands are supported by surface water, or have oxygenated, lateral-flowing groundwater that precludes the formation of redox features (less likely).

The existing wetlands appear to be sustained by sheetflow runoff and possibly by groundwater contributions from the adjoining uplands, and the slowly permeable soils. Additionally, as evidenced by a drift line that extends just upslope of the wetland boundary, the wetland may also be supported to a degree by floodwaters backing up from the lower end of Little Lake Valley and up into the swale.

3.4.1.2 Wetland Establishment Site

The soils in the establishment site had subsoil textures ranging from clay loam to light clay. Of the six soil pits excavated, redox features were present in the surface layer in five of the pits (Appendix B-12) and some of the profiles had redox in the subsoil. This suggests that saturation presently occurs at the soil surface and could be the result of soil compaction caused by livestock. Redox features were also present in some of the subsoils.

3.4.1.3 Suitability Evaluation

Four of the six soil pit sites were rated as having a “medium” suitability and two were rated as having a “low-medium” suitability. The two low-medium soil pit sites are positioned higher on the alluvial fan and therefore may have less favorable hydrologic support than the other pits positioned lower on the alluvial fan. It is expected that, once wetland construction is complete, the established wetland will be sustained by a combination of a high water table, upslope runoff contributions, and backwater inundation from down-valley flooding, depending on the location within the establishment site.

3.4.2 Watson East—South Establishment Site

3.4.2.1 Existing Wetlands

The wetlands that adjoin the south establishment site on the Watson East offsite mitigation parcel occur on a planar alluvial fan. The wetlands are roughly 0.5 to 1 foot below the existing grade of the south establishment site.

Based on the five pits excavations made in the existing wetlands, three have a moderately permeable subsoil of gravely clay loam. The other two have clay subsoils in which the upper boundary is approximately 16 inches beneath the surface. All of the soils had redox features in the surface layer and in some of the soils the redox features extended into the subsurface and subsoil horizons. It is unknown whether the absence of redox in some of the subsoils of these pits was due to the fact the wetlands are supported by surface water, or have oxygenated, lateral-flowing groundwater that precludes the formation of redox features (less likely).

The existing wetlands appear to be sustained by sheetflow runoff and possibly by groundwater contributions from the adjoining uplands, and locally, the slowly permeable soils. Additionally, as evidenced by a drift line that extends into the part of the wetland to the west of the establishment site, part of the wetland may also be supported to a degree by floodwaters backing up from the lower end of Little Lake Valley.

3.4.2.2 Wetland Establishment Site

The soils in the establishment site had subsoil textures ranging from gravelly loam to silty clay loam. Of the six soil pits described, redox features were present in the surface layer in all the pits. This suggests that saturation presently occurs at the soil surface and could be the result of soil compaction caused by livestock. Redox features were generally absent in the subsoils.

3.4.2.3 Suitability Evaluation

All but one soil pit was rated as having a "medium" or higher suitability. The other site was rated as having a "low-medium" suitability. The low-medium site is positioned higher on the alluvial fan and therefore may have less favorable hydrologic support than the other pits positioned lower on the alluvial fan. It is expected that once wetland construction is complete, the established wetland will be sustained by a combination of local surface water from incident precipitation, upslope runoff contributions, and by backwater inundation from down-valley flooding, depending on the location within the establishment site.

4 Conclusions

Based on published soil survey data, data collected from wetland delineations and the PLHO soil evaluations, and soil/site data collected specifically for this evaluation, it appears that most of the existing wetlands at the offsite mitigation parcels are primarily supported by the presence of a high water table, rather than primarily by a perched water table over a subsurface restrictive layer. However, depending on the wetland establishment site, "backwaters" from down-valley flooding, and/or a perched water table also appear to contribute the existing wetlands' hydrology locally.

This conclusion is consistent with the conclusions of the hydrologic study (Caltrans 2010a) of the establishment parcels, which observed that because there are relatively few soils with slow to very slow permeability (e.g., clay), it is likely that most of the existing wetlands are primarily sustained by local aquifer conditions (Caltrans 2010a). The hydrologic study also observed that field observations of local drainageways and topographic conditions suggest that a few of the wetlands also may benefit from lateral movement of groundwater into the subsurface layer and subsoil of the wetlands (Caltrans 2010a).

At the Ford and Niesen parcels, the present evaluation has determined that it will be feasible to establish wet meadow and mixed marsh habitat by removing the fill material to an elevation that is roughly the same as that of the adjoining, existing wetlands, such that the establishment site will be subject to a seasonal high water table level and periodic flooding. The soil pits excavated in support of this evaluation show that the native topsoil layer exists beneath the fill material, at a level that is approximately at the proposed finish grade of the established wetlands.

At the Goss/MGC Plasma Middle/MGC Plasma North parcels, the present evaluation has determined that it will be feasible to establish wet meadow habitat by lowering the grade such that it will be closer to the seasonal high water table and by creating a more planar-to-broadly concave slope shape that tends to "collect" runoff rather than "shedding" it. A perched water table may form locally. The presence of hydrophytic species and some soil redox features at the soil pits suggest existing mesic conditions, such that the proposed grading will be sufficient to establish a dominance of hydrophytes and wetland hydrologic conditions.

At the Watson East parcel, the present evaluation has determined that it will be feasible to establish wet meadow habitat by lowering the grade such that it will be closer to the seasonal high water table and by creating a more planar-to-broadly concave slope shape that tends to "collect" runoff rather than "shedding" it. A perched water table may form locally. The grading is also expected to make the downslope parts of both establishment sites subject to inundation by occasional backwater flooding from down-valley. The presence of hydrophytic species and some soil redox features at the soil pits suggest existing mesic conditions, such that the proposed grading will be sufficient to establish a dominance of hydrophytes and wetland hydrologic conditions.

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Old Outlet Creek

Outlet Creek

Wetland Establishment Site – 2.854 acres

Temporary Impacts to Wetlands from Mitigation Construction

Redwood Hwy

Repair Eroding Bank to Improve Hydrology

Wetland Establishment Monitoring Reference Site

FORD
108-010-06

1 2 3 4 5 6 7 8

Offsite Mitigation Parcel

Habitat Mitigation Type
- Riparian Establishment
- Wetland Establishment
- Oak Woodland Establishment
- Riparian Enhancement
- Wetland Enhancement
- Other Waters Enhancement

Mitigation Actions
- Improve Hydrology (Grading)
- Headcut or Eroding Bank
- Control Invasive Plants
- Plant Oaks
- Plant Riparian
- Implement Grazing Plan
- Monitoring Reference Site
- 7 Soil Pit Location

Riparian Corridors
- Category I Riparian Corridor
- Category II Riparian Corridor
- Category III Riparian Corridor

Project Bypass Footprint
- Permanent Impact Area
- Temporary Impact Area
- Right of Way

N

0 200

Scale in Feet

Figure 1
Mitigation Actions
Ford
APN 108-010-06

Proposed Willits Bypass
Riparian, Wetland, and Oak
Establishment and Enhancement

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Offsite Mitigation Parcel

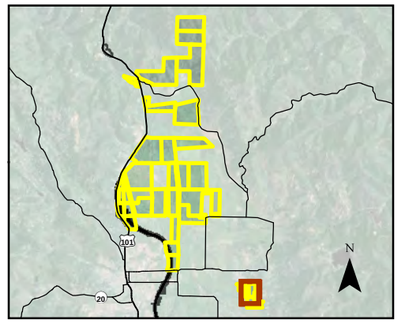
Habitat Mitigation Type
- Riparian Establishment
- Wetland Establishment
- Oak Woodland Establishment
- Riparian Enhancement
- Wetland Enhancement
- Other Waters Enhancement

Mitigation Actions
- Improve Hydrology (Grading)
- Headcut or Eroding Bank
- Control Invasive Plants
- Plant Oaks
- Plant Riparian
- Implement Grazing Plan
- Monitoring Reference Site
- 7 Soil Pit Location

Riparian Corridors
- Category I Riparian Corridor
- Category II Riparian Corridor
- Category III Riparian Corridor

Project Bypass Footprint
- Permanent Impact Area
- Temporary Impact Area
- Right of Way

N



0 200

Scale in Feet

Figure 2
Mitigation Actions
Goss & MGC Plasma
103-230-02, 103-230-06, & 103-250-14
Proposed Willits Bypass
Riparian, Wetland, and Oak
Establishment and Enhancement

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LUSHER
038-060-08

LUSHER
108-030-03

LUSHER
108-030-04

Mill Creek

Road Disking

NIESEN
108-040-02

Redwood Hwy

Permanent Impacts to Other Waters from Mitigation Construction

Wetland Establishment Site – 5.666 acres

Wetland Establishment Monitoring Reference Site

I

II

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

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Offsite Mitigation Parcel

Habitat Mitigation Type
- Riparian Establishment
- Wetland Establishment
- Oak Woodland Establishment
- Riparian Enhancement
- Wetland Enhancement
- Other Waters Enhancement

Mitigation Actions
- Improve Hydrology (Grading)
- Headcut or Eroding Bank
- Control Invasive Plants
- Plant Oaks
- Plant Riparian
- Implement Grazing Plan
- Monitoring Reference Site
- 7 Soil Pit Location

Riparian Corridors
- Category I Riparian Corridor
- Category II Riparian Corridor
- Category III Riparian Corridor

Project Bypass Footprint
- Permanent Impact Area
- Temporary Impact Area
- Right of Way

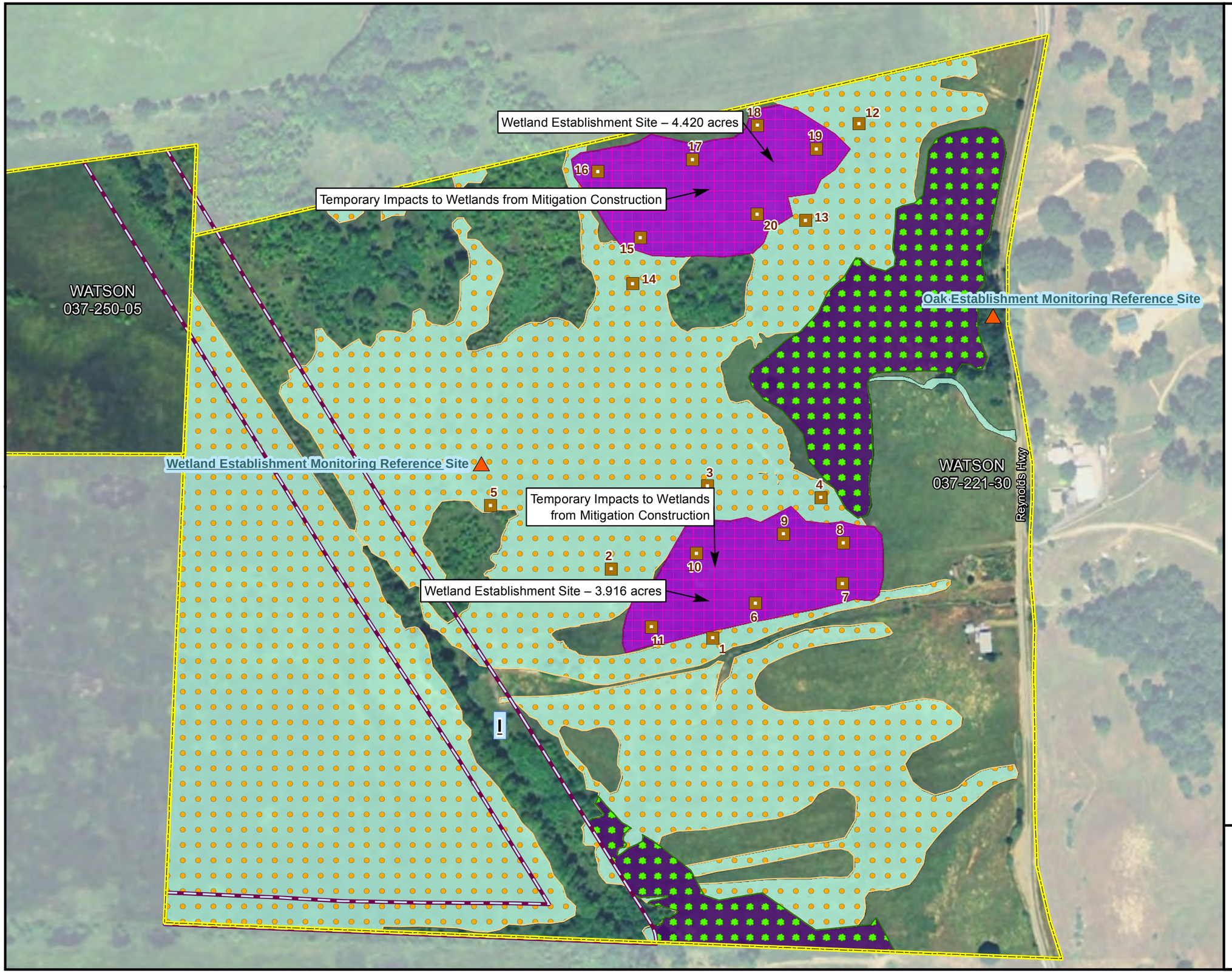
N

0 200

Scale in Feet

Figure 3
Mitigation Actions
Niesen
APN 108-040-02

Proposed Willits Bypass
Riparian, Wetland, and Oak
Establishment and Enhancement



Offsite Mitigation Parcel

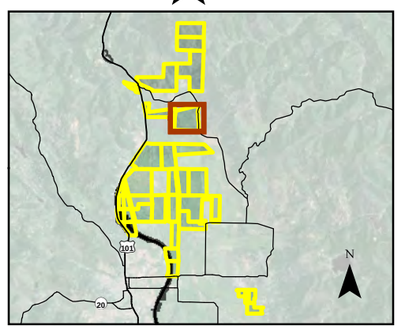
Habitat Mitigation Type
- Riparian Establishment
- Wetland Establishment
- Oak Woodland Establishment
- Riparian Enhancement
- Wetland Enhancement
- Other Waters Enhancement

Mitigation Actions
- Improve Hydrology (Grading)
- Headcut or Eroding Bank
- Control Invasive Plants
- Plant Oaks
- Plant Riparian
- Implement Grazing Plan
- Monitoring Reference Site
- 7 Soil Pit Location

Riparian Corridors
- Category I Riparian Corridor
- Category II Riparian Corridor
- Category III Riparian Corridor

Project Bypass Footprint
- Permanent Impact Area
- Temporary Impact Area
- Right of Way

N



0 200

Scale in Feet

Figure 4
Mitigation Actions
Watson
APN 037-221-30

Proposed Willits Bypass
Riparian, Wetland, and Oak
Establishment and Enhancement

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Appendix A

Data Forms

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Ford	Pit No.: 1
Investigator(s): Joel Butterworth	Date: July 29, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex Slightly hummocky	Landform: alluvial fan low terrace swale floodplain basin Slope Gradient (%): 2
Soil Map Unit: Haplaquepts, 0 to 1% slopes (133)	Soil Series as Observed: Haplaquepts
General Comments: Elevated ~ 6" above area to southeast.	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 26
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-3	A1	cl	gr, 2	High	None	Mod – slow	
3-11	A2	cl	abk, 1	Mod	c, m/f, D, Fe-x, RC & M	Mod –slow	A2 contains highly weathered sandstone fragments
11-26	Bw	cl	m	Low	m, m, P, Fe-x, M	Mod – slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Ford	Pit No.: 2
Investigator(s): Joel Butterworth	Date: July 29, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 0-1
Soil Map Unit: Haplaquepts, 0 to 1% slopes (133)	Soil Series as Observed: Haplaquepts
General Comments: Moderate biotic crust	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 27
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0 – 1	A1	cl	gr,2	High	m, f, D, Fe-x, RC	Mod – slow	
1 – 15	A2	cl	m	Mod	m, m, D, Fe-x, M/PL	Mod – slow	
15 – 19	Bw1	l	m	Low	m, c, D, Fe-x, M	Mod	10% gravel
19 – 27	Bw2	sl	m	Low	c, m, F, Fe-x, M	Mod	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Ford	Pit No.: 3
Investigator(s): Joel Butterworth	Date: July 29, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0220 (knife at bottom of A2)	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 0-1
Soil Map Unit: Haplaquepts, 0 to 1% slopes (133)	Soil Series as Observed: Haplaquepts
General Comments: weak biotic crust	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 31
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0 – 1	A1	cl	abk, 2	High	None	Mod – slow	
1 – 10	A2	sicl	abk, 1	Mod	m, m, D, Fe-x, M	Mod – slow	
10 – 21	Bw	sil	m	Low	m, m, D, Fe-x & D, M	Mod	
21 – 24	C1	ls	sg	Low	c, m, F, Fe-x, M	Mod – rapid	
24 – 31	C2	sil	m	Low	c, m, D, Fe-x, M+m, c, D, D, M	Mod	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Ford	Pit No.: 4
Investigator(s): Joel Butterworth	Date: July 29, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex Slightly hummocky	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 0-2
Soil Map Unit: Haplaquepts, 0 to 1% slopes (133)	Soil Series as Observed: Haplaquepts
General Comments: Sediment deposits; 30' east of edge of overburden	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): free water in pit at 31
Depth to Restrictive Layer (in.): 1" (slightly restrictive)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-1	A1	cl	gr, 1	High	None	Mod – slow	
1-7	A2	sic	m	Mod	m, m, D, Fe-x, M	Slow	
7-17	Bw1	sic	m	Low	m, m, D, Fe-x, M+PL	Slow	
17-22	Bw2	sil	m	Low	m, m, D, Fe-x, M	Mod	
22-32	Bw3	sic	m	Low	m, m, D, Fe-x, M	Slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Ford	Pit No.: 5
Investigator(s): Joel Butterworth	Date: July 29, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0230	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin *fill area with in flood plain area
	Slope Gradient (%): 0-2
Soil Map Unit: Haplaquepts, 0 to 1% slopes (133)	Soil Series as Observed: N/A
General Comments: Native soil may have been truncated before fill placement	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 98
Depth to Restrictive Layer (in.): 80 (Ab somewhat restrictive)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-80	FILL	grl	m	High	None	Mod	Ashy/burnt consistency; high bark and wood content
80-98	Ab	sic	m	Unknown	f, m, D, Fe-x, PL	Slow	Very moist

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Ford	Pit No.: 6
Investigator(s): Joel Butterworth	Date: July 29, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0231	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin *fill within alluvial fan
	Slope Gradient (%): 3-5
Soil Map Unit: Haplaquepts, 0 to 1% slopes (133)	Soil Series as Observed:
General Comments: native soil may have been truncated prior to fill placement	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): 94
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-49	FILL1	vgsl	m	Low	None	Mod – rapid	
49-72	FILL2	wood	m	High	None	---	Bark and lumber
72-91	Ab	sicl	m	Unknown	None	Mod – slow	Very moist

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Ford	Pit No.: 7
Investigator(s): Joel Butterworth	Date: July 29, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin *fill area within flood plain
	Slope Gradient (%): 0-3
Soil Map Unit: Haplaquepts, 0 to 1% slopes (133)	Soil Series as Observed: undetermined
General Comments: native soil may have been truncated before fill placement	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 57
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-52	FILL	grsl	m	Low	None	Mod – rapid	Contains lumber and tree bark
52-57	Ab	sicl	m	Unknown	None	Mod – slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Ford	Pit No.: 8
Investigator(s): Joel Butterworth	Date: July 29, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0226 & 0228 (knife not at a horizon boundary)	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin *fill area within alluvial fan
	Slope Gradient (%): 7
Soil Map Unit: Haplaquepts, 0 to 1% slopes (133)	Soil Series as Observed:
General Comments: Fill material also contains telephone pole and t-post; native soil may have been truncated before fill placement	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): 69
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-58	FILL	grl and cl	m	Low	None	Mod – mod slow	Mixed with wood fragments; angular gravel
59-69	Ab	sicl	m	Unknown	None	Mod - slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Goss-MGC Plasma	Pit No.: 1
Investigator(s): Joel Butterworth	Date: July 19, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 2
Soil Map Unit: Gielow sandy loam, 0 to 5% slopes (128)	Soil Series as Observed: Cole
General Comments: In distal part of alluvial fan	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 26
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-4	Ap	sil	gr, 3	Mod	None	Mod	
4-11	A	cl	sbk, 2	Mod	c, 2, F, Fe-x, M	Mod – slow	
11-26	Bt	cl	sbk, 2	Low	c, 2, F, Fe-x, M	Mod - slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance
f - few
c - common
m - many

Redox Size
1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast
F - faint
D - distinct
P - prominent

Redox Type
Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location
M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Goss-MGC Plasma	Pit No.: 2
Investigator(s): Joel Butterworth	Date: July 19, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0184, 0186	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 3
Soil Map Unit: Gielow sandy loam, 0 to 5% slopes (128)	Soil Series as Observed: Cole
General Comments:	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 28
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-3	A1	l	gr, 2	Mod	c, l, D, Fe-x, RC	Mod	
3-11	A2	l	sbk, 1	Mod	c, 2, D, Fe-x, M	Mod	
11-21	Bt1	cl	sbk, 2	Mod – low	c, 2, D, Fe-x, M	Mod – slow	
21-28	Bt2	cl	sbk, 2	Low	c, 2, P, Fe-x, M	Mod - slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Goss-MGC Plasma	Pit No.: 3
Investigator(s): Joel Butterworth	Date: July 19, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex Broad swale	Landform: alluvial fan low terrace (swale) floodplain basin
	Slope Gradient (%): 2-3
Soil Map Unit: Gielow sandy loam, 0 to 5% slopes (128)	Soil Series as Observed: Cole
General Comments:	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland (Near wetland/non-wetland boundary)	Depth to Soil Saturation (in.): None to 24
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-2	A1	l	gr, 2	Mod	c, l, D, Fe-x, RC	Mod	
2-10	A2	l	abk, 2	Mod	c, l, D, Fe-x, M	Mod	
10-15	Bt1	sicl	abk, 1	Mod-Low	c, l, D, Fe-x, M	Mod – slow	5% gravel
15-24	Bt2	sicl	abk, 1	Low	c, l, D, Fe-x, M	Mod – slow	5% gravel

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Goss-MGC Plasma	Pit No.: 4
Investigator(s): Joel Butterworth	Date: July 19, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0188 Knife at top of Bt1	

Land Surface Shape: (slightly) planar concave convex Broad, poorly-defined swale	Landform: alluvial fan low terrace (swale) floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Cole; trending slightly towards Clear Lake
General Comments:	

Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 23

Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-6	A	l	gr, 2	Mod	c, l, F, Fe-x, RC	Mod	
6-9	Bt1	cl	abk, 3	Mod-Low	None	Mod – slow	
9-23	Bt2	sicl	abk, 3	Low	c, 2, D, Fe-x, M	Mod – slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Goss-MGC Plasma	Pit No.: 5
Investigator(s): Joel Butterworth	Date: July 19, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0190	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: Clear Lake clay, 0 to 2% slopes (112)	Soil Series as Observed: Clear Lake
General Comments:	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 23
Depth to Restrictive Layer (in.): 1	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-1	A1	l	gr, 1	High	None	Mod	
1-9	A2	c	abk, 3	Mod	None	Very slow	
9-23	Bss	c	pr, 3	Mod	m, 2, D, Fe-x, M	Very slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance
f - few
c - common
m - many

Redox Size
1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast
F - faint
D - distinct
P - prominent

Redox Type
Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location
M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Goss-MGC Plasma	Pit No.: 6
Investigator(s): Joel Butterworth	Date: July 19, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 2-3
Soil Map Unit: Clear Lake clay, 0 to 2% slopes (112)	Soil Series as Observed: undetermined
General Comments:	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 24
Depth to Restrictive Layer (in.): 12	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-2	A1	cl	gr, 2	Mod-high	none	Mod slow	
2-12	A2	cl	abk, 2	Mod	f, 2, F, Fe-x, M	Mod slow	
12-24	Bt	c-	abk, 3	Mod	f, 2, F, Fe-x, M	Very slow	10% gravel

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Goss-MGC Plasma	Pit No.: 7
Investigator(s): Joel Butterworth	Date: July 19, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Cole
General Comments:	

Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 26

Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-9	A	cl	abk, 1	Mod	m, 2, D, Fe-x, M	Mod slow	
9-26	Bt	sicl	abk, 2	Low	m, 2, D, Fe-x, M	Mod slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Goss-MGC Plasma	Pit No.: 8
Investigator(s): Joel Butterworth	Date: July 19, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0192	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 2
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Cole
General Comments:	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 23
Depth to Restrictive Layer (in.): 13	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-13	A	cl	abk, 1	Mod	c, l, D, Fe-x, M	Mod. Slow	
13-33	Bt	sic	abk, 3	Low-Mod	m, 2, D, Fe-x, M	Slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Goss-MGC Plasma	Pit No.: 9
Investigator(s): Joel Butterworth	Date: July 19, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 3
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: undetermined
General Comments: shift in veg to drier species; unusual profile	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 20
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-4	A1	l	abk, 1	Mod	c, l, D, Fe-x, RC	Mod	
4-9	A2	grl	m	Mod	c, 2, D, Fe-x, M	Mod rapid	15% gravels, 10% cobbles
9-20	Btss	vgrc+	pr, 1	Low	c, 2, D, D, M	Very slow	Reddish brown matrix; 25% gravels, 15% cobbles

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance
f - few
c - common
m - many

Redox Size
1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast
F - faint
D - distinct
P - prominent

Redox Type
Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location
M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Goss-MGC Plasma	Pit No.: 10
Investigator(s): Joel Butterworth	Date: July 19, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 2
Soil Map Unit: Gielow sandy loam, 0 to 5% slopes (128)	Soil Series as Observed: Cole
General Comments: Bt horizon is slightly moist	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 26
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-6	A1	l	gr, 1	Mod	c, l, D, Fe-x, RC	Mod	
6-16	A2	l	abk, 2	Mod	c, 2, D, Fe-x, M	Mod	
16-26	Bt	cl	abk, 1	Low	c, 2, D, Fe-x, M	Mod slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Goss–MGC Plasma	Pit No.: 11
Investigator(s): Joel Butterworth	Date: July 19, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 2
Soil Map Unit: Gielow sandy loam, 0 to 5% slopes (128)	Soil Series as Observed: Cole transitioning toward Gielow
General Comments:	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 26
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-4	A1	l	gr, 1	Mod	c, l, D, Fe-x, RC	Mod	
4-18	A2	l	abk, 1	Mod	c, 1+2, D, Fe-x, M+RC	Mod	
18-26	Bt	sicl	m	Low	M, 2, D, Fe-x, M	Mod slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Goss-MGC Plasma	Pit No.: 12
Investigator(s): Joel Butterworth	Date: July 19, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 2
Soil Map Unit: Gielow sandy loam, 0 to 5% slopes (128)	Soil Series as Observed: Cole
General Comments:	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 24
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-4	A1	sil	abk, 2	Mod	c, l, D, Fe-x, RC	Mod	
4-15	A2	sil +	abk, 2	Mod-low	c, 2, D, fe-x, M	Mod	
15-24	Bw	cl	abk, 1	Low	M, 2, D, Fe-x, M	Mod slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Goss-MGC Plasma	Pit No.: 13
Investigator(s): Joel Butterworth	Date: July 19, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 2
Soil Map Unit: Clear Lake clay, 0 to 2% slopes (112)	Soil Series as Observed: Cole
General Comments:	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 24
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-4	A1	l	gr, 2	Mod	None	Mod	
4-12	A2	cl	abk, 1	Mod	c, 2, D, Fe-x, M	Mod slow	
12-24	Bt	cl	abk, 1	Low	M, 2, D, Fe-x, M	Mod slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Goss-MGC Plasma	Pit No.: 14
Investigator(s): Joel Butterworth	Date: July 19, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex Broad, very poorly-defined swale	Landform: alluvial fan low terrace (swale) floodplain basin
	Slope Gradient (%): 1
Soil Map Unit: Gielow sandy loam, 0 to 5% slopes (128)	Soil Series as Observed: Cole
General Comments:	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 24
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-4	A1	l	gr, 2	Mod	c, l, D, Fe-x, RC	Mod	
4-11	A2	cl	abk, 2	Mod	c, 2, D, Fe-x, M	Mod slow	
11-15	Bt1	cl	abk, 2	Low - mod	None	Mod slow	
15-24	Bt2	cl	abk, 2	Low	c, 2, P, Fe-x, M	Mod slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Goss-MGC Plasma	Pit No.: 15
Investigator(s): Joel Butterworth	Date: July 19, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: Gielow sandy loam, 0 to 5% slopes (128)	Soil Series as Observed: Undetermined
General Comments: Bt horizon may be somewhat restrictive	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 22
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-2	A1	l	m	High	none	Mod	
2-13	A2	cl	m	Mod	c, l, D, Fe-x, M	Mod slow	
13-22	Bt	fsc	m	Low	m, 2, D, Fe-x, M	Slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Goss–MGC Plasma	Pit No.: 16
Investigator(s): Joel Butterworth	Date: July 19, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 2
Soil Map Unit: Gielow sandy loam, 0 to 5% slopes (128)	Soil Series as Observed: Undetermined
General Comments: Shovel refusal at 21". AB horizon may be somewhat restrictive	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 21
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-1	A1	l	gr, 3	Mod	None	Mod	
1-8	A2	l	gr, 2	Mod	c, l, D, Fe-x, RC	Mod	
8-18	AB	sic	abk, 2	Mod low	None	Slow	
18-21	Bw	grcl	m	Low	None	Mod	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Goss-MGC Plasma	Pit No.: 17
Investigator(s): Joel Butterworth	Date: July 19, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 2
Soil Map Unit: Gielow sandy loam, 0 to 5% slopes (128)	Soil Series as Observed: Gielow
General Comments:	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 22
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-9	A1	l	gr, 2	Mod-high	none	Mod	
9-17	A2	cl	abk, 1	Mod	c, 2, D, Fe-x, M	Mod slow	
17-22	AB	cl	abk, 1	Low	c, 2, D, Fe-x, M	Mod slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance
f - few
c - common
m - many

Redox Size
1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast
F - faint
D - distinct
P - prominent

Redox Type
Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location
M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Goss-MGC Plasma	Pit No.: 18
Investigator(s): Joel Butterworth	Date: June 14, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0137	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 0-1
Soil Map Unit: Clear Lake clay, 0 to 2% slopes (112)	Soil Series as Observed: Cole
General Comments: Profile data originally collected for North Coast semaphore grass study (site Goss 3) All but upper 3 inches of profile moderately moist when described	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): none to 25
Depth to Restrictive Layer (in.): n/a	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-2	A1	l	gr, 2	Mod	none	Mod	
2-12	A2	l	sbk, 1	Mod	none	Mod	Gravel layer between 9-11 in.
12-21	Bt1	cl	m	Mod-low	m, 2, D, Fe-x, M	Mod slow	
21-25	Bt2	cl	m	Low	c, 2, D, Fe-x, M	Mod slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Goss-MGC Plasma	Pit No.: 19
Investigator(s): Joel Butterworth	Date: June 14, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0140	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 0-1
Soil Map Unit: Clear Lake clay, 0 to 2% slopes (112)	Soil Series as Observed: Cole, trending toward Clear Lake
General Comments: Profile data originally collected for North Coast semaphore grass study (site Goss 4)	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): none to 26
Depth to Restrictive Layer (in.): n/a	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-6	A	cl	sbk, 1	Mod	c, 1, P, Fe-x, PL	Mod slow	
6-11	Bt1	cl	sbk, 1	Mod	none	Mod slow	
11-20	Bt2	cl	m	Mod-low	m, 2, D, Fe-x, M	Mod slow	
20-26	Bt3	sicl	m	Low	m, 2, D, Fe-x, M	Mod slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Niesen	Pit No.: 1
Investigator(s): Joel Butterworth	Date: July 28, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0218 (knife at bottom of A1)	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Cole
General Comments: Biotic crust present (moderate)	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 27
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-3	A1	cl	gr, 3	High	None	Mod slow	
3-17	A2	cl	abk, 3	Mod	m, m, D, Fe-x, M	Mod slow	
17-27	A3	cl	m	Low	m, m, D, Fe-x, M	Mod slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Niesen	Pit No.: 2
Investigator(s): Joel Butterworth	Date: July 28, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 1
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Cole
General Comments:	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 26
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-3	A1	cl-	gr, 2	Mod	None	Mod slow	
3-16	A2	cl	abk, 2	Mod	c, m, D, Fe-x, M	Mod slow	
16-26	A3	cl	abk, 1	Low	m, m, D, Fe-x, M	Mod slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Niesen	Pit No.: 3
Investigator(s): Joel Butterworth	Date: July 28, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 1
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Cole
General Comments: Moderate biotic crust	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 26
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-4	A1	cl	gr, 3	High	c, f, P, Fe-x, RC	Mod slow	
4-22	A2	cl	abk, 3	Mod	c, m, D, Fe-x, M	Mod slow	
22-26	A3	cl	m	Low	c, m, D, Fe-x, M	Mod slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Niesen	Pit No.: 4
Investigator(s): Joel Butterworth	Date: July 28, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Cole
General Comments:	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 29
Depth to Restrictive Layer (in.): 12	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-3	A1	cl	gr, 2	High	c, f, D, Fe-x, RC	Mod slow	
3-12	A2	cl	abk, 1	Mod	c, m, D, Fe-x, M	Mod slow	
12-29	Bt	c	m	Low	m, m, D, Fe-x, M	Very slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Niesen	Pit No.: 5
Investigator(s): Joel Butterworth	Date: July 28, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0219	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Cole
General Comments:	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 28
Depth to Restrictive Layer (in.): 25	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-1	A1	cl	gr, 1	High	None	Mod slow	
1-11	A2	cl	abk, 2	Mod	c, f, D, Fe-x, RC, c, m, D, Fe-x, M	Mod slow	
11-25	Bt1	sicl	m	Low	c, f, D, Fe-x, M	Mod slow	
25-28	Bt2	c	m	Low	c, f, D, Fe-x, M	Mod slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Niesen	Pit No.: 6
Investigator(s): Joel Butterworth	Date: July 29, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin *fill within floodplain area
	Slope Gradient (%): 2
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: N/A
General Comments:	

Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 37
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-15	FILL	grl	m	Low-mod	none	mod	Angular gravels
15-28	Ab1	sicl	m	Mod	m, m, P, Fe-x, PL+M	Mod slow	
28-37	Ab2	sicl	m	Low	m, m, P, Fe-x, PL+M	Mod slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Niesen	Pit No.: 7
Investigator(s): Joel Butterworth	Date: July 29, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0222 and 0223 native soil buried under fill material	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin *fill within overall alluvial fan
	Slope Gradient (%): 1-2
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: N/A
General Comments:	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 104
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-49	FILL1	vgrl	m	Low-mod	None	Mod rapid	
49-59	FILL2	sc	m	Low	None	Slow	Saprolitic material; variegated
59-99	FILL3	grcosc	m	Low	None	Mod slow	___
99-104	Ab	sil	m	Mod	None	Mod	Partly decomposed detritus; dark grey

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Niesen	Pit No.: 8
Investigator(s): Joel Butterworth	Date: July 29, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin *fill within overall alluvial fan
	Slope Gradient (%): 1-2
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: N/A
General Comments:	

Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 103
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-41	FILL1	xgrsl	m	Low-mod	None	Rapid	
41-97	FILL2	lsc	m	Low	None	Mod-slow	Variegated
97-103	Ab	sil	m	Mod	f, m, f, Fe-x, M	Mod	Partly decomposed detritus

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Niesen	Pit No.: 9
Investigator(s): Joel Butterworth	Date: July 29, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin *fill within overall alluvial fan area
	Slope Gradient (%): 2-3
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: N/A
General Comments:	

Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 99
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-72	FILL1	xgrl	m	Low-mod	None	Rapid	
72-87	FILL2	sicl	m	Low	None	Mod-slow	Variegated; partly decomposed organic material
87-99	Ab	sicl	m	Mod	m, m, D, Fe-x, M	Mod-slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Niesen	Pit No.: 10
Investigator(s): Joel Butterworth	Date: July 29, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex *disturbed area	Landform: alluvial fan low terrace swale floodplain basin *fill area with in overall floodplain
	Slope Gradient (%): 3
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Cole
General Comments: shallow water table probably due to adjacent stock pond seepage	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): 40*
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-9	A1/FILL	cl	abk, 1	High	m, m, D, Fe-x, M	Mod-slow	Fill mixed with A horizon; 10% gravel
9-18	A2	cl	m	Mod	c, m, F, Fe-x, M	Mod-slow	
18-31	Bt	sicl	m	Low	m, m, D, Fe-x, M	Mod-slow	
31-41	BtC	vgrcl	m	Low	c, c, D, Fe-x, M	Mod	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Niessen	Pit No.: 11
Investigator(s): Joel Butterworth	Date: July 29, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin *fill area within alluvial fan
	Slope Gradient (%): 3-5
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Undetermined
General Comments:	

Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): Free water at 53
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-6	FILL	grcl	m	Mod	c, m, D, Fe-x, M	Mod	
6-13	Ab	cl	m	Mod	c, m, D, Mn-x, M	Mod	
13-22	Bt	cl	abk, 1	Low	c, m, F, Fe-x, M	Mod	
22-53	BC	fsc	m	Low	m, m, D, Fe-x, M	Slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Niesen	Pit No.: 12
Investigator(s): Joel Butterworth	Date: July 29, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 7
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Cole
General Comments: No fill material present	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 63
Depth to Restrictive Layer (in.): 8 (Bt somewhat restrictive)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-3	A1	cl	abk, 1	Mod	c, f, D, Fe-x, RC	Mod-slow	
3-8	A2	cl	abk, 1	Mod	None	Mod-slow	
8-29	Bt	sic	abk, 1	Low	None	Slow	
29-63	C	cl	m	Low	m, m, D, Fe-x, M	Mod-slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Niesen	Pit No.: 13
Investigator(s): Joel Butterworth	Date: July 29, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 3
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Cole
General Comments:	

Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 41

Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-3	A1	cl	m	Mod	c, f+m, D, Fe-x, RC+PL	Mod-slow	
3-11	A2	cl	abk, 2	Low-mod	m,m, P, Fe-x, PL	Mod-slow	
11-21	Bt	sicl	abk, 1	Low	c, m, F, Fe-x, M	Mod-slow	
21-41	cl	cl	m	Low	c, m, F, Fe-x, M	Mod-slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Niesen	Pit No.: 14
Investigator(s): Joel Butterworth	Date: July 29, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin *fill area within overall alluvial fan
	Slope Gradient (%): 5
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Undetermined
General Comments:	

Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): 47
Depth to Restrictive Layer (in.): 26	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-9	A1/FILL	cl	abk, 2	Mod	None	Mod-slow	Fill mixed within A1 horizon
9-26	A2	cl	m	Mod	m, m, D, Fe-x, M	Mod-slow	
26-35	Bt1	c	m	Low	m, m, D, Fe-x, M	Very slow	
35-48	Bt2	sic	m	Low	m, m, D,D, M	Slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Niesen	Pit No.: 15
Investigator(s): Joel Butterworth	Date: July 29, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0221	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin *fill material within floodplain area
	Slope Gradient (%): 5
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: N/A
General Comments:	

Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 53
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-35	FILL	n/a	sg	Low	None	Mod-rapid	Buried woody material and metallic fragments
35-53	Ab	sicl	m	Low	m, m, P, Fe-x, M	Mod-slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Watson East (North)	Pit No.: 12
Investigator(s): Joel Butterworth	Date: July 28, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0211 (knife at top of Bt), 0212 (weathered rock fragments in A2 horizon [not redox])	

Land Surface Shape: (slightly) planar concave convex broad swale	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 2-3
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Cole
General Comments: 5% gravel in A1 and A2 horizons	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 29
Depth to Restrictive Layer (in.): 21"	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-2	A1	l	grl	High	f, f, D, Fe-x, RC	Mod	
2-21	A2	cl	abk, 2	Mod	c, f, D, Fe-x, PL	Mod-slow	
21-29	Bt	c-	m	Low	c, m, D, Fe-x, M	Very slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Watson East (North)	Pit No.: 13
Investigator(s): Joel Butterworth	Date: July 28, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 2
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Cole
General Comments:	

Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 32”

Depth to Restrictive Layer (in.): 9”	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-1	A1	l	m	High	m, f, D, Fe-x, RC	Mod	
1-9	A2	cl-	m	Mod	c, f, D, Fe-x, PL	Mod-slow	
9-22	Bt	c-	abk, 3	Low	None	Very slow	
22-32	BtC	grcl	m	Low	None	Mod	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

“-“ = “light” (as in a clay textural class with relatively low clay content)
“+“ = “heavy” (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance
f - few
c - common
m - many

Redox Size
1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast
F - faint
D - distinct
P - prominent

Redox Type
Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location
M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Watson East (North)	Pit No.: 14
Investigator(s): Joel Butterworth	Date: July 28, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 1
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Cole
General Comments:	

Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): none to 30”
Depth to Restrictive Layer (in.): 24” (Bt somewhat restrictive)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-4	A1	l	gr, 2	High	c, f, F, Fe-x, RC	Mod	
4-13	A2	sicl	gr, 3	Mod	c, m, F, Fe-x, M	Mod-slow	
13-24	Bt1	sicl	abk, 3	Low	None	Mod-low	
24-30	Bt2	sic	m	Low	m, m, D, Fe-x, M	Slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

“-“ = “light” (as in a clay textural class with relatively low clay content)
“+“ = “heavy” (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Watson East (North)	Pit No.: 15
Investigator(s): Joel Butterworth	Date: July 28, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0213 (knife at top of Bt)	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 3
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Undetermined
General Comments: Approx. 1-1.5' higher than adjacent wetland	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 31
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-2	A1	l	gr, 1	High	c, f, D, Fe-x, RC	Mod	
2-10	A2	cl	abk, 2	Mod	None	Mod-slow	
10-20	Bt	cl	abk, 3	Low	f, m, D, Fe-x, RC	Mod-slow	
20-31	BtC	grcl	m	Low	None	Slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Watson East (North)	Pit No.: 16
Investigator(s): Joel Butterworth	Date: July 28, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 3
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: undetermined
General Comments: approx. 1' higher than adjacent wetland	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): none to 28"
Depth to Restrictive Layer (in.): 18"	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-4	A1	l	gr, 2	High	c, f, D, Fe-x, RC	Mod	
4-10	A2	cl	abk, 3	Low-mod	None	Mod-slow	
10-18	Bt	cl	abk, 3	Low	c, m, F, Fe-x, M	Mod-slow	
18-28	BC	c-	m	Low	None	Very slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Watson East (North)	Pit No.: 17
Investigator(s): Joel Butterworth	Date: July 28, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0217 (knife at top of Bt horizon)	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Undetermined
General Comments: approx. 1.5 – 2' above adjacent wetland	

Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): none to 27"
Depth to Restrictive Layer (in.): 21"	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-4	A1	cl	gr, 2	Mod	c, f, D, Fe-x, RC	Mod-slow	
4-13	A2	cl	abk, 2	Mod	c, m, F, Fe-x, M	Mod-slow	
13-21	Bt	cl	abk, 1	Low	None	Mod-slow	
21-27	BC	c-	m	Low	None	Very slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Watson East (North)	Pit No.: 18
Investigator(s): Joel Butterworth	Date: July 28, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 3
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Feliz
General Comments:	

Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 30

Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-3	A1	cl	m	Mod	c, f, F, Fe-x, RC	Mod-slow	
3-13	A2	cl	abk, 1	Mod	None	Mod-slow	
13-28	A3	cl	m	Low	None	Mod-slow	
28-30	C	cl	m	Low	None	Mod-slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance
f - few
c - common
m - many

Redox Size
1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast
F - faint
D - distinct
P - prominent

Redox Type
Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location
M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Watson East (North)	Pit No.: 19
Investigator(s): Joel Butterworth	Date: July 28, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 4
Soil Map Unit: Feliz loam, 0 to 2% slopes (123)	Soil Series as Observed: Feliz
General Comments: Approx. 1' higher than adjacent wetland	

Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 36"
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-3	A1	grcl	m	Mod	c, f, F, Fe-x, RC	Mod	
3-19	A2	grcl	abk, 2	Mod	None	Mod	
19-32	C1	vgrcl	m	Low	None	Mod	
32-36	C2	cl+	m	Low	None	Mod-slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Watson East (North)	Pit No.: 20
Investigator(s): Joel Butterworth	Date: July 28, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 5
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Feliz
General Comments: Approx. 1' higher than adjacent wetland	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): none to 31"
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-3	A1	cl	gr, 1	Mod	None	Mod-slow	10% gravel
3-15	A2	cl	m	Low-mod	None	Mod-slow	10% gravel
15-30	A3	cl	m	Low	None	Mod-slow	10% gravel
30-31	AC	cl	m	Low	f, m, D, Fe-x, M	Mod-slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Watson East (South)	Pit No.: 1
Investigator(s): Joel Butterworth	Date: July 27, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 037	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: Feliz clay loam, gravely substratum 2 to 8% slopes (126)	Soil Series as Observed: Feliz
General Comments: about 30' south of establishment area; edge of small alluvial fan within floodplain	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 32"
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-5	A1	l	abk, 3	Mod	m, f+m, d, Fe-x, RC	Mod	
5-10	A2	grl	abk, 2	Mod	c, m, F, Fe-x, M	Mod	
10-32	A3	grcl	abk, 1	Low	None	Mod	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Watson East (South)	Pit No.: 2
Investigator(s): Joel Butterworth	Date: July 27, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0200	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 2
Soil Map Unit: Feliz clay loam, gravely substratum 2 to 8% slopes (126)	Soil Series as Observed: Feliz, transitioning to Cole
General Comments:	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 25”
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-3	A1	l	gr, 2	Mod	c, f, D, Fe-x, RC	Mod	
3-17	A2	l	abk, 2	Mod	None	Mod	
17-25	A3/Bt	grcl	abk, 1	Low	None	Mod	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

“-“ = “light” (as in a clay textural class with relatively low clay content)
“+“ = “heavy” (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Watson East (South)	Pit No.: 3
Investigator(s): Joel Butterworth	Date: July 27, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0201 Knife is at top of Bt	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 2-3
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Cole
General Comments: shallow mud casts (about 1")	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 30"
Depth to Restrictive Layer (in.): 17"	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-4	A1	l	gr, 3	Mod-high	c, f, D, Fe-x, RC	Mod	
4-17	A2	l	abk, 2	Mod	c, m, F, fe-x, M	Mod	
17-30	Bt	c	m	Low	m, m, F, Fe-x, M	Very slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance
f - few
c - common
m - many

Redox Size
1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast
F - faint
D - distinct
P - prominent

Redox Type
Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location
M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Watson East (South)	Pit No.: 4
Investigator(s): Joel Butterworth	Date: July 27, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0202	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 2
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Feliz grading towards Cole
General Comments: 5-10% gravel throughout	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): none to 24"
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-6	A1	l	gr, 1	High	c, f, D, Fe-x, RC	Mod	
6-19	A2	l+	abk, 1	Low-mod	None	Mod	
19-24	BC	grcl	abk, 1	Low	None	Mod	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Watson East (South)	Pit No.: 5
Investigator(s): Joel Butterworth	Date: July 27, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0203 (overall), 0204 (of pit; knife at top of BT)	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 2-3
Soil Map Unit: Feliz clay loam, gravely substratum 2 to 8% slopes (126)	Soil Series as Observed: Cole transitioning to Fluvaquents
General Comments: distal part of alluvial fan; sediment deposits	

Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 27”
Depth to Restrictive Layer (in.): 15”	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-2	A1	l	gr, 2	Mod-high	c, f, D, Fe-x, RC	Mod	
2-15	A2	cl	abk, 3	Mod	m, m, D, Fe-x, M	Mod-slow	
15-27	Bt	c-	m	Low	m, m, D, Fe-x, M	Very slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

“-“ = “light” (as in a clay textural class with relatively low clay content)
“+“ = “heavy” (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance
f - few
c - common
m - many

Redox Size
1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast
F - faint
D - distinct
P - prominent

Redox Type
Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location
M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Watson East (South)	Pit No.: 6
Investigator(s): Joel Butterworth	Date: July 27, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: None	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: Feliz clay loam, gravely substratum 2 to 8% slopes (126)	Soil Series as Observed: Feliz
General Comments: Biotic crust (weak); shallow mud casts (~1"); 5-10% gravel in profile.	

Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 29"
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: Pit is approx. 6"-12" higher than adjacent wetland to south

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-2	A1	l	gr, 2	Mod	c, f, D, fe-x, RC	Mod	
2-22	A2	l	abk, 2	Mod	None	Mod	
22-29	A3	sicl-	m	Low	None	Mod-slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Watson East (South)	Pit No.: 7
Investigator(s): Joel Butterworth	Date: July 27, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 2
Soil Map Unit: Feliz clay loam, gravely substratum 2 to 8% slopes (126)	Soil Series as Observed: Feliz
General Comments: 10% gravel throughout	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 28
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-3	A1	l	abk, 1	Mod-high	c, f, D, Fe-x, RC	Mod	
3-13	A2	l	abk, 2	Mod	None	Mod	
13-28	AC	cl	m	Low	None	Mod-slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Watson East (South)	Pit No.: 8
Investigator(s): Joel Butterworth	Date: July 27, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 2
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Feliz
General Comments: adventitious Lolium roots; 10% gravel in all horizons	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): none to 29
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-3	A1	cl-	abk, 1	Mod	m, f, D, Fe-x, RC	Mod-slow	
3-16	A2	cl	m	Mod	None	Mod-slow	
16-29	AC	cl	m	Low	None	Mod-slow	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Watson East (South)	Pit No.: 9
Investigator(s): Joel Butterworth	Date: July 27, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0205 knife at top of AC horizon	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 1
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Feliz
General Comments: weak, spotty biotic crust; 5% gravel in A1, A2 and AC horizons.	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 32”
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-2	A1	l	abk, 1	Mod	c, f, D, Fe-x, RC	Mod	
2-12	A2	l	abk, 1	Mod	None	Mod	
12-19	AC	l	m	Low	None	Mod	
19-32	C	grl	m	Low	None	Mod	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

“-“ = “light” (as in a clay textural class with relatively low clay content)
“+“ = “heavy” (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance
f - few
c - common
m - many

Redox Size
1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast
F - faint
D - distinct
P - prominent

Redox Type
Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location
M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Watson East (South)	Pit No.: 10
Investigator(s): Joel Butterworth	Date: July 27, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0207, 0208	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Feliz
General Comments:	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): None to 27"
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-3	A1	grl	abk, 1	Mod	m, f, D, Fe-x, RC	Mod	
3-20	A2	l	abk, 1	Mod	None	Mod	
20-27	AC	grl	m	Low	c, m, F, Fe-x, M	Mod	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Offsite Mitigation Parcel: Watson East (South)	Pit No.: 11
Investigator(s): Joel Butterworth	Date: July 27, 2010	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: N/A	

Land Surface Shape: (slightly) planar concave convex	Landform: alluvial fan low terrace swale floodplain basin
	Slope Gradient (%): 0-1
Soil Map Unit: Cole clay loam, 0 to 2% slopes (115)	Soil Series as Observed: Feliz
General Comments:	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): none to 27"
Depth to Restrictive Layer (in.): N/A	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-6	A1	l	abk, 2	Mod	m, f, D, Fe-x, RC	Mod	
6-14	A2	cl	abk, 1	Mod	None	Mod-slow	
14-27	AC	l	m	Low-mod	None	Mod	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

Appendix B

Representative Digital Images from July 2010 Soil Evaluations at Wetland Establishment Sites



Appendix B-1. Ford Offsite Mitigation Parcel Wetland Establishment Site (Soil Pit 5)
Overview of backhoe pit excavation.



Appendix B-2. Goss/MGC Plasma Offsite Mitigation Parcels Existing Wetland (Soil Pit 2)
Clay loam subsoil; redox extends to surface.

Appendix B
Representative Digital Images from July 2010 Soil Evaluations at Wetland Establishment Sites



Appendix B-3. Watson East Offsite Mitigation Parcel Existing Wetland (Soil Pit 3)
Knife at top of clay subsoil; redox extends to surface.



Appendix B-4. Niesen Offsite Mitigation Parcel Existing Wetland (Soil Pit 1)
Clay loam subsoil; redox begins at 3 inches depth (at knife).



Appendix B-5. Goss/MGC Plasma Offsite Mitigation Parcels Existing Wetland (Soil Pit 19)
Clay loam subsoil; redox at 0–6 inches and below 11 inches depth.



Appendix B-6. Goss/MGC Plasma Offsite Mitigation Parcels Wetland Establishment Site (Soil Pit 5)
Dense roots in A1 horizon, suggesting surface ponding or root restriction from clay soil (Clear Lake series) below; redox begins at 9 inches depth.

Appendix B
Representative Digital Images from July 2010 Soil Evaluations at Wetland Establishment Sites



Appendix B-7. Ford Offsite Mitigation Parcel Wetland Establishment Site (Soil Pit 7)
Woody refuse in fill material, which extends to 52 inches.



Appendix B-8. Ford Offsite Mitigation Parcel Wetland Establishment Site (Soil Pit 6)
Investigator standing on native soil at 72 inches; excavated fill in background.

Appendix B
Representative Digital Images from July 2010 Soil Evaluations at Wetland Establishment Sites



Appendix B-9. Niesen Offsite Mitigation Parcel Wetland Establishment Site (Soil Pit 15)
Very gravelly fill material containing metal fragments and woody material.



Appendix B-10. Niesen Offsite Mitigation Parcel Wetland Establishment Site (Soil Pit 7)
Close-up of buried A horizon (with partly decomposed organic matter),
taken from 99 inches depth; reddish excavated fill is at right.



Appendix B-11. Goss/MGC Plasma Offsite Mitigation Parcels Wetland Establishment Site (Soil Pit 8)
Silty clay subsoil; redox extends to surface.



Appendix B-12. Watson East Wetland Establishment Site (Soil Pit 9)
Loam/gravelly loam soils; knife at bottom of subsurface layer; redox at 0–12 inches depth, suggesting short duration ponding on nearly level slope.

Attachment 1

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94103-1398

JUL - 9 2010

REPLY TO
ATTENTION OF

Regulatory Division

SUBJECT: File Number 1991-19474N

Mr. Charlie Fielder
District 1 Director
California Department of Transportation
P.O. Box 3700
Eureka, California 95502

Dear Mr. Fielder:

Per our District Commander's June 29, 2010 e-mail communication to you, we are hereby providing you with the list of items Caltrans must provide to the Corps by August 15, 2010, in order for us to come to a permit decision by August 30, 2010. To adequately address the three items specified by the District Commander, including the 401 Certification, a complete long-term management plan, and complete endowment calculations broken down by parcel (must use spreadsheet provided by the Corps by e-mail on June 2, 2010 for **each parcel**), you must provide the following 6 items to meet the spirit and intent of our commitments.

These items are a subset of the larger list provided today to you by the RWQCB representing the complete information needs of the Corps, the RWQCB, and the EPA. The list below represents the minimum information necessary for us to complete our public interest review, ensure compliance with mandatory "no net loss" policy, and ensure compliance with our Mitigation Regulations (33 CFR Part 332). To date, you have only proposed 23 acres of wetland establishment (creation) and have not shown how you will effect "no net loss" of the 83 acres of fill that is proposed.

1. A **clear accounting** of existing conditions on each mitigation parcel specific to waters of the U.S. including aquatic resource type (you must specify either wetlands, non-wetland waters of the U.S., OR riparian buffer) and acreage in a table with associated drawings. We also require a clear accounting of proposed conditions (i.e. climax community) on each mitigation parcel specific to waters of the U.S. including proposed aquatic resource types and acreages.

2. Compensation types must be clarified throughout the Mitigation and Monitoring Plan (MMP) and only Corps-recognized definitions are to be used. "Protection" is not a recognized Corps definition per 33 CFR Part 332 and any mitigation parcel areas

classified under this term **must be reclassified** according to one of the Corps-recognized definitions. The word "protection" may not be used in the final MMP.

You have counted returning areas that will be temporarily impacted to their original contours as "restoration". "Restoration" is not defined per 33 CFR Part 332 as "areas temporarily affected by onsite or offsite construction activities that will be restored to pre-project conditions." Any areas classified this way within the MMP **must be removed** from the mitigation totals, as the Corps does not recognize them as "restoration" areas.

3. As specified in our April 23, 2010 letter, information justifying areas proposed for preservation must be provided pursuant to 33 CFR Part 332.3(h).

4. Each and every area proposed for **establishment** must have the following details and baseline information: 1) Caltrans needs to describe the process used in selecting each site. 2) Caltrans needs to clearly define the purpose of each establishment site. What functions and values are being replaced at the establishment site? Performance standards and success criteria will be based on this. 3) Caltrans needs to provide **fully developed** construction plans: existing contours, proposed contours, planting plans, construction sequence. 4) Caltrans needs to clearly define the location and the size of each mitigation site (not give us the size of the actual parcel, we need to know the size of the mitigation site). 5) Caltrans must have a corresponding reference site for each establishment site. The enhancement plans must contain the following information:
   a. Hydrology. The following information is needed for each proposed wetland establishment site:
      1) Current conditions information:
         - Analysis of existing hydrologic conditions in reference sites.
         - Hydrologic testing of the mitigation sites. Testing must include:
            - Examination of the groundwater availability.
            - Hydroperiod Information: the frequency of flooding, depth, duration, timing of saturation or inundation, percent of open water.
            - Historical hydrology of mitigation site if different from present conditions.
            - Acres of contributing drainage areas.
            - Results of water quality analysis: data on surface water, groundwater, redox, nutrients, organic content, suspended matter, DO, heavy metals.
      2) Information to estimate proposed hydrological conditions:
         - A reliable water budget must be presented. You must be able to show that net inflows are greater than net outflows. Water budget must include: water source(s): precipitation, surface runoff, groundwater, stream. Water losses.

- Provide a water budget for wet years and dry years.
- Modification of the hydrologic characteristics should be kept to a minimum.
- Site should be hydrologically self sustaining.

b. Soil Characteristics. The following information is needed for each wetland establishment site:
   1) Soil profile. The MMP provided the soil survey information. Caltrans needs to locate those soils on site. Submit a report of soil samples with a map showing data sample points.
   2) Standard soil analysis: percent organic matter, structure, texture, permeability.
   3) What will be the source of the soils? (e.g., existing soil, imported hydric soil from impact site).
   4) Also need: erosion and soil compaction control measures.

c. Vegetation.
   1) Existing conditions: We generally have a list of the species that occur on site from the delineations that were completed. For each wetland establishment site we need:
      - Species characteristics such as: densities, age, health, natives/non natives.
      - Percent cover.
      - Community structure (canopy stratification).
      - Map showing the correct location of plant communities with representative site photos.
      - Proposed site should be located adjacent to existing waters of the U.S. or a high functioning buffer adjacent to waters of the U.S. to create a wildlife corridor. Provide documentation of this connectivity.

d. Watershed context/surrounding land use for each wetland establishment site:
   1) Impairment status and impairment type of aquatic resources.
   2) Description of watershed land uses (percent agriculture, forested, wetland, developed).
   3) Size of natural buffers (show on map and do not call them "riparian").
   4) Description of landscape connectivity: proximity and connectivity of existing aquatic resources and natural upland areas (and show on map).
   5) Relative amount of aquatic resource area that the impact site represents for the watershed and/or ecoregion (by individual type and by overall resources).

e. Goals of each wetland establishment site:
   1) Types and areas of habitat to be established.
   2) Specific functions of the habitat types.
   3) Time lapse between jurisdictional impacts of the project and mitigation site success.

4) Total cost of the establishment site: site preparation, planting, maintenance, monitoring.
5) Overall watershed improvement to be gained by the wetland establishment site.

f. Wetland Establishment Site Implementation:
   1) For each establishment site Caltrans must:
      - Provide a rationale for expecting implementation success.
      - Name responsible parties.
      - Provide financial assurance information.
      - Provide a construction schedule.
      - Provide a site preparation plan.
      - Provide a planting plan. The planting plan design must emulate a reference site in terms of plant species and spacing. Planting design must place plants relative to the water source supporting them specific to what the optimal condition would be for that species.
      - Prior to planting the site soil conditions must be confirmed: soil moisture, ph, salinity, organic matter, nitrogen, soil type. Be advised that the native soils must support the proposed wetland establishment. Clay liners or other artificial barriers are not permitted.
      - Provide as-builts within 45-days of construction of establishment wetland site.

g. Maintenance Activities During Monitoring Period for each wetland establishment site:
   1) Provide the list of maintenance activities
   2) Responsible parties
   3) Schedule

h. Monitoring Plan for each wetland establishment site:
   1) Target dates for performance standards and success criteria
   2) Target functions
   3) Target hydrological regime. Hydrologic functions must be compared to what is occurring at the reference site.
   4) Target mitigation acreage of establishment
   5) Monitoring method and schedule
   6) Annual monitoring report

i. Completion of each Mitigation Site:
   1) Written notification is required
   2) Agency confirmation will be required before mitigation is considered complete.

j. Contingency Measures for each mitigation site:

1) Initiation Procedures. Circumstances necessitating the initiation of contingency measures must be described.
2) Funding mechanism (See item 5. below)
3) Responsible parties

5. The Corps requires a performance bond or other Corps-approved financial assurance mechanism payable at the direction of the District Engineer to his designee or to a standby trust agreement. This financial assurance mechanism shall be posted **within 30 days of permit issuance** or else the Corps permit will be revoked. In order to determine the appropriate assurance amount, Caltrans must provide **sufficient and itemized calculations** by August 15, 2010 for the cost of the following: collection of all necessary baseline information, parcel-specific mitigation plan preparation based on a watershed approach, land acquisition, planning and engineering, legal fees, mobilization, construction, and monitoring, and a contingency fund for any necessary remediation.

6. As specified in our April 23, 2010 letter, the Corps believes discharge of fill for project construction should be carried out concurrently with project phase construction. Caltrans must provide us with the fill amount associated with Phase I alone, the additional fill amount associated with Phase II, and the associated drawings demonstrating the two separate Phases as described by Dave Kelley in our May 10, 2010 conference call.

These items collectively are the minimum information necessary (to be supplied by August 15, 2010) for the Corps to complete the application evaluation process.

Should you have any questions regarding this matter, please call me at (415) 503-6771. Please address all correspondence to the Regulatory Division and refer to the File Number at the head of this letter.

Sincerely,

Jane M. Hicks

Jane M. Hicks
Chief, Regulatory Division

Copy Furnished:

US EPA, San Francisco, CA (Attn: A. Strauss/J. Brush/ M. Scianni)
CA RWQCB, Santa Rosa, CA (Attn: C. Kuhlman/J. Puget)
California Department of Transportation, Sacramento, CA (Attn: R. Land)
California Transportation Commission, Sacramento, CA (Attn: J. Earp)

DEPARTMENT OF TRANSPORTATION
DISTRICT 3 – SACRAMENTO AREA OFFICE
GATEWAY OAKS
2379 GATEWAY OAKS DR., STE. 150
SACRAMENTO, CA 95833
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Flex your power!
Be energy efficient!

August 25, 2010

Jane M. Hicks
Chief, Regulatory Division
U.S. Army Corps of Engineers
San Francisco District
1455 Market Street
San Francisco, CA 94103-1398

Mr. Jason Brush
Wetlands Regulatory Office
US EPA, Region 9
75 Hawthorne Street, WTR-8
San Francisco, CA 94105-3901

Dear Ms. Hicks and Mr. Brush:

The U.S. Army Corps of Engineers (USACE) provided the California Department of Transportation (Caltrans) a letter on July 9, 2010, that listed the minimum information necessary for the USACE to come to a Clean Water Act Section 404 permit decision on the Willits Bypass Project (bypass project). A meeting was held on July 12 and 13, 2010 in Santa Rosa with the USACE, Environmental Protection Agency (USEPA), North Coast Regional Water Quality Control Board (RWB), California Department of Fish and Game (CDFG), and other stakeholders to discuss the requested information in the July 9 letter and other agency-requested information and capture all of it in a permitting "punch list" for the bypass project. Since that time, Caltrans has been conducting field work, reviewing and analyzing data, running models, and documenting these efforts in technical memoranda submitted per the permitting punch list due dates. On August 15, 2010, Caltrans submitted the remaining requested information from the July 9 letter and permitting punch list, as well as miscellaneous requests from the July 12 and 13, 2010 meetings and the July 26, 2010 field meeting, and submitted these items to the USACE, USEPA, RWB, CDFG, and other stakeholders.

To-date, Caltrans has received the following comments from USACE and USEPA on some of the July 9 letter and punch list submittals:

- August 11, 2010 letter from USEPA regarding Niesen Parcel and Monitoring Reference Sites
- August 11, 2010 e-mail from Melissa Scianni of USEPA regarding the Long-term Management Plan (Chapter 11 of the MMP)
- August 13, 2010 e-mail from Melissa Scianni of USEPA regarding soil characteristics at wetland establishment sites
- August 5, 2010 e-mail from Melissa Scianni of USEPA regarding the preservation technical memorandum submitted on August 2, 2010
- July 29, 2010 e-mail from Dave Wickens of USACE regarding location in MMP of requested information from the July 9 letter from USACE to Caltrans

Caltrans is providing this letter to address the above comments on submittals in an effort to ensure that the USACE has as much information as is available at this time in order to issue a Clean Water Act Section 404 permit for the Willits Bypass Project by August 30, 2010. The permit is needed by this date so that the bypass project can continue to move forward by receiving approval from the Federal Highway Administration for federal matching funds.

Responses to August 11, 2010 letter from USEPA regarding Niesen Parcel and Monitoring Reference Sites

1) Reference Sites

USEPA has expressed concern over the currently identified wetland establishment monitoring reference sites. According to USEPA, since the reference sites are targeted for enhancement in the bypass project Mitigation and Monitoring Proposal (MMP), they may not represent the highest function attainable. However, due to their adjacency Caltrans believes the proposed reference sites provide the most similar vegetation, hydrologic, and soils information for the establishment sites. Caltrans appreciates the suggestion of using the Huff and Watson West offsite mitigation preservation parcels to come to resolution on the subject. However, replicating the riparian woodlands and scrub wetlands on Huff and the marsh wetlands on Watson West parcels at the proposed wetland establishment sites in Little Lake Valley would result in a disrupted ecological landscape at these sites.

Improved functions and values at the enhancement sites is a component of the mitigation plan. Grazing will be one action used to improve functions and values at the enhancement sites. Over the long-term, similar grazing prescriptions used at the enhancement sites would be used at the establishment sites resulting in the most continuous ecological landscape possible. Since this issue was not a "punch list" item, Caltrans expects that a permit decision can be made irrespective of a decision on this issue. As proposed by USEPA, and affirmed here by Caltrans, a quick resolution of the topic is a mutually desired outcome. However, if any changes are needed, then there is likely insufficient time to further inform the discussion or edit relevant document sections prior to the end of the month. Caltrans proposes that USACE approval of the final reference sites be included as a special condition in the 404 permit.

2) Wetland Establishment Site Hydrology

A telephone conference call was held on August 13 to discuss site-specific wetland establishment hydrology. Agency staff and staff from the Willits Environmental Center (WEC) noted the need for additional site-specific wetland establishment hydrology data to confirm that establishment would be successful and naturally sustainable.

Caltrans remains committed to continuing to collect site-specific hydrology data for the establishment areas, but believes that data currently available can be used to confirm the future success of proposed wetland establishment sites . Based on verified wetland delineations, field observations, the hydrology technical memorandum (July 29 submittal), and the soils technical memorandum (August 10 submittal), the established wetlands are expected to have the same hydrologic regime as the adjacent, existing wetlands. The elevation of the wetland establishment sites will be lowered to match that of adjacent wetlands so that any high water table, overbank channel flow, or sheetflow experienced by existing wetlands would extend into the adjacent wetland establishment sites. The soils technical memorandum indicates little difference between the soils in the establishment sites and adjacent existing wetlands, a further indication that the established wetlands will have hydrological conditions similar to the existing wetlands. Furthermore, the soils technical memorandum indicates that the restrictive layer of soils that was found in some soil pits was thick and extended below planned excavation depths. As a result, excavation planned for the wetland establishment sites would not remove the restrictive layer that could help support wetland hydrology at some locations (see mitigation construction plans – August 2 submittal). If the wetland establishment sites do not function as expected, the MMP protocols ensure that such a failure would be detected and remedial actions would be taken.

The hydrology technical memorandum (July 29 submittal) provided all available site specific information regarding surface water and groundwater observed at the Goss/MGC Plasma establishment site. The memorandum also provided water balance time series estimates of water level elevations under a wet and dry water year for a wetland supported by a high water table and a wetland supported by a restrictive layer, but it did not provide water balance time series estimates of water level elevations at each wetland establishment site. Since the hydrology technical memorandum was submitted, additional information has become available as presented in the soils technical memorandum (August 10 submittal). This additional information can be used to refine the hydrology discussion. However, to generate time series estimates of water level elevations for each establishment site, more data is needed such as rainfall runoff models for each site that may receive upslope sheetflow (such models need time series hydrological data for calibration), time series information regarding aquifer elevation at each site, and time series information regarding flooding at each site (e.g., from Old Outlet Creek at the Ford site or from backwater inundation at the Watson East parcel resulting from down-valley flooding). Fortunately, site-specific time series estimates are not necessary to be confident that the establishment sites will function as wetlands.

Table 1 and the following discussion provide site-specific hydrologic information from the soils technical memorandum.

Table 1. Site Specific Hydrologic Information for Wetland Establishment Sites from Soils Technical Memorandum (August 10 Submittal)

Wetland Establishment Site	Evidence for High Water Table at Site[a]	Evidence of Restrictive Layer	Other Potential Sources of Water[b]
Ford[c]	Subsurface redox features at reference and establishment sites and very moist surface soil at 2 of 4 establishment pits	Slow permeability in 1 of the 4 reference pits and 1 of the 4 establishment pits	Shallow flooding from Old Outlet Creek
Goss/MGC Plasma	Subsurface or subsoil redox features at reference and establishment sites. In addition, shallow groundwater present at North Coast semaphore grass groundwater monitoring sites (which usually occur in wetlands) despite lack of restrictive layer.	No sites with slow permeability in 6 reference pits, but slow or very slow permeability in 5 of the 12 establishment pits	Upslope sheetflow runoff
Niesen[c]	Subsurface redox features at reference and establishment sites	Very slow or slow permeability at 1 of the 5 reference pits and 3 of the 10 establishment pits	Seepage from pond
Watson East (North)	Subsurface redox features at some reference and establishment sites	Very slow or slow permeability at 3 of the 4 reference pits and 3 of the 6 establishment pits	Backwater inundation from down-valley flooding and upslope sheetflow runoff
Watson East (South)	Subsurface redox features at some reference and establishment sites	Very slow or slow permeability at 2 of the 5 reference pits, but none of the establishment pits	Backwater inundation from down-valley flooding and upslope sheetflow runoff

a. A high water table means that the top of an unconfined aquifer is near the soil surface. Redoximorphic (redox) features present in the subsurface are indicative of a high water table, although they can also form as a result of prolonged inundation from flooding (potentially at Ford and Watson East parcels) or the retention of water by a restrictive layer that retains water in subsurface soils (a condition not common at the wetland establishment sites).
b. Additional sources of water that support existing wetlands would also support adjacent established wetlands.
c. The redox features and other soil characteristics described for the soil pits excavated within the Ford and Niesen establishment sites refer to the native soil below the fill material.

At all wetland establishment sites except Watson East (South), soils with slow or very slow permeability were detected in some, but not all, soil pits. At the locations where the soils have slow or very slow permeability, there is a potential for the water to be retained in a manner similar to what was illustrated in the bottom (low aquifer) graphs shown in Figures 11 – 13 of the hydrology technical memorandum. However, because many soil pits did not contain soils with a restrictive layer, it is likely that the wetlands at the 5 establishment sites are dependent on outside sources of water (a high water table being most likely, but water from flooding and upslope sheetflow runoff may also contribute). At locations supported by a high water table or flooding (i.e., almost all sites), the wetlands are likely to behave in a manner similar to that shown in the top graphs (high aquifer) in Figures 11-13 of the hydrology technical memorandum. However, the exact water surface elevations (whether groundwater or surface water) will depend on the local groundwater table and pattern of flooding. If a site were supported by upslope sheetflow runoff, the hydrologic pattern would show the same "spiky" pattern dependent on rainfall that is shown in the perched aquifer line (red) shown in Figures 11-13 of the hydrology technical memorandum, but higher water elevations would be attained (see paragraph below for more information).

Figure 1 represents a hypothetical example where the soil is assumed to have moderately slow permeability of 5.4 inches per day, a value expected for typical (not very restrictive) soil textures found at the wetland establishment sites. In the sheetflow scenario, sheetflow is assumed to occur if daily rainfall is greater than 0.33 inches and it is assumed to increase the effect of precipitation by a factor of fifteen. Note that the values shown for no sheetflow are the same as the "soil perched" line that appears in the upper graph of Figure 11 of the hydrology technical memorandum (July 29 submittal).

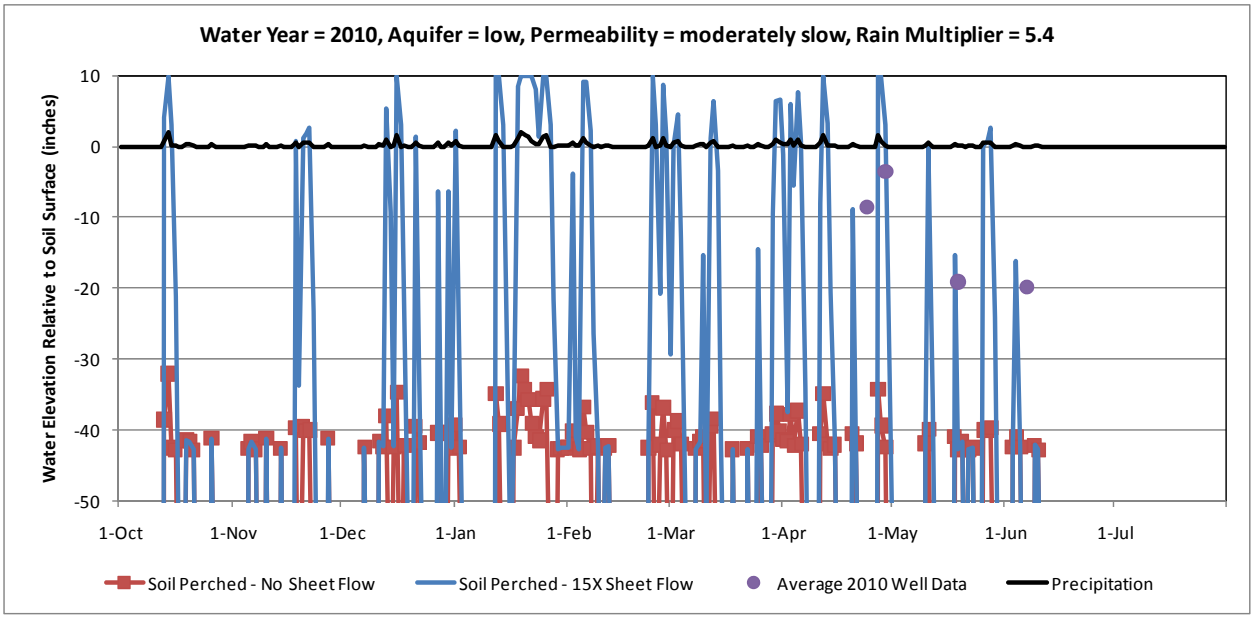

Figure 1. Estimated Water Surface Elevation for Water Perched on Soil with and without Sheetflow

Based on the information in Table 1, the following site-specific hydrologic inferences can be drawn at the wetland establishment parcels:

Ford. Existing wetlands at the Ford parcel are most likely supported by a high water table and/or overflow from Old Outlet Creek. Once the establishment site is excavated to the same elevation as the adjacent, existing wetlands, the establishment site is expected to have the same hydrology as the existing wetlands.

Goss/MGC Plasma. Existing wetlands at the Goss/Plasma site are most likely supported by a high water table. Upslope runoff to local depressions may provide some contribution, but because the soils upslope of the parcel are likely to absorb most precipitation, runoff contributions into the parcel are generally not expected to be large. None of the soil pits in existing wetlands had slow or moderately slow permeability, although 5 of the 12 pits in the establishment area had slow or moderately slow permeability. The presence of water in the PLHO monitoring wells during spring 2010, despite the lack of a restrictive layer, is indicative of a high water table. The Goss/ MGC Plasma wetland establishment site is expected to be supported by the same hydrologic conditions as the existing wetlands. In addition, the localized presence of soils with a restrictive layer may further benefit the established wetlands.

Niesen. Existing wetlands at the Niesen parcel are most likely supported by a high water table. Once the establishment site is excavated to the same elevation as the adjacent, existing wetlands, the establishment site is expected to have the same hydrology as the existing wetlands.

Watson East (North and South). There are multiple potential water sources for the existing wetlands at the Watson parcel, depending on location: backwater effects from down-valley flooding, upslope sheetflow runoff, retention of incident precipitation by restrictive layer soils, and a high water table. It is likely that the lower portions of the parcel receive more water from down-valley flooding than the locations farther upslope. Wetlands to be established on the site are likely to be supported by the same water sources as the existing wetlands. The soil pits indicate that there may be more areas with restrictive layer soils in the existing wetlands than in the establishment sites, but because the restrictive layer soils are not present everywhere, other sources of water are likely to be more important.

Caltrans will be collecting additional site-specific hydrology data at the wetland establishment sites as part of baseline studies that will begin in fall 2010 and continue through spring 2011. Additional groundwater wells and soil moisture data loggers are proposed to be installed to collect this data.

3) Niesen Wetland Establishment Site

USEPA has indicated that they have doubts regarding the Niesen wetland establishment site. The site is surrounded on three sides with non-native and invasive plants being prevalent.

The Niesen wetland establishment site has been included in the bypass project's mitigation plan in an effort to address agency direction to provide as much wetland establishment in Little Lake Valley as possible. Efforts to identify mitigation lands in the valley that would support wetland establishment are documented in the Feasibility Study (2005) and Mitigation Parcels Report (2007). Agency determinations that lands delineated by Caltrans as uplands were wetlands and changing preferences of land owner willingness to sell led to very little remaining wetland establishment opportunities in the valley. In July 2008 Caltrans briefed the agencies on the lack of viable wetland establishment opportunities within Little Lake Valley. The RWB response letter indicated that Caltrans needed to re-double their efforts for identifying wetland establishment both within and outside of Little Lake Valley. Considerable effort and cost has gone into the research and development of these sites. Caltrans understanding in moving forward with this work was that despite the costs, the maximum amount of wetland establishment should be pursued.

The Niesen wetland establishment site was presented in the March 2010 MMP and its location alone did not result in substantive comment at that time. However, Caltrans infers that the USEPA's concern is not based entirely on the fact that it is surrounded by roadways. Rather the concern is that since it is surrounded by roadways the site will pose problems from an invasive species maintenance standpoint and benefits of the established wetland site will be reduced due to poor hydrological connectivity. With respect to invasive species control, Caltrans has developed a Property Analysis Record (PAR) that provides for invasive species management in perpetuity at the wetland establishment sites. If invasive species are not controlled on this parcel, either as a result of enhancement or establishment efforts, then this parcel would continue to be degraded with invasive species infestations. With respect to hydrologic connectivity, it will be maintained at the Niesen parcel post-construction. The land surface at the wetland establishment site will be lowered to match the elevation of the existing adjacent wet meadow. The land surface will slope down gently to the north from the southern parcel boundary. A culvert will enter the southwest corner of the established wetland and flow north across the wetland. In addition, another culvert will enter the parcel midway along its western boundary and flow across the established wetland from west to east and eventually drain into the existing wetland on the east side of the bypass through a culvert under the bypass embankment. If the Niesen establishment site is eliminated from the bypass project's mitigation plan, there are limited options available to make up for the expected 5.66 acres of wet meadow to be established at this parcel. If the Niesen establishment site is eliminated, Caltrans will need to determine how the elimination of this establishment site affects permits already issued by the RWB and CDFG based on the inclusion of the Niesen establishment site.

The USEPA letter of August 11, 2010 also states that hydrology and plant community information have not yet been received for the Niesen parcel. Hydrology data was provided as part of the hydrology technical memorandum submitted on July 29 and vegetation/plant community data was provided as part of the vegetation technical memorandum submitted on August 10.

Response to August 11, 2010 e-mail from Melissa Scianni of USEPA regarding the Long-term Management Plan (Chapter 11 of the MMP)

Caltrans provided a Long-term Management Plan (LTMP) in the June 2010 MMP (Chapter 11). During the July 12-13th meeting the USEPA and USACE provided verbal comments on the MMP. All comments received from the July meeting were addressed in the August 9, 2010 version provided to the agencies. Caltrans anticipated either concurrence or comments focused on the new changes. Many of the comments in the August 11 e-mail are new requests for additional details based on a re-review of the entire document. Due to the timing of these new requests, Caltrans will address these comments in the next planned revision of the LTMP.

Responses to August 13, 2010 e-mail from Melissa Scianni of USEPA regarding Soil Characteristics at Wetland Establishment Sites

1) The topsoil at the Ford property consists of fill material and is not appropriate for placement on the wetlands after construction. Please remove the replacement of topsoil language from the MMP for this parcel. Since the topsoil cannot be replaced at this site, is there any need to treat the new surface layer to facilitate plant growth?

The requested change has been made to Chapter 7 in the MMP (provided as part of the August 15 submittal). With respect to treating the buried native soil surface layer, it appears from some of the soil pits excavated at the proposed wetland establishment site at the Ford parcel (e.g., soil pits #5 and #7) that the top of the native soil is below the finish grade elevation (0.8 meter and 0.4 meter, respectively). However, there appear to be areas at the Niesen parcel that have suitable, native topsoil that could be applied at the Ford parcel, or there may be areas in the bypass project alignment where native topsoil could be salvaged prior to disturbance and applied at the Ford parcel. There should be no need to treat/amend the new, applied surface layer soil.

2) Is there any evidence that the old mill site treated wood (e.g. with creosote), or did it only process natural wood? Was there any evidence of treated wood in the fill material at the Ford Parcel? If there is evidence of treated wood, some soil chemistry analysis may be necessary at the Ford parcel.

During the July 2010 soil evaluation at the wetland establishment site at the Ford parcel, no treated wood was observed where soil pits were excavated in the fill material. Crews did uncover a utility pole in one of the pits, but because it had been buried for many years, it was

difficult to determine whether the pole had been treated with creosote; however, the crew did not observe any obvious creosote coating on the pole. Based on the results of the July 2010 soil evaluation, the fill material consists mostly of bark, natural wood and lumber pieces, partly burned wood, and ash.

In addition, Caltrans has conducted hazardous materials reconnaissance and assessment for the mitigation parcels, including Ford. The results of the assessment identified no significant hazardous waste/material issues at the parcel (see attached).

3) As I understand, the material to be removed from the Ford parcels is currently proposed for road base in the bypass. Given what was learned about the material present at this site, is it still appropriate for road base material? If not, can the wetland construction at the Ford parcel be moved up in the schedule?

Caltrans has determined that the fill material can be used for fill in the bypass project alignment. As such, the schedule in the MMP for wetland establishment at the Ford parcel (with the proposed wetland establishment site being constructed toward the end of the Phase 1 construction schedule) is still accurate.

4) The Niesen property contains gravelly fill material that appears to have been incorporated into the native soil in some locations. Will all of the foreign material be removed under the currently proposed grading plans? If not, they will need to be revised to ensure that all of the gravelly material is removed.

Based on the July 2010 soil evaluation at the wetland establishment site at the Niesen parcel, the amount of gravelly fill mixed in with the native soil is minor, and does not extend very deep. Excavating to the finish grade elevation will most likely remove most or all of the mixed-in gravel.

5) As with the Ford property, placement of the topsoil back on the wetlands after construction is not appropriate for the Niesen property. For this parcel, please remove the language about replacing the topsoil from the MMP. Since the topsoil cannot be replaced at this site, is there any need to treat the new surface layer to facilitate plant growth?

Based on the soil pits excavated at the Niesen property, it appears that the top of the native soil is at or just above finish grade. Therefore, it is expected that there will be no need to treat the soil at finish grade.

6) The soils memo suggests that the hydrology at Watson and Goss/MG Plasma may not be driven only by groundwater and is more complicated that what was presented in the MMP and hydrology memo. I will comment more on this once I have a chance to review the hydrology report in more detail.

The hydrology technical memorandum describes the Watson East and Goss/MGC Plasma establishment sites and adjoining wetlands at a broader scale than does the soils technical memorandum, the latter which was based on a more intensive site evaluation. For example, the hydrology technical memorandum necessarily did not factor-in the influence of microtopographic variations on the presence of wetland hydrologic conditions. Although the hydrology technical memorandum accurately identifies the hydrology of these sites to be predominately groundwater-driven, the soils technical memorandum also identified that surface water (i.e., shallow ponding) and a shallow perched water table are also localized factors in controlling the hydrology of the existing wetlands. Such factors are also expected to operate in the established wetlands on a localized basis.

Responses to August 5, 2010 e-mail from Melissa Scianni of USEPA regarding the Preservation Memorandum submitted on August 2, 2010

Caltrans provides the following additional technical information regarding the Watson West and Huff offsite mitigation parcels. Caltrans asserts that these parcels meet the standards pursuant to 33 CFR Part 332, Section 332.3(h) for inclusion of these parcels for preservation as part of the mitigation plan. Please see specific responses below.

1) The document states that preservation of the two parcels will contribute to the ecological sustainability of Baker's meadowfoam and North Coast semaphore grass populations in the Valley. However, the plant community section does not identify meadowfoam and semaphore grass on Watson or semaphore grass on Huff.

There is an observed population of Baker's meadowfoam on the Huff parcel (0.08 acre; see June 2010 MMP Appendix C, Sheet C-55); however, there is no observed population of North Coast semaphore grass on the Huff parcel. Surveys for Baker's meadowfoam and North Coast semaphore grass and have not been conducted on the Watson West parcel. Preservation of the Huff parcel would directly contribute to the sustainability of habitat for Baker's meadowfoam.

2) Are there downstream populations that will benefit from the preservation? Please clarify how preservation of Huff and Watson will benefit these plant species.

There are no known downstream populations of Baker's meadowfoam which would benefit from preservation of the species on the Huff parcel. However, preserving the Huff parcel will directly benefit the existing Baker's Meadowfoam population that has been observed on this parcel from future disturbance from development or trespass.

3) Please describe in more detail the condition of Outlet Creek on these parcels. For

example, is there riffle habitat, salmonid spawning areas, salmonid rearing habitat, etc. (for fish habitat information, please see #4 and #5)

Per the erosion site assessment conducted for the offsite mitigation parcels in May 2010 and the Outlet Creek Basin Assessment Report (LeDoux-Bloom and Downie 2008), relevant findings for instream habitat in Outlet Creek include:

- A majority of habitat units consist of long runs dominated by fine sediments (silts and sands); shallow pool depths were noted, probably resulting from the fine sediments; and riffles (although present near gravel bars) were not abundant.
- Fine sediment deposits contribute to small spawning substrate (and can lead to an increase in flooding through loss of channel capacity, which in turn exacerbates bank erosion).
- Embeddedness levels are unsuitable in many streams (which signals fine sediment deposition from bank and near-bank processes).
- Woody debris influence was generally low.
- The six dams in the Outlet Creek Basin have significantly decreased downstream gravel recruitment.

4) Do these reaches of Outlet Creek represent critical migration corridors for salmonids to reach upstream high quality spawning habitat?

Stream habitat quality for most streams in Little Lake Valley generally decreases as the channel geomorphology changes from a high gradient stream occurring on basin slopes to a low gradient stream occurring on the valley floor. This decrease in habitat quality is largely due to past and present land uses. Nonetheless, the lower stream reaches, including Outlet Creek, are important to varying degrees for coho and Chinook salmon and steelhead and support migration habitat for all species, seasonal rearing habitat for all species, year-round rearing habitat for steelhead, and spawning habitat for Chinook salmon. In addition, the lower reaches are designated critical habitat for coho and Chinook salmon and steelhead, and are designated as Essential Fish Habitat (EFH) for coho and Chinook salmon.

5) How does the condition of Outlet Creek on these parcels compare to other reaches of the Creek (e.g. is the Creek higher functioning here than in other areas)?

Based on consultation with the resource agencies, the streams and riparian corridors in Little Lake Valley have been categorized based on their relationship to designated critical habitat areas for listed anadromous fish. The category of the Outlet Creek stream and riparian corridor on the Huff and Watson West parcels is considered Category I Stream/Riparian Corridor. Category I Riparian Corridor represents those vegetated areas that occur along salmonid-bearing streams (i.e., Category I streams). These streams and riparian corridors are designated critical habitat for listed salmonids, including coho salmon. The health of these streams and riparian corridors has an immediate and direct effect on anadromous fish populations. Parts of Category I streams and riparian corridors fall under USACE jurisdiction as wetlands or other waters.

6) How do the riparian and wetland habitats on these parcels compare to the other wetland and riparian habitats in the valley?

The preservation technical memorandum (August 2 submittal, Section 4) describes site-specific plant community conditions on the Huff and Watson West parcels. Based on qualitative observations and information contained in the verified wetland delineations, wetland and riparian habitats on the Huff and Watson West parcels are relatively undisturbed and provide important linkages across the northern part of Little Lake Valley and along Outlet Creek. The wetland and riparian types present on Watson West are more mesic than those occurring further south in the valley based on overall valley hydrology. The riparian habitats on the Huff parcel are dense and in some places impenetrable. They also support a well-developed understory.

7) Are there any unique species/habitats present? Do the habitats on these parcels represent the highest functioning wetlands/riparian areas in the Valley?

The Huff parcel supports riparian scrub which is uncommon on the offsite mitigation parcels (August 15 submittal, Table 2). The Watson West parcel supports marsh which is also uncommon on the offsite mitigation parcels (August 15 submittal, Table 2).

8) What proportion of mature, high functioning riparian habitat around Outlet Creek occurs on these parcels (i.e. do these parcels represent a significant portion of the good riparian habitat in the Valley)?

Please refer to the watershed technical memorandum (August 10 submittal) and the preservation technical memorandum (August 2 submittal). Table 1 of the watershed technical memorandum lists the total existing wetlands occurring on the offsite mitigation parcels by habitat type. The total riparian woodland wetland occurring on the offsite mitigation parcels is 107.557 acres.

9) What proportion of mixed marsh in the Valley is present on Watson (i.e. is this a significant portion of the mixed marsh present in the Valley)?

Please refer to the watershed technical memorandum (August10 submittal) and the preservation technical memorandum (August 2 submittal). Table 1 of the watershed technical memorandum lists the total existing wetlands occurring on the offsite mitigation parcels by habitat type. The total marsh wetland habitat type is 141.051 acres. Watson West has 39.69 acres of marsh (Table 2 of the preservation technical memorandum), which is 28% of the marsh on the offsite mitigation parcels.

10) The document identifies several invasive plant species on both parcels (e.g. Himalayan blackberry, teasel). Please describe the extent of these invasive plant populations and how they affect aquatic resource functions on the parcels.

Please refer to the preservation vegetation sites technical memorandum (August 15 submittal). There is currently no data available showing the boundaries and density of invasive plant populations. However, point-intercept transect data was collected for plant communities and the information collected is summarized below.

On the Huff parcel, within the wet montane meadow community, two invasive plant species, medusahead and teasel were observed with 3% absolute cover in transect 4. In the Oregon ash grove community, one invasive plant, Himalayan blackberry, was observed with 1% absolute cover in a single transect. In the annual brome grassland alliance, yellow star thistle was observed with an absolute cover of 10% in a transect, and medusahead was also observed with 12% absolute cover in a transect.

On the Watson West parcel, the only invasive plant observed was Himalayan blackberry, which was 5% of the absolute cover in one Oregon ash grove community transect.

11) The document states that the parcels are important for maintaining habitat linkages. Please provide additional detail about how Huff and Watson connect with other high functioning habitat in the Valley, including whether or not Huff and Watson are critical components to maintaining connectivity of high functioning habitat.

Figure 4 in the watershed technical memorandum (August 10 submittal) shows the landscape connectivity of all offsite mitigation parcels. This includes the connection of Huff and Watson West with Outlet Creek and other stream corridors and the wetlands surrounding them. Outlet Creek is the main drainage of the valley and as such serves as a major wildlife corridor. Outlet Creek supports salmonids and provides a water source for wildlife throughout the year. The Watson East offsite mitigation parcel is connected to the Watson West parcel which creates an east-west wildlife migration corridor that includes Outlet Creek on its western border. The Huff offsite mitigation parcel also contains a portion of Outlet Creek downstream of the Watson West parcel, and riparian woodlands there are extensive and completely shade the Outlet Creek channel.

12) Outlet Creek and the Eel River are 303(d) listed for temperature and sediment. Yet the document does not address how the preservation of the Huff and Watson parcels will advance the sediment and temperature TMDLs. Please provide a discussion of how the habitats on these parcels are important for achieving the specific goals presented in the TMDLs. Please provide quantitative discussions for the above items to the extent possible.

Please refer to the memorandum titled "*TMDL Nexus, Willits Bypass Project*" David Melendrez, Caltrans, August 4, 2010 (attached).

The Willits Bypass Project is located in the Upper Main Eel River Hydrologic Area (111.60), Outlet Creek Hydrologic Sub-area (111.61). The Outlet Creek HAS is listed in the current, 2006, Clean water Act 303(d) List of Water Quality Limited Segments, as impaired for Sedimentation/Siltation and Temperature.

As stated in the Upper main Eel River TMDL: "*The primary purpose of the TMDL program for the California's Eel River is to assure that beneficial uses of water (such as salmonid habitat) are protected from adverse increases in natural sediment and temperature. <u>The water quality problems in the Upper Main Eel River and tributaries addressed in this report are related to the decline of west coast salmon and steelhead populations</u>.*"

The following activities are listed for contributing Temperature impairment:

- Channelization
- Habitat Modification
- Removal of Riparian Vegetation
- Streambank Modification/Destabilization
- Drainage/Filling of Wetlands and
- And Nonpoint Sources

The following activities are listed for contributing Sediment/Siltation impairment:

- Agriculture/Grazing
- Silviculture
- Harvesting, Restoration, Residue Management
- Logging Road Construction/Maintenance
- Silviculture Point Sources
- Construction/Land Development
- Highway/Road/Bridge Construction
- Removal of Riparian Vegetation
- Streambank Modification/Destabilization and
- Erosion and Siltation

Offsite Mitigation Lands

The bypass project's MMP was developed by evaluating Little Lake Valley through historical research and study of current conditions with an objective of developing a comprehensive and successful ecosystem restoration project with positive effects on listed plants, sensitive habitats, and fish. The objective of the compensatory mitigation proposed for the bypass project is to establish, enhance, repair, preserve, and protect a mosaic of high-functioning habitats in perpetuity and increase the ecological values of Little Lake Valley and the Upper Main Eel River watershed.

Under the bypass project's Clean Water Act Section 401 water quality certification, an extensive Monitoring and Reporting Program (MRP) issued by the RWB will apply to both the onsite impact areas and to the offsite mitigation parcels. Both sediment and temperature will be monitored on a continuous basis for a minimum of seven years, following implemented mitigation actions, and in years five and ten.

Temperature and sediment are grouped together because mitigation actions implemented to address these two parameters should have beneficial effects that apply to both. For example, riparian planting and stabilization of eroding headcuts will likely have a beneficial effect on temperature, as well as decreasing localized turbidity of the receiving waters.

Caltrans has prepared and submitted a Technical Memorandum to the Resource Agencies for consideration and proposed as part of the MMP: *Assessment of Erosion Sites On Offsite Mitigation Parcels in Little Lake Valley, May 2010*. The technical memorandum is written in a fashion that models previous studies and information developed by the RWB to address sediment delivery sites.

Implementation of specific plans will be further supported by baseline data collection efforts. Baseline shade /canopy data within the offsite mitigation parcels will be established according to California SWAMP protocols, and may go beyond SWAMP protocols due to the length of the various stream reaches. Mitigation constructiton plans for riparian planting, erosion restoration (headcut sites), wetland establishment, and fish passage are being finalized by Caltrans staff.

Implementing actions identified in the *Assessment of Erosion Sites On Offsite Mitigation Parcels in the Little Lake Valley* technical memorandum will have positive benefits to address both sediment and temperature. Additionally, preserving the Huff and Watson West mitigation parcels for their ecological values in perpetuity will ensure that future developments and activities contributing to temperature, sediment, and siltation impairment of the Outlet Creek basin (such as stream channelization, riparian vegetation removal, drainage/filling of wetlands, logging road construction, silviculture, and land development) are not conducted on these parcels. No grazing is proposed on these two preservation parcels, thereby further reducing contributions to temperature, sediment, siltation, and nutrient impairment to the Outlet Creek basin.

Preservation of the Watson West offsite mitigation parcel provides a connection to the Watson East offsite mitigation parcel creating an east-west wildlife migration corridor that includes Outlet Creek on its western border, and will preserve existing high-quality marsh habitat, including a portion of the historic "Little Lake" situated at the north end of the Little Lake Valley. The Huff offsite mitigation parcel will preserve a portion of Outlet Creek downstream of the Watson West parcel that supports riparian woodlands that are mature, extensive, and completely shade the Outlet Creek channel. Additionally, the Huff parcel is unique in its geographic position, in that it is the point at which Outlet Creek exits Little Lake Valley and enters a more canyon-like landscape. Maintaining the naturally high functions of the marsh system at the Watson West parcel and the mature dense riparian woodland on the Huff parcel in perpetuity is important in achieving the TMDL goals for this basin.

Responses to July 29, 2010 e-mail from Dave Wickens of USACE regarding location in MMP of requested information from the July 9, 2010 letter from USACE to Caltrans

In response to the USACE July 9 letter that requested information related to the bypass project's mitigation plan, Caltrans provided the location for the requested information in the June 2010 MMP, where applicable. USACE responded in their July 29 e-mail that most of the requested information was not in the June 2010 MMP and provided additional detailed information requests. Caltrans respectfully disagrees that most of the requested information in the July 9 letter was not included in the June 2010 MMP. Caltrans also notes that USACE provided the comments in the July 29 e-mail in advance of the submittal of the series of technical memoranda on hydrology, soils, vegetation, preservation parcels, and miscellaneous information prepared by Caltrans that further refined available information and presented new information (e.g., plant communities present at the wetland establishment sites and preservation parcels). Please consult these memoranda for the requested information. Caltrans has additional responses to some of the comments in the July 29 e-mail and these are provided below.

1) How are we measuring groundwater re-charge, biomass, wildlife diversity, aquatic diversity. What is baseline for these functions (pages 2-3)?

The bypass project's mitigation plan identifies the functions that the Outlet Creek Basin provides – among them being groundwater re-charge, biomass, wildlife diversity, and aquatic diversity. Through the Clean Water Act Section 401 water quality certification Monitoring and Reporting Plan (MRP), aquatic diversity data under baseline, project, and post-project changes will be collected.

Groundwater re-charge will be measured through the use of groundwater monitoring wells, which will be placed in appropriate locations at each of the offsite mitigation parcels, including the establishment parcels and the Huff and Watson West preservation parcels. Some groundwater monitoring wells have been installed as part of hydrologic studies relating to North Coast semaphore grass (Goss, Huffman, and Lusher parcels). Additional wells are proposed to be installed and measurements will begin prior to the start of construction of the bypass and mitigation projects.

Biomass changes will be measured as a function of changes in vegetative cover. As per the MMP, the establishment of the target vegetative communities and meeting vegetation success criteria includes meeting the targeted increases in native plant and riparian cover at each mitigation site, as described in Chapters 9 and 10 of the MMP. Additionally, changes in plant cover will be noted by aerial photography. Aerial photographs will be taken the year that the mitigation areas meet their final success criteria and compared to pre-project photographs. Additional aerial photographs are proposed to be taken in years 5, 10 and 15, and then every ten years after mitigation areas meet their final success criteria in order to detect landscape level changes in vegetation patterns.

Aquatic diversity will be measured as part of baseline studies (currently in progress) and will be monitored throughout the bypass project and mitigation project implementation and reporting period, as described in the MMP and supporting documentation. Data will be collected using the following protocol, as directed by the RWB: *"Collecting Benthic Macroinvertebrate Samples and Associated Physical and Chemical Data for Ambient Bioassessments in California (updated 02/01/07)"*. This protocol includes a biological component (macro-invertebrate surveys) as well as physical components including measurements of wetted width, bank-full width, substrate measurements, cobble embeddedness, canopy cover, sinuosity and gradient, chemical composition, etc.

It should also be noted that the Upper Main Eel River TMDL states that: "*The primary purpose of the TMDL program for the California's Eel River is to assure that beneficial uses of water (such as salmonid habitat) are protected from adverse increases in natural sediment and temperature. <u>The water quality problems in the Upper Main Eel River and tributaries addressed in this report are related to the decline of west coast salmon and steelhead populations</u>*." The extensive Monitoring Reporting Program (MRP) issued by the North Coast RWB will apply to both the onsite impact areas and to the offsite mitigation parcels; ultimately these measures

intend to benefit west coast salmon and steelhead populations. Furthermore Caltrans' riparian mitigation strategy, developed in conjunction with the CDFG and National Marine Fisheries Service (NMFS), is also driven by the requirements of west coast salmon and steelhead populations.

2) MMP does not speak to what the watershed improvement will be (page 3)?

Part of the mitigation vision for the bypass project articulated in the June 2010 MMP is that, once mitigation construction is complete and after approximately 10 years of management and monitoring, the Valley as a whole will provide enhanced wetland functions and exhibit greater ecological value than existed prior to bypass project construction. The Valley will experience a long-term benefit to habitat because the offsite mitigation parcels will not be developed and will be managed for the benefit of biological resources in perpetuity. Existing wetlands and riparian and oak woodland will be increased (24.33 acres of wetland establishment are proposed), and physical barriers to wildlife passage and movement will be reduced or eliminated. The offsite mitigation parcels will be publicly owned in trust for the people of California and will be adaptively managed to benefit wildlife and water quality in the Valley. Functions to be improved by the mitigation plan are provided in the June 2010 MMP (Chapter 2, pages 2-16 through 2-23).

For example, the overall health of streams in Little Lake Valley will be guided by the Clean Water Act Section 401 water quality certification and Monitoring and Reporting Plan (MRP). The MRP requires that an extensive list of water quality constituents and bioassessment parameters be monitored to track watershed surface water quality improvement. As part of watershed surface water quality improvement efforts, it is expected that implementation of a grazing management plan will help to reduce sedimentation and organic nutrients in valley streams because access to stream/riparian corridors by cattle will be restricted except for a minimum number of controlled crossings (see mitigation construction plans and special provisions submitted on August 2).

3) Develop self sustaining ecosystems that allow for natural succession…. Is this (really) the goal of your mitigation (page 3)?

The mitigation plan's goal with respect to wetland establishment is to have both self-sustaining *target* ecosystems and *natural* ecosystems where succession is managed through adaptive grazing practices. At the proposed wetland establishment sites (i.e., Ford, Goss/MGC Plasma Middle/MGC Plasma North, Niesen, and Watson West), once the sites achieve success criteria they will be evaluated to determine when and what level of grazing intensity is appropriate as part of management actions to achieve a target ecosystem. At some wetland enhancement sites in the north (more mesic) section of the valley, grazing will be excluded from some wet meadow to support the natural succession of this habitat to riparian woodland wetland. For example, at the Brooke offsite mitigation parcels, grazing is proposed to be excluded on the eastern portion of the parcels to allow for the re-generation of Oregon ash and other riparian species that are starting to become established. Riparian planting is proposed to expedite this successional

change. See the August 15 version of the Chapter 7 for more information.

Caltrans has worked diligently to respond to all agency questions. In addition, per the June 30 suggestion by Alexis Strauss of the USEPA, the services of former USEPA staff member Mike Monroe have been retained. Mr. Monroe is knowledgeable about the bypass project and mitigation plan due to his former involvement as a NEPA 404 team member. Given Mr. Monroe's past involvement, Caltrans further offers that resolution of any outstanding issues may be accelerated by using Mr. Monroe as moderator for future discussions.

We remain available to answer any further questions.

Please do not hesitate to contact me at (916) 274-0621, or by e-mail at Jeremy_Ketchum@dot.ca.gov, if you have any questions or concerns.

Thank you.

Sincerely,



Jeremy Ketchum, Chief
Environmental Management, S1

Cc: Ms. Melissa Scianni, EPA
Mr. Jeremiah Puget, NCRWQCB
Mr. Craig Martz, CDF&G
Ms. Janet Olave, MCRCD
Mr. David Drell, WEC

Attachments: TMDL Nexus, Willits Bypass Project
Potential Mitigation Properties, Hazardous Waste Clearance

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: LUSTER	Pit No.: 108-030-04
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe **sharpshooter** hand auger	Photo Number:	

Land Surface Shape: (slightly) planar **concave** convex	Landform: natural levee artificial levee **swale** **floodplain** basin
	Slope Gradient (%): 0 – 1
Soil Map Unit: GIELOW	Soil Series as Observed: GIELOW
General Comments:	
Dominant Plant Species: JUNCUS SP, MENPUL, DESCHAMPSIA SP, PHALARIS SP	
Jurisdictional Status at Pit: **existing wetland (reference)** wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 21
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0–10	A	l	abk, 2	L	m, 2, P, Fe-x, M	MOD.	ROOT MAT AT BASE
10–16	C1	grsl	sg	VL	NONE	HIGH	
16–21	C2	s	sg	VL	"	HIGH	
21+	2Ab	cl	m	L	m, 2, P, Fe-x, M	MOD	RELATIVELY MOIST

[1]**Texture and Coarse Fragment Content**

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]**Soil Structure**

Structure Type

gr - granular
abk - angular blocky
pl - platy
pr - prismatic
sg - single grain
m - massive

Structure Grade

0 - structureless
1 - weak
2 - moderate
3 - strong

[3]**Redoximorphic Feature Morphology**

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: LUSHER	Pit No.: 108-030-04 2
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: GIELOW	Soil Series as Observed: ?
General Comments:	
Dominant Plant Species: BROHOR, AVENA SP, LOLIUM SP, DECHAMPSIA SP	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 24
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-7	A	sl	sg	M	NONE	MOD	
7-13	C1	ls	sg	L	NONE	HIGH	
13-19	C2	gr ls	sg	L	NONE	HIGH	
19-24	2Ab/C3	sil	m	M	M, 2, D, Fe-x, M	MOD	

[1]**Texture and Coarse Fragment Content**

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]**Soil Structure**

Structure Type

gr - granular
abk - angular blocky
pl - platy
pr - prismatic
sg - single grain
m - massive

Structure Grade

0 - structureless
1 - weak
2 - moderate
3 - strong

[3]**Redoximorphic Feature Morphology**

Redox Abundance

f - few
c - common
m - many

Redox Size

1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast

F - faint
D - distinct
P - prominent

Redox Type

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location

M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: LUSHER	Pit No.: 108-030-04 3
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe **sharpshooter** hand auger	Photo Number:	

Land Surface Shape: (slightly) **planar** concave convex	Landform: natural levee artificial levee swale **floodplain*** basin
SOMEWHAT DISTURBED, ESPECIALLY TO EAST	Slope Gradient (%): 1-2
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed:
General Comments: GLASS SHARD (SLIGHTLY WORN) AT 8"	* NEAR TOE OF NATURAL LEVEE (?)
Dominant Plant Species: TACAPMED, BROHOR, CENSOL, AVENA SP	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition **upland**	Depth to Soil Saturation (in.): NONE TO 28
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low **medium** high Comments: DIFFICULT TO ASSESS WITH REGARD TO REDOX BECAUSE OF GRAVELLY MATERIAL FROM 2 TO 26, WHICH DOES NOT PROMOTE

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments (REDOX)
							1/4" ORGANIC MAT AT SURFACE*
0-2	A	l	m	LOW	C, 2, D, Fe-x, PL	MOD.	* FROM INUNDATION ?
2-11	AC	xgrsl	sg	LOW	NONE	HIGH	
11-26	C	vgrls	sg	LOW	NONE	HIGH	
26-29	2Ab/C	sil	m	MOD	C, 2, D, Fex-M	MOD	RELATIVELY MOIST

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
Redox Size	Mn-nc - manganese nodule or concretion
1 - fine (<2mm)	D - depletion
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
Redox Contrast	RC - root channel (ox. rhizospheres)
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name:	Pit No.: 108-030-04 4
Investigator(s): Joel Butterworth		Date: August 15, 2011
Method of Excavation: backhoe sharpshooter hand auger		Photo Number:

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: GIELOW	Soil Series as Observed: GIELOW
General Comments:	
Dominant Plant Species: LOLIUM SP, HORMARGUS, DECHAMPSIA SP	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 24
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-2	A1	l	M	MOD	M,2,D,Fe-x,RC	MOD	
2-11	A2	l	M	LOW-MOD	M,2,D,Fe-x,M	"	
11-22	AC	sl	M	LOW	NONE	"	
22-26	C	sl	sg	LOW	C,2,D,Fe-x,M	"	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: 108-010-06 1
Investigator(s): Joel Butterworth	Date: August 16, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 2 (VERY SUBTLE)
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: FLUVAQUENTS
General Comments: STRATIFIED	
Dominant Plant Species: UNIDENTIFIABLE GRASSES, JUNCUS SP	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 27
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-7	A1	sl	m	MOD.	NONE	MOD	
7-15	A2	sl	m	MOD	C,2,F,Fe-x,M	MOD	
15-19	C1	grsl	sg	LOW	NONE	HIGH	
19-27	C2	sil	m	LOW	M,2,P,Fe-x,M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: 108-010-06 2
Investigator(s): Joel Butterworth	Date: August 16, 2011	
Method of Excavation: backhoe **sharpshooter** hand auger	Photo Number:	

Land Surface Shape: (slightly) **planar** concave convex	Landform: natural levee artificial levee swale **floodplain** basin
	Slope Gradient (%): 1-2
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: FLUVAQUENTS
General Comments:	
Dominant Plant Species: UNIDENTIFIABLE GRASSES, JUNCUS SP., MINOR PHALARIS	
Jurisdictional Status at Pit: **existing wetland (reference)** wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 27
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-9	A1	FSL	gr	HIGH	(NONE)	MOD	
9-20	A2	FSL	M	MOD	M, 2, D, Fe-x, M	MOD	
20-27	Bg	CL	M	LOW	M, 2, P, Fe-x & Mn-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance
- f - few
- c - common
- m - many

Redox Size
- 1 - fine (<2mm)
- 2 - medium 2–5mm)
- 3 - coarse (5–20mm)
- 4 - very coarse (20–76mm)
- 5 - extremely coarse (>76mm)

Redox Contrast
- F - faint
- D - distinct
- P - prominent

Redox Type
- Fe-x - iron concentration (soft mass)
- Fe-nc - iron nodule or concretion
- Mn-x - manganese concentration (soft mass)
- Mn-nc - manganese nodule or concretion
- D - depletion

Redox Location
- M - soil matrix
- P - ped face
- PL - pore lining
- RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: 108-010-06 3
Investigator(s): Joel Butterworth	Date: August 16, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: HAPLAQUEPTS	Soil Series as Observed: HAPLAQUEPTS
General Comments:	
Dominant Plant Species: UNIDENTIFIABLE GRASSES, MINOR JUNCUS	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 21
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-7	A1	L	gr	HIGH	M, 1, P, Fe-x, RC	MOD	
7-15	A2	VFSL	M	MOD	M, 2, D, Fe-x, M	MOD	
15-21	Bg	SICL	M	LOW	"	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: 108-010-06 4
Investigator(s): Joel Butterworth	Date: August 16, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 2 (NEAR TOE)
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed:
General Comments:	
Dominant Plant Species: UNIDENTIFIABLE GRASSES (PASTURE)	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-3	A1	VFSL	gr	MOD	NONE	MOD	
3-22	A2	VFSL	M	MOD	C, 2, D, Fe-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance
- f - few
- c - common
- m - many

Redox Size
- 1 - fine (<2mm)
- 2 - medium 2–5mm)
- 3 - coarse (5–20mm)
- 4 - very coarse (20–76mm)
- 5 - extremely coarse (>76mm)

Redox Contrast
- F - faint
- D - distinct
- P - prominent

Redox Type
- Fe-x - iron concentration (soft mass)
- Fe-nc - iron nodule or concretion
- Mn-x - manganese concentration (soft mass)
- Mn-nc - manganese nodule or concretion
- D - depletion

Redox Location
- M - soil matrix
- P - ped face
- PL - pore lining
- RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: WILDLANDS	Pit No.: ~~108-070-09~~ 1
Investigator(s): Joel Butterworth	Date: August 16, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: FLUVAQUENTS
General Comments:	
Dominant Plant Species: POA PRA (?), FESTUCA (?), MINOR JUNCUS	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 22
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-2	A1	l	SG	HIGH	F, 1, D, Fe-x, RC	MOD	
2-16	A2	l	M	MOD	NONE	MOD	
16-22	Bg	sil	M	LOW	M, 2, D, Fe-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: WILDLANDS	Pit No.: 108-070-09 2
Investigator(s): Joel Butterworth	Date: August 16, 2011	
Method of Excavation: backhoe **sharpshooter** hand auger	Photo Number:	

Land Surface Shape: (slightly) **planar** concave convex	Landform: **natural levee** artificial levee swale **floodplain** basin
	Slope Gradient (%): 1-2
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: FLUVAQUENTS
General Comments:	
Dominant Plant Species: POA PRA, FESTUCA (?), LOLIUM (?),	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition **upland**	Depth to Soil Saturation (in.): NONE TO 25
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium **high**
	Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-1	A1	l	SG	HIGH	NONE	MOD	
1-12	A2	l	M	HIGH	M, 2, D, Fe-x, M	MOD	
12-25	C	FSL	M	LOW	ALONG STRATA: M, 2, D, Fe-x, M	MOD	STRATIFIED

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: WILDLANDS	Pit No.: 108-070-09 3
Investigator(s): Joel Butterworth	Date: August 16, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex LOCAL, SMALL DEPRESSION	Landform: natural levee artificial levee swale floodplain basin Slope Gradient (%): 0-1
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: FLUVAQUENTS
General Comments:	
Dominant Plant Species: POA PRA (?), FESTUCA (?), JUN PAT,	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-1	A1	VFSL	GR	HIGH	M, 1, D, Fe-x, RC	MOD	
1-7	A2	VFSL	M	MOD	M, 2, D, Fe-x, M	MOD	
7-23	C	FSL	M	LOW	M, 3, P, Fe-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: WILDLANDS	Pit No.: 108-070-09 4
Investigator(s): Joel Butterworth	Date: August 16, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): (TOE) 1-2
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: FLUVAQUENTS
General Comments:	
Dominant Plant Species: POA PRA (?), FESTUCA (?) (PASTURE GRASSES)	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 23
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-1	A1	SL	GR	HIGH	NONE	MOD	
1-9	A2	SL	SG	MOD	C, 2, D, Fe-x, M RC	MOD	1/2" GRAVEL LENS AT BASE
9-23	C	FSL	SG	LOW	M, 2, P, Fe-x, M	MOD	VERY FINELY STRATIFIED

[1]**Texture and Coarse Fragment Content**

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]**Soil Structure**

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]**Redoximorphic Feature Morphology**

Redox Abundance
- f - few
- c - common
- m - many

Redox Size
- 1 - fine (<2mm)
- 2 - medium 2–5mm)
- 3 - coarse (5–20mm)
- 4 - very coarse (20–76mm)
- 5 - extremely coarse (>76mm)

Redox Contrast
- F - faint
- D - distinct
- P - prominent

Redox Type
- Fe-x - iron concentration (soft mass)
- Fe-nc - iron nodule or concretion
- Mn-x - manganese concentration (soft mass)
- Mn-nc - manganese nodule or concretion
- D - depletion

Redox Location
- M - soil matrix
- P - ped face
- PL - pore lining
- RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: WILDLANDS	Pit No.: 108-070-09 5
Investigator(s): Joel Butterworth	Date: August 16, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin (SUBTLE)
	Slope Gradient (%): 0-1
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: FLUVAQUENTS
General Comments:	
Dominant Plant Species: UNIDENTIFIABLE GRASSES, POA DRA(?), MINOR JUNPAC	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 27
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-7	A1	FSL	SG & M	MOD	NONE	MOD	
7-14	A2	FSL	M	LOW	C, 2, D, Fe-x, M	MOD	
14-27	C	FSL	M	LOW	M, 2, P, Fe-x, M	MOD	DISTINCT BOUNDARIES ON REDOX; MAY BE RELICTUAL.

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FURD	Pit No.: 108-030-021
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 2-3
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: GIFLOW
General Comments: APPARENT SURFACE INUNDATION	
Dominant Plant Species: BROHOR, DESCHAMPSIA SP, CHEINT	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 25
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-2	A	l	m	L	c, 2, D, Fe-x, M	MOD.	
2-25	AC	vgrsl	sg	L	NONE	HIGH	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: 108-030-02-2
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 2-3
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: FLUVAQUENTS
General Comments:	
Dominant Plant Species: FESTUCA SP (?), CYNECH	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 28
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-5	A	SL	m	L/M	NONE	MOD	
5-26	AC	L to GRSL	sg	L	IN CERTAIN STRATIFICATIONS ONLY	MOD	
26-28	Ab/C	L	m	L/M	m,3,P,Fe-x,M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: 108-030-02 3
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 2-3
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed:
General Comments:	
Dominant Plant Species: POA PRA, FESTUCA, MINOR RUMEX	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 22
Depth to Restrictive Layer (in.): NONE	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-6	A1	l	m	m	NONE	MOD	
6-17	A2	l	m	c	c, 2, D, Fe-x, M	MOD	
17-22	Bg	vfsl	m	c	m, 3, D, Fe-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: 108-030-02 4
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 0-1
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: FLUVAQUENTS
General Comments: STRATIFIED	
Dominant Plant Species: FESTUCA SP (?), LOLIUM SP., MINOR RUMEX,	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.):
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-4	A	sl	m	L	f, 2, D, Fe-x, M	MOD	ROOT MAT AT BASE
4-19	A/C	vgrsl	sg	L	NONE	HIGH	
19-25	C	sl	m	L	M, 2, P, Fe-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FUND	Pit No.: ~~108-030-02~~ 5
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe **sharpshooter** hand auger	Photo Number:	

Land Surface Shape: (slightly) **planar** concave convex	Landform: natural levee artificial levee swale **floodplain** basin
	Slope Gradient (%): 1-2
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: FLUVAQUENTS
General Comments: STRATIFIED	
Dominant Plant Species: LOLIUM SP., FESTUCA SP (?), BROHOR; MINOR RUMCRI, MENPUL, & CHIINT	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition **upland**	Depth to Soil Saturation (in.): NONE TO 22
Depth to Restrictive Layer (in.): NONE	Overall Soil and Site Suitability for Wetland Establishment: low **medium** high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-5	A1	sl	m	L	C, 3, D, Fe-x, M	MOD	
5-11	A2	vgrls	sg	VL	NONE	HIGH	
11-18	C1	s	sg	VL	"	HIGH	
18-22	C2/2Ab	sil	m	L	M, 3, P, Fe-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: ~~108-030-02~~ 6
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: GIELOW	Soil Series as Observed: FLUVAQUENTS
General Comments:	
Dominant Plant Species: FESTUCA SP(?), POA PRA, PHALARIS SP.(?), MINOR RUMEX	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.):
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-8	A	vfsl	m	MOD	NONE	MOD	
8-19	ABg	l	sbk	LOW	C, 2, D, Fe-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Size	Redox Contrast
f - few	1 - fine (<2mm)	F - faint
c - common	2 - medium 2–5mm)	D - distinct
m - many	3 - coarse (5–20mm)	P - prominent
	4 - very coarse (20–76mm)	
	5 - extremely coarse (>76mm)	

Redox Type	Redox Location
Fe-x - iron concentration (soft mass)	M - soil matrix
Fe-nc - iron nodule or concretion	P - ped face
Mn-x - manganese concentration (soft mass)	PL - pore lining
Mn-nc - manganese nodule or concretion	RC - root channel (ox. rhizospheres)
D - depletion	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: 109-030-02 7
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: FLUVAQUENTS
General Comments: NOT STRATIFIED	
Dominant Plant Species: FESTUCA SP. (?), BROHOR, DESCHAMPSIA (?), CYNECH, MINOR RUMCRI	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 25
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-3	A1	sl	GR	HIGH	NONE	MOD	
3-11	A2	sl	M	MOD	C, 2, D, Fe-x, PL M	MOD	
11-23	AC	sl	M	LOW	F, 2, D, Fe-x - M	MOD	
23-25	C	fsl	M	LOW	M, 3, D, Fe-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: 108-030-02 P
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: FLUVAQUENTS / GIELOW	Soil Series as Observed: FLUVAQUENTS
General Comments:	
Dominant Plant Species: FESTUCA (?), POAPRA, MINOR CONVOLVULUS SP.	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 25
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-2	A1	l	M	MOD	C,2,D,Fe-x,M	MOD	
2-12	A2	sl	M	LOW	NONE	MOD	
12-25	Bg	l	M	LOW	M,2,P,Fe-x,M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance
- f - few
- c - common
- m - many

Redox Size
- 1 - fine (<2mm)
- 2 - medium 2–5mm)
- 3 - coarse (5–20mm)
- 4 - very coarse (20–76mm)
- 5 - extremely coarse (>76mm)

Redox Contrast
- F - faint
- D - distinct
- P - prominent

Redox Type
- Fe-x - iron concentration (soft mass)
- Fe-nc - iron nodule or concretion
- Mn-x - manganese concentration (soft mass)
- Mn-nc - manganese nodule or concretion
- D - depletion

Redox Location
- M - soil matrix
- P - ped face
- PL - pore lining
- RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: 108-030-02 9
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 2
Soil Map Unit: GIELOW	Soil Series as Observed: FLUVAQUENTS
General Comments:	
Dominant Plant Species: POA PRA, FESTUCA (?), MENPUL, CONVOLVULUS SP.	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 24
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-3	A1	l	gr	HIGH	C, 2, D, Fe-x, RC	MOD.	
3-10	A2	l	m	MOD	C, 2, D, Fe-x, M	MOD.	
10-20	AC	vfsl	m	LOW	"	"	
20-24	C	scl	m	LOW	"	"	RELATIVELY MOIST

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: 108-030-02 10
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe **sharpshooter** hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex SLOPE?; TOE OF NATURAL LEVEE	Landform: natural levee artificial levee swale floodplain basin Slope Gradient (%): 2 (GRADIENT)
Soil Map Unit: GIELOW	Soil Series as Observed: GIELOW
General Comments: GLASS SHARD (WORN) AT 10"; STRATIFIED THROUGHOUT PROFILE	
Dominant Plant Species: BROMUS, AVENA SP.,	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition **upland**	Depth to Soil Saturation (in.): NONE TO 23
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low **medium** high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-20	A/C	LOAM TO VGRLS	M TO SG	L-M	ONLY IN LOAM, NON-GRAVELLY LAYERS	MOD - HIGH	STRATIFIED
20-23	C	S;L	M	L	C, 2, D, Fe-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name:	Pit No.: 108-030-02 11
Investigator(s): Joel Butterworth		Date: August 15, 2011
Method of Excavation: backhoe sharpshooter hand auger		Photo Number:

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 2
Soil Map Unit: GIELOW/ FLUVAQUENTS	Soil Series as Observed: GIELOW
General Comments: GLASS SHARD (SLIGHTLY WORN)	
Dominant Plant Species: BROMUS HORMARGUS, LOLIUM SP., AND MINOR CHLNT AND RUMCRI	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 24
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
							1/4" THICK ORGANIC LAYER
0-2	A1	sl	M	M	C, 1, D, Fe-x, RC	MOD	
2-18	A2	sl	M	L	REDOX IN NON-	"	STRATIFIED
18-24	C	l	M	L	GRAVELLY LAYERS	"	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: 108-030-02 12
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 0-1
Soil Map Unit: GIELOW	Soil Series as Observed: FLUVAQUENTS
General Comments:	
Dominant Plant Species: POA PRA, FESTUCA SP., JUNCUS SP.	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 25
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-4	A1	vfsl	m	MED	f, 1, D, Fe-x, M	MOD	
4-17	A2	vfsl	m	LOW	NONE	MOD	
17-25	C	sl	m	LOW	c, 2, D, Fe-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
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[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
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	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

Memorandum

Date:	January 4, 2012
To:	Shanna Zahner California Department of Transportation 703 B Street Marysville, CA 95901
Cc:	
From:	Harry Oakes
Subject:	**Willits Bypass Project – Soil Characteristics at Proposed Group 2 Wetland Establishment Sites**

Introduction and Background

The Willits Bypass Project (bypass project) has several compensatory mitigation components, including wetland establishment. As part of the Clean Water Act (CWA) Section 404 individual permit process for the bypass project, the U.S. Army Corps of Engineers (USACE) has requested information related to soils at the offsite mitigation parcels where Group 2 wetland establishment is proposed. Table 1 lists these parcels and the wetland establishment acreage planned at each parcel.

Table 1. Proposed Group 2 Wetland Establishment Sites on the Offsite Mitigation Parcels

Offsite Mitigation Parcel	APN	Planned Acreage of Wetland Establishment (less temporary wetland impact acreage)
Ford	108-020-04	6.48
Ford	108-030-02	1.86
Lusher	108-030-04	5.22
Wildlands	108-020-07	2.18
Benbow	108-020-06	1.34
Wildlands	108-060-01	4.80
Wildlands	108-070-09	4.27
Benbow	108-040-13	1.65

This memorandum presents soils information that was collected on August 15 and 16 and December 12 and 13, 2011 in response to concerns expressed by USACE in the form of response to comments (dated December 9, 2011) on the October 2011 MMP. Appendix A is composed of the soil data field forms for the August and December 2011 soil evaluations. Photographs of representative soil pits are presented in Appendix B.

Natural Resources Conservation Service Soil Survey Mapping

The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soil survey for parts of Mendocino and Trinity counties (Howard and Bowman 1991) provides the most recent mapping of soils at the offsite mitigation parcels where Group 2 wetland establishment is proposed. Table 2 summarizes the NRCS soil survey information for the three soil map units that occur at the offsite mitigation parcels.

Table 2. Summary of Soil Characteristics at the Offsite Mitigation Parcels as Mapped by USDA NRCS Soil Survey[a]

Soil Map Symbol	Soil Map Unit Name	Landform	Natural Drainage Class	Generalized Typical Profile (Surface, Subsurface, and Subsoil)	Parcel Occurrence (Wetland Establishment Area)
115	Cole clay loam, 0 to 2% slopes	Alluvial plains, basins	Somewhat poor	Clay loam over clay loam over clay	Benbow 108-040-13
127	Fluvaquents, 0 to 1% slopes	Floodplains	Poor and very poor	Very fine sandy loam over silt loam[b]	Ford 108-020-04 Lusher 108-030-04 Wildlands 108-060-01 Wildlands 108-070-09
128	Gielow sandy loam, 0 to 5% slopes	Alluvial plains, fans	Somewhat poor	Sandy loam and loam over sandy loam and fine sandy loam	Ford 108-020-04 Lusher 108-030-04 Wildlands 108-020-07 Benbow 108-020-06

Source: Howard and Bowman 1991.

Notes:

a. The characteristics described above for each soil map unit do not reflect map unit inclusions, whose drainage class and profile characteristics may be different than that of the primary soil component of the map unit.

b. Because of their variability, Fluvaquents have no typical profile. The profile described above occurs approximately 2,000 feet north of Ford parcel 108-020-04 along Outlet Creek.

Based on field observations within the offsite mitigation parcels where Group 2 wetland establishment is proposed, the Fluvaquents, 0 to 1 percent slopes map unit was observed to generally correspond to the low natural levees that straddle Outlet and Davis creeks. The soil survey shows the width of this map unit (and therefore roughly the width of the natural levee) ranging between nearly zero to 700 feet beyond the top of bank of the corresponding stream channel. The Gielow sandy loam, 0 to 8 percent slopes map unit appears to occupy nearly level alluvial plains and fans beyond the distal edge of the natural levee.

Topographic expression of the boundary between the Fluvaquents unit (natural levee areas) and adjoining areas of Gielow unit is very apparent within Wildlands parcels 108-070-09 and particularly 108-060-01, where a distinct slope break occurs. However, within the remaining offsite mitigation parcels where Group 2 wetland establishment is proposed, there is no clear topographic indication of the boundary between the two soil map units. Consequently, topographically, the Fluvaquents unit grades nearly imperceptivity into the Gielow unit.

For reference, a narrow artificial levee has been constructed along sections of Outlet and Davis creeks. Fill material placed to construct the artificial levee (where present) has increased the height of the natural levee by approximately one to three feet,

As mapped by the NRCS, the soils at the offsite mitigation parcels generally are weakly to weak-moderately developed, such that in many cases the surface, subsurface, and subsoil layer textures do not differ markedly within a given profile, at least as a result of soil-forming processes. Instead, the textural differences among the horizons for both the Fluvaquents and Gielow soils appear to be more a result of depositional variations, rather than clay weathering and significant clay illuviation. Because of the relatively recent deposition of their parent materials, neither of the mapped soils have profiles that contain a well-defined subsurface restrictive layer, such as a claypan or a duripan. The Gielow soil shows slightly more development than the Fluvaquents soil (because of its more stable landscape position), as evidenced by the BAt and Btg horizons.

The Cole soil is mapped only at Benbow parcel 108-040-13 and is the most developed of the three soil map units that occur within the parcels. There is no clear topographic indication of the boundary between the Cole soil and adjoining map unit (i.e., Feliz loam, 0 to 2 percent slopes) that exists along the unnamed tributary to Davis Creek to the east.

Following are descriptions of the horizons, textures, and permeability of the three soils.

Fluvaquents, 0 to 1 Percent Slopes

The representative profile described by the soil survey for the Fluvaquents unit occurs approximately 2,000 feet north of Ford parcel 108-020-04 along Outlet Creek. The profile is presented in Table 3. Despite the fact that the representative profile is located rather close to the Group 2 wetland establishment sites, the Fluvaquents profiles at the offsite mitigation parcels may differ markedly from it, which is a result of the variability in local depositional characteristics.

Because of the variability in the composition of Fluvaquents from place to place, the permeability ranges from moderately slow to moderately rapid (Howard and Bowman 1991).

Table 3. Soil Profile for Fluvaquents (0 to 1 Percent Slopes)

Horizon	Depth (inches	Texture
A1	0 – 2	Very fine sandy loam
A2	2 – 4	
Bg	4 – 25	Silt loam
C	25 – 30	Loamy sand
Ab	30 – 42	Silt loam
Cg1	42 – 56	Alternating sand and loamy sand
Cg2	56 – 63	Silt loam

Gielow Sandy Loam, 0 to 5 Percent Slopes

The representative profile described by the soil survey for the Gielow soil (which is located in Talmage) is presented in Table 4. The permeability of the Gielow soil is moderate (Howard and Bowman 1991).

Table 4. Soil Profile for Gielow Sandy Loam (0 to 5 Percent Slopes)

Horizon	Depth (inches	Texture
Ap1	0 – 4	Sandy loam
Ap2	4 – 8	Loam
A1	8 – 11	Loam
A2	11 – 18	Sandy loam
BAt	18 – 37	Fine sandy loam
Btg	37 – 48	Sandy loam
C	48 – 65	Sandy loam

Cole Clay Loam, 0 to 2 Percent Slopes

The representative profile described by the soil survey for the Cole soil (which is located in Potter Valley) is presented Table 5. The permeability of the Cole soil is slow (Howard and Bowman 1991).

Table 5. Soil Profile for Cole Clay Loam (0 to 2 Percent Slopes)

Horizon	Depth (inches	Texture
Ap	0 – 8	Clay loam
Bt1	8 – 15	Clay loam
Bt2	15 – 27	Clay
Bt3	27 – 41	Clay loam
C	41 – 60	Silty clay loam

Methods

The soil evaluations were conducted by an ICF soil scientist. A preliminary soil evaluation, using sharpshooter-excavated soil pits, was performed on August 15 and 16, 2011. A detailed soil evaluation, using backhoe pits, was performed on December 12 and 13, 2011.

Preliminary Soil Evaluation

The August 2011 soil pits were positioned in the proposed wetland establishment areas as well as in adjoining existing wetlands. The pits positioned in existing wetlands were intended to serve as a reference for assessing the suitability of the soils in the wetland establishment areas. Table 6 shows the number of profiles that were described within each parcel. Figure 1 shows the locations of the soil pits.

The pits were excavated to a depth of 19 to 28 inches and soil profile and site information was recorded on soil profile and site description forms. The profiles were described with respect to horizon; texture; coarse fragments (i.e., pebbles [>2 mm diameter] or larger-sized particles); structure; organic matter content (inferred from structure, color, and abundance of very fine roots); redoximorphic feature abundance, size, contrast, type, and location; and permeability (inferred from texture and coarse fragment content). Site characteristics that were described were landform, percent slope, slope shape, soil series as mapped and as observed (where apparent), dominant plant species, and depth to saturated soil. Based on these characteristics, particularly the depth to redoximorphic features, each evaluation site was rated (low, medium, or high, or intermediate levels between these primary ratings) with respect to its suitability for wetland establishment. (*Note: the existing wetlands in Little Lake Valley are supported by seasonal flooding and by shallow groundwater, rather than a shallow subsurface restrictive layer, such as a claypan. Accordingly, the factors considered in assessing the suitability of the establishment areas did not include the presence of a restrictive layer.*)

The soil profile information obtained during the preliminary evaluation was later used to supplement the profile information collected for the detailed evaluation by comparing the preliminary information to the designed finish grade at each soil pit site.

Table 6. Numbers of Soil Profiles Described in Existing Wetland Sites and Wetland Establishment Sites

	Number of Profiles	
Parcel	Backhoe-Excavated Pits	Sharpshooter-Excavated Pits
Ford 108-020-04		
Existing Wetland Sites	0	3
Wetland Establishment Sites	7	5
Ford 108-030-02		
Existing Wetland Sites	0	1
Wetland Establishment Sites	5	3
Lusher 108-030-04		
Existing Wetland Sites	0	1
Wetland Establishment Sites	4	3
Wildlands 108-020-07		
Existing Wetland Sites	0	0
Wetland Establishment Sites	4	0
Benbow 108-020-06		
Existing Wetland Sites	0	0
Wetland Establishment Sites	1	0
Wildlands 108-060-01		
Existing Wetland Sites	0	0
Wetland Establishment Sites	3	1
Wildlands 108-070-09		
Existing Wetland Sites	0	1
Wetland Establishment Sites	3	3
Benbow 108-040-13		
Existing Wetland Sites	0	0
Wetland Establishment Sites	1	0

Note: Not included in figures above are soil pit locations outside the area of grading: one backhoe pit excavated within Ford (108-020-04) and within Lusher (108-030-04), both in the natural levee/upland area along Outlet Creek.

Detailed Soil Evaluation

Nearly all the December 2011 soil pits were positioned in the proposed wetland establishment areas (Table 6); two were positioned on or adjacent to the artificial levee that separates the establishment areas from the nearby stream channel. The soils at these two pits were evaluated to assess the permeability of the soils adjacent to the stream channel and therefore whether significant subsurface hydrologic connectivity caused by rapidly permeable soils exists between the establishment area and the stream channel. (Significant subsurface hydrologic connectivity could cause a given establishment area to drain towards the adjoining stream channel when the water surface elevation in the channel is low, thereby causing the establishment area to not be supported by shallow saturated or inundated conditions for a duration sufficient to support wetlands.) Figure 1 shows the locations of the backhoe pits.

The pits were excavated to a depth of 29 to 51 inches, with all but two excavated to at least 41 inches. In all cases, the pits were excavated to at least 24 inches below the targeted finish grade of the established wetland at that location.

The profiles were described with respect to the same morphological characteristics as were recorded for the preliminary evaluation, but because the backhoe pits afforded a view of a larger section of the profile, it was possible to better assess the *in situ* characteristics of the soil and to assess the continuity of any relatively permeable, coarse-textured layers. The backhoe pits also better enabled an estimation of root diameter and abundance and the percent coarse fragment of each horizon[1]. The other site characteristics that were described were the same as that of the preliminary evaluation pits. Particular attention was directed to those characteristics that would indicate whether the soils in the establishment areas would lose excessive amounts of surface water to deep percolation or to excessive lateral movement of in-profile water (i.e., interflow) towards the adjoining creek (Outlet Creek and Davis Creek). The profile characteristics at each evaluation site, particularly the inferred permeability of a given horizon, were evaluated relative to the designed finish grade at that location (as shown on Figure 1) and rated with respect to its suitability for wetland establishment.

Results and Discussion

The soil profile and site description forms and photographs taken of representative backhoe pit profiles are provided at the end of this report.

In general, those profiles that were assigned a medium to high suitability rating were regarded as being overall suitable for wetland establishment. Those profiles that were assigned a low or low-medium suitability rating were regarded as being overall unsuitable for wetland establishment. Such profile sites and their surrounding areas were then excluded from the area proposed for wetland establishment. The associated grading plans have been revised accordingly.

[1] Unless otherwise specified on the soil/site description forms, a given horizon had less than two percent coarse fragments.

Ford (APN 108-020-04)

Soils in this parcel were assigned suitability ratings ranging from low-medium to high. Some of the profiles were inferred to have moderate permeability at or just below finish grade (for example, profile Q as shown in Appendix B), and therefore suitable for wetland establishment. However, profiles N and O (see Appendix B) contained loamy sand or very gravelly sand layers that would exist at or just below the planned finish grade elevation. Such layers were determined to be excessively permeable, such that wetlands established in and near these locations could be subject to excessive lateral movement of in-profile water toward Outlet Creek.

Consequently, the grading plan that covers this parcel was revised to exclude areas in the vicinity of profiles N and O from the proposed mitigation.

Ford (APN 108-030-02)

Soils in this parcel were assigned suitability ratings ranging from low to high. Some of the profiles were inferred to have moderate permeability at or just below finish grade (for example, profile V) and therefore suitable for wetland establishment. However, profile Y (see Appendix B) contained loamy sand and pebbly layers that would exist at or just below the planned finish grade elevation. Such layers were determined to be excessively permeable, such that wetlands established in and near these locations could be subject to excessive lateral movement of in-profile water toward Outlet Creek.

Consequently, the grading plan that covers this parcel was revised to exclude areas in the vicinity of profile Y from the proposed mitigation.

Lusher (108-030-04)

Soils in this parcel were assigned suitability ratings ranging from low-medium to high. Some of the profiles were inferred to have moderate permeability at or just below finish grade (for example, profile Z) and therefore suitable for wetland establishment. However, profiles AA and BB (Figure 1) contained continuous gravelly sand, fine loamy sand, and very gravelly sand layers that would exist at or just below the planned finish grade elevation. Such layers were determined to be excessively permeable, such that wetlands established in and near these locations could be subject to excessive lateral movement of in-profile water toward Outlet Creek.

Consequently, the grading plan that covers this parcel was revised to exclude areas in the vicinity of profiles AA and BB from the proposed mitigation.

Wildlands (108-020-07)

All the soils in this parcel were assigned a suitability rating of high. All of the profiles were inferred to have moderate permeability at or just below finish grade (for example, profile I) and therefore suitable for wetland establishment.

Benbow (108-020-06)

The single detailed soil evaluation profile (K) described at this parcel was assigned a suitability rating of medium-high. The profile was inferred to generally have moderate permeability, but with a moderate to high permeability in part of the depth range of 11 to 19 inches because of the presence of fine loamy sand material. However, the soil will be a moderately permeable loam at and just below finish grade and therefore suitable for wetland establishment.

Wildlands (108-060-01)

Soils in this parcel were assigned suitability ratings of medium or high. With the exception of profile E (see Appendix B), the profiles were inferred to have moderate permeability at or just below finish grade and therefore suitable for wetland establishment. Profile E will have a gravelly loam layer at finish grade, but because that layer has only 20% gravel content, it is expected to be moderately permeable. The profile also contains a sand lens between 15 and 16 inches depth, but because it appears to not be continuous, it is not expected to cause significant losses of water from the profile. Because the soil will be a moderately permeable loam at and just below finish grade, it will therefore be suitable for wetland establishment.

Wildlands (108-070-09)

Soils in this parcel were assigned suitability ratings of medium-high or high. The profiles were inferred to have moderate permeability at or just below finish grade and therefore suitable for wetland establishment (Appendix B). Profile C will have a stratified silt loam and loamy sand layer 15 inches below finish grade and a continuous, one inch thick loamy sand layer 18 inches below finish grade. A clay loam Bg horizon below these stratified layers should prevent excessive deep percolation losses. Because the soil will be a moderately permeable loam at and just below finish grade, it will therefore be suitable for wetland establishment.

Benbow (108-040-13)

The single detailed soil evaluation profile (L) (see Appendix B) described at this parcel was assigned a suitability rating of high. The profile was inferred to have moderate permeability with loam or light clay loam textures throughout. The soil will be a light clay loam at and just below the planned finish grade and therefore will be suitable for wetland establishment.

Conclusion

Based on the soil/site data collected for this evaluation, the soils are suitable for wetland establishment at all the Group 2 wetland establishment sites except parts of Ford 108-020-04 , Ford, 108-030-02, and Lusher 108-030-04. These soils are unsuitable because of apparent rapidly permeable layers or horizons that could cause excessive deep percolation below the root zone or lateral movement of in-profile water toward the adjoining stream channels when the water surface elevation in the channels is lower than that of the soil water table.

Areas of unsuitable soils on these parcels have been excluded from the wetland mitigation program and the wetland grading and planting plans have been revised accordingly.

Citation

Howard, R.F. and R.H. Bowman. 1991. Soil survey of Mendocino County, eastern part, and Trinity County, southwestern part, California. USDA Soil Conservation Service in cooperation with the USDA Forest Service, USDI Bureau of Land Management and Bureau of Indian Affairs, and Regents of the University of California.

Appendix A Soil Data Collection Forms

SOIL PROFILE AND SITE SUITABILITY DESCRIPTION FORMS

Fund

108-020-04

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: M
Investigator(s): Joel Butterworth, Paul Weller	Date: December 13, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 5325 KNIFE AT TOP OF Loamy Sand Layer	
Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin	
	Slope Gradient (%): 1-2%	
Soil Map Unit: 127	Soil Series as Observed: FLUVAQUENTS	
General Comments: THE FINISH GRADE IS 0.5' BELOW THE EXISTING GRADE, LOAMY SAND LAYER AT 29" TO 33", CONTINUOUS, CHARCOAL AT 26", LOAMY SAND LAMBRIS 2% SUBANGULAR GRAVEL		
Dominant Plant Species: FESTUCA, LOLIUM, PHALARIS		
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 41"	
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:	

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-3"	A1	sil	2, gr	MOD	NONE	MOD	ROOTS COMMON FINE
3"-7"	A2	l	1, sbk	MOD	NONE	MOD	ROOTS COMMON FINE
7"-16"	B	l	1, sbk	LOW	NONE	MOD	ROOTS FEW FINE
16"-41"	Bg	l	0, M	LOW	m, 2, D, Fe-x, M	MOD	ROOTS FEW FINE

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	Redox Location
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: N
Investigator(s): Joel Butterworth, Paul Weller	Date: December 13, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: #5326, KNIFE AT TOP OF B1	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1%
Soil Map Unit: 128	Soil Series as Observed: FLUVAQUENTS
General Comments: FINISH GRADE 0.4' BELOW EXISTING GRADE, CHARCOAL AT 14", PROFILE IS CRUDELY STRATIFIED BETWEEN 4" & 29"	
Dominant Plant Species: FESTUCA, LOLIUM, PHALARIS, GEDI, TRIFOLIUM	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 29"
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-2"	A1	l	3gr	HIGH	NONE	MOD	ROOTS MANY MEDIUM, MANY FINE
2"-4"	A2	l	2 sbk	HIGH	c, 1, D, Fe-x, PL	MOD	ROOTS COMMON MEDIUM, COMMON FINE
4"-7"	B1	l	0, M	LOW	C, 2, D, Fe-x, M	MOD	ROOTS FEW FINE
7"-14"	B2	ls	0, M	LOW	NONE	HIGH	ROOTS FEW FINE, GRAVEL CONTENT 5%
14"-17"	B3	sil	0, M	LOW	m, 2, D, Fe-x, M	MOD	ROOTS FEW FINE
17"-26"	Bg	sil	0, M	LOW	m, 2, D, Fe-x, M	MOD	ROOTS FEW VERY FINE
26"-29"	B	fls	0, M	LOW	NONE	MOD	ROOTS NONE

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
si - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	Redox Location
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: O
Investigator(s): Joel Butterworth, Paul Weller	Date: December 13, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: #5327, KNIFE @ BOTTOM OF C	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1 %
Soil Map Unit: 128	Soil Series as Observed: GIELO
General Comments: FINISH GRADE 0.8' BELOW EXISTING GRADE, GLASS SHARD CONTAMINED IN THE C HORIZON, CHARCOAL @ 34", PROFILE CRUDELY STRATIFIED 9"-17", SANDY LAMERS CONTINUOUS	
Dominant Plant Species: GEDI, TRIFOLIUM, FESTUCA, LOLIUM, PHALARIS	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 9"
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-9"	A	l	2,gr	MOD	NONE	MOD	ROOTS MANY FINE
9"-15"	C	vars	0,M	LOW	NONE	HIGH	ROOTS MANY VERY FINE, 60% GRAVEL, ROUNDED & SUBANGULAR
15"-17"	Cg1	sil	0,M	LOW	c,1,D,Fe-x,PL	MOD	ROOTS NONE
17"-22"	Cg2	cos	0,M	LOW	m,3,F,Fe-x,M	HIGH	ROOTS NONE
22"-26"	Cg3	sl	0,M	LOW	m,3,D,Fe-x,M	MOD	ROOTS NONE
26"-30"	Cg4	cos	0,M	LOW	m,3,F,Fe-x,M	HIGH	ROOTS NONE
30"-47"	Cg5	sl	0,M	LOW	m,3,D,Fe-x,M	MOD HIGH	ROOTS NONE

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
ifs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: P
Investigator(s): Joel Butterworth, Paul Weller	Date: December 13, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: #5329, KNIFE AT TOP OF C1	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin ADJACENT TO ARTIFICIAL LEVEE (LOW)
	Slope Gradient (%): 2%
Soil Map Unit: 127	Soil Series as Observed: FLUVAQUENTS
General Comments: FINISH GRADE 1.0' LOWER THAN EXISTING GRADE 35' FROM TOP OF BANK, SUBSURFACE TOPOGRAPHY OF Bw & C1 HORIZONS VARIES GREATLY	
Dominant Plant Species: LOLIUM, FESTUCA, GEDI, TRIFOLIUM, PLANTAGO, BROMUM,	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 51"
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-7"	A	l	2,sbk	MOD	NONE	MOD	ROOTS COMMON FINE MEDIUM
7"-13"	Bw	sl	0,M	LOW	NONE	MOD	ROOTS FEW FINE
13"-32"	C1	vgrs	0,M	LOW	NONE	HIGH	ROOTS NONE, 65% GRAVEL ROUNDED & SUBANGULAR
32"-43"	C2	sl	0,M	LOW	NONE	HIGH	ROOTS NONE, CRUDELY STRATIFIED
43"-51"	Cg	sil	0,M	LOW	m,2,D,Fe-x,M	MOD	ROOTS NONE

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	Redox Location
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: Q
Investigator(s): Joel Butterworth, Paul Weller	Date: December 13, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: #5330, KNIFE @ TOP OF C	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin TRANSITIONAL
	Slope Gradient (%): 1 - 2 %
Soil Map Unit: 127/128 BOUNDARY	Soil Series as Observed: FLUVAQUENTS
General Comments: FINISH GRADE IS 1.0' BELOW EXISTING GRADE	
Dominant Plant Species: FESTUCA, LOLIUM, PHALARIS, TRIFOLIUM	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 48"
Depth to Restrictive Layer (in.): N/A ☑(Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-3"	A1	sicl	3 gr	MOD	NONE	MOD	ROOTS FEW MEDIUM COMMON FINE
3"-8"	A2	sil	1 sbk	MOD	NONE	MOD	ROOTS COMMON FINE
8"-16"	Bw	l	0, M	LOW	m, 3, D, Fe-x, M	MOD	ROOTS FEW, VERY FINE
16"-29"	Bg	sil	0, M	LOW	C, 2, D, Fe-x, M	MOD	ROOTS FEW, VERY FINE
29"-37"	Cg	sil	0, M	LOW	C, 3, D, Fe-x, M	MOD	ROOTS FEW, VERY FINE
37"-48"	C	ls	0, M	LOW	NONE	HIGH	ROOTS NONE

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: R
Investigator(s): Joel Butterworth, Paul Weller	Date: December 13, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: #5331, KNIFE @ TOP OF Bw2	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1-2%
Soil Map Unit: 127	Soil Series as Observed: FLUVAQUENTS
General Comments: FINISH GRADE IS 0.4' BELOW EXISTING GRADE,	
Dominant Plant Species: FESTUCA, LOLIUM, RANUNCULUS, TRIFOLIUM, JUN PAT	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 44"
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-4"	A	sicl-	1, sbk	Mod	None	Mod	Roots many very fine
4"-15"	Bw1	l-	0, m	Low	None	Mod	Roots few fine
15"-18"	Bw2	sl	0, m	Low	c, 2, D, Fe-x, M	Mod	Roots few fine
18"-44"	Bg	sil	0, m	Low	c, 1, P, Fe-x, PL	Mod	Roots few very fine

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	Redox Location
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: S
Investigator(s): Joel Butterworth, Paul Weller	Date: December 13, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: ~~0~~	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1%
Soil Map Unit: 127	Soil Series as Observed: GIELOW
General Comments: FINISH GRADE 0.4' BELOW EXISTING GRADE,	
Dominant Plant Species: FESTUCA, LOLIUM, GEDI, TRIFOLIUM	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 42"
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-6"	A	l	1, sbk	Mod	NONE	Mod	ROOTS COMMON FINE AND MEDIUM, 5% GRAVEL
6"-15"	Bw	sil	0, M	Low	NONE	Mod	ROOTS COMMON VERY FINE
15"-18"	C1	grfsl	0, M	Low	NONE	HIGH	ROOTS FEW VERY FINE, 5% GRAVEL, ROUNDED
18"-22"	Bg	l	0, M	Low	m, 3, D, Fe-x, M	Mod	ROOTS FEW VERY FINE
22"-31"	C2	ls	0 M	Low	c, 3, F, Fe-x, M	HIGH	ROOTS NONE
31"-40"	Cg	sil	0 M	Low	m, 3, D, Fe-x, M	Mod	ROOTS NONE
40"-47"	C3	grs	0, M	Low	NONE	HIGH	ROOTS NONE, 25% GRAVEL, ROUNDED

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: T
Investigator(s): Joel Butterworth, Paul Weller	Date: December 13, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: #5332, KNIFE @ BOTTOM OF BW	
Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin	
	Slope Gradient (%): 1%	
Soil Map Unit: 127	Soil Series as Observed:	
General Comments: FINISH GRADE IS 0.5' BELOW EXISTING GRADE		
Dominant Plant Species: FESTUCA, LOLIUM, TRIFOLIUM		
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): SAT @ 51"	
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:	

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-5"	A	sl	0,M	MOD	NONE	MOD	ROOTS COMMON FINE
5"-12"	Bw	grsl	0,M	LOW	NONE	MOD HIGH	ROOTS FEW, VERY FINE, 20% GRAVEL ROUNDED
12"-24"	Bg1	sil	0,M	LOW	m,3,D,Mn-x Fe-x,M	MOD	ROOTS FEW, VERY FINE
24"-28"	C	s	0,M	LOW	NONE	HIGH	ROOTS NONE
28"-37"	Bg2	l	0,M	LOW	m,2,D,Fe-x,M	MOD	ROOTS NONE
37"-51"	C	s	0,M	LOW	NONE	HIGH	ROOTS NONE

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	Redox Location
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

"5b"

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: ~~108-030-02~~ 5
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe **sharpshooter** hand auger	Photo Number:	

Land Surface Shape: (slightly) **planar** concave convex	Landform: natural levee artificial levee swale **floodplain** basin
	Slope Gradient (%): 1-2
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: FLUVAQUENTS
General Comments: STRATIFIED	
Dominant Plant Species: LOLIUM SP, FESTUCA SP (?), BROHOR; MINOR RUMCRI, MENPUL, & CHLINT	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition **upland**	Depth to Soil Saturation (in.): NONE TO 22
Depth to Restrictive Layer (in.): NONE	Overall Soil and Site Suitability for Wetland Establishment: low **medium** high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-5	A1	sl	m	L	C, 3, D, Fe-x, M	MOD	
5-11	A2	vgrls	sg	VL	NONE	HIGH	
11-18	C1	s	sg	VL	"	HIGH	
18-22	C2/2Ab	sil	m	L	M, 3, P, Fe-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

"66"

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: ~~108-030-02~~ 6
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: GIELOW	Soil Series as Observed: FLUVAQUENTS
General Comments:	
Dominant Plant Species: FESTUCA SP(?), POA PRA, PHALARIS SP.(?), MINOR RUMEX	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.):
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-8	A	vfsl	m	MOD	NONE	MOD	
8-19	ABg	l	sbk	LOW	C, 2, D, Fe-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

"76"

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: 109-030-02 7
Investigator(s): Joel Butterworth		Date: August 15, 2011
Method of Excavation: backhoe sharpshooter hand auger		Photo Number:

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: FLUVAQUENTS
General Comments: NOT STRATIFIED	
Dominant Plant Species: FESTUCA SP. (?), BROMUS, DESCHAMPSIA (?), CYNOSCH, MINOR RUMEX	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 25
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-3	A1	sl	GR	HIGH	NONE	MOD	
3-11	A2	sl	M	MOD	C, 2, D, Fe-x, M PL	MOD	
11-23	AC	sl	M	LOW	f, 2, D, Fex - M	MOD	
23-25	C	fsl	M	LOW	M, 3, D, Fe-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

"86"

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: ~~108-030-02~~ 8
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: FLUVAQUENTS / GIELOW	Soil Series as Observed: FLUVAQUENTS
General Comments:	
Dominant Plant Species: FESTUCA (?), POAPRA, MINOR CONVOLVULUS SP.	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 25
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-2	A1	l	M	MOD	C, 2, D, Fe-x, M	MOD	
2-12	A2	sl	M	LOW	NONE	MOD	
12-25	Bg	l	M	LOW	M, 2, P, Fe-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
Redox Size	Mn-nc - manganese nodule or concretion
1 - fine (<2mm)	D - depletion
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
Redox Contrast	RC - root channel (ox. rhizospheres)
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

"96"

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: 108-030-02 9
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 2
Soil Map Unit: GIELOW	Soil Series as Observed: FLUVAQUENTS
General Comments:	
Dominant Plant Species: POA PRA, FESTUCA (?), MENPUL, CONVOLVULUS SP.	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 24
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-3	A1	l	gr	HIGH	C, 2, D, Fe-x, RC	MOD.	
3-10	A2	l	m	MOD	C, 2, D, Fe-x, M	MOD.	
10-20	AC	vfsl	m	LOW	"	"	
20-24	C	scl	m	LOW	"	"	RELATIVELY MOIST

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

"105"

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: 108-030-02 10
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex SPLAY?; TOE OF NATURAL LEVEE	Landform: natural levee artificial levee swale floodplain basin Slope Gradient (%): 2 (GRADIENT)
Soil Map Unit: GIELOW	Soil Series as Observed: GIELOW
General Comments: GLASS SHARD (WORN) AT 10"; STRATIFIED THROUGHOUT PROFILE	
Dominant Plant Species: BROMUS, AVENA SP.,	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 23
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-20	A/C	LOAM TO VGRLS	M TO SG	L-M	ONLY IN LOAM, NON-GRAVELLY LAYERS	MOD - HIGH	STRATIFIED
20-23	C	SIL	M	L	C, 2, D, Fe-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

"116"

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name:	Pit No.: 108-030-02 11
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 2
Soil Map Unit: GIELOW/ FLUVAQUENTS	Soil Series as Observed: GIELOW
General Comments: GLASS SHARD (SLIGHTLY WORN)	
Dominant Plant Species: BROMUS HORMARGUS, LOLIUM SP., AND MINOR CHLNT AND RUMEX	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 24
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
							1/4" THICK ORGANIC LAYER
0-2	A1	sl	M	M	C, I, D, Fe-x, RC	MOD	
2-18	A2	sl	M	L	REDOX IN MAN-	"	STRATIFIED
18-24	C	l	M	L	GRAVELLY LAYERS	"	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

"126"

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: 108-030-02 12
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 0-1
Soil Map Unit: GIELOW	Soil Series as Observed: FLUVAQUENTS
General Comments:	
Dominant Plant Species: POA PRA, FESTUCA SP., JUNCUS SP.	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 25
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-4	A1	vfsl	M	MED	f, 1, D, Fe-x, M	MOD	
4-17	A2	vfsl	M	LOW	NONE	MOD	
17-25	C	sl	M	LOW	c, 2, D, Fe-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

FORD

108-030-02

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: 4
Investigator(s): Joel Butterworth, Paul Weller	Date: December 13, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1%
Soil Map Unit: 127	Soil Series as Observed: FLUVAQUENTS
General Comments: FINISH GRADE IS 0.25' LOWER THAN EXISTING GRADE	
Dominant Plant Species: FESTUCA, LOLIUM, TRIFOLIUM	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): SAT @ 50"
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-2"	A1	l	1, gr	HIGH	NONE	MOD	ROOTS MANY FINE, 10% GRAVEL ROUNDED
2"-6"	A2	grl	1, sbk	LOW	NONE	MOD HIGH	ROOTS COMMON FINE 15% GRAVEL ROUNDED
6"-19"	BA	l	0, M	LOW	F, 2, D, Fe-x-M	MOD	ROOTS FEW FINE, 5% GRAVEL ROUNDED
19"-23"	Bg1	sil	0, M	LOW	M, 2, D, Fe-x, M	MOD	ROOTS NONE
23"-50"	Bg2	fsl	0, M	LOW	C, 3, F, Fe-x, M	MOD	ROOTS NONE

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance
f - few
c - common
m - many

Redox Size
1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast
F - faint
D - distinct
P - prominent

Redox Type
Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location
M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: V
Investigator(s): Joel Butterworth, Paul Weller	Date: December 13, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin TRANSITION
	Slope Gradient (%): 1%
Soil Map Unit: 127	Soil Series as Observed: FLUVAQUENTS
General Comments: FINISHED GRADE IS 0.3' BELOW EXISTING GRADE	
Dominant Plant Species: FESTUCA, LOLIUM	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 42"
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-4"	A'	l	1, sbk	MOD	NONE	MOD	ROOTS COMMON FINE
4"-12"	AB	l	0, M	LOW	NONE	MOD	ROOTS FEW FINE
12"-26"	Bw	sil	1, sbk	LOW	c, 2, F, Fe-x, M	MOD	ROOTS FEW FINE
26"-42"	Bg	sicl	0, M	LOW	m, 2, D, Fe-x, M	MOD	ROOTS FEW FINE

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2-5mm)	**Redox Location**
3 - coarse (5-20mm)	M - soil matrix
4 - very coarse (20-76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: W
Investigator(s): Joel Butterworth, Paul Weller	Date: December 13, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: #5334, KNIFE @ BOTTOM OF A2	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1%
Soil Map Unit: 127	Soil Series as Observed: FLUVAQUENTS
General Comments: FINISHED GRADE IS 0.25' BELOW EXISTING GRADE	
Dominant Plant Species: GEDI, TRIFOLIUM, FESTUCA, LOLIUM, PHALARIS	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): SAT @ 46"
Depth to Restrictive Layer (in.): N/A ☑(Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-2"	A1	fsl	1,sbk	HIGH	NONE	MOD	ROOTS MANY VERY FINE
2"-4"	A2	fsl	1,sbk	MOD	NONE	MOD	ROOTS FEW VERY FINE
4"-9"	Bg1	sil	0,M	LOW	M,2,D,Fe-x,M	MOD	ROOTS FEW VERY FINE
9"-36"	Bg2	fsl	0,M	LOW	M,3,D,Fe-x,M	MOD	ROOTS FEW VERY FINE
36"-46"	C	ls	0,M	LOW	NONE	HIGH	ROOTS NONE

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2-5mm)	**Redox Location**
3 - coarse (5-20mm)	M - soil matrix
4 - very coarse (20-76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: X
Investigator(s): Joel Butterworth, Paul Weller	Date: December 13, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: #5335, KNIFE @ TOP OF C	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 2%
Soil Map Unit: 127	Soil Series as Observed: FLUVAQUENTS
General Comments: FINISH GRADE 0.75' LOWER THAN EXISTING	
Dominant Plant Species: TRIFOLIUM, ERODIUM, HYPOCRUS, PHALARIS, LOLIUM, FESTUCA	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 41"
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-2"	A1	l	1-sbk	MOD	NONE	MOD	ROOTS COMMON VERY FINE
2"-5"	A2	l	1-sbk	MOD	NONE	MOD	ROOTS COMMON VERY FINE, GRAVEL 5%
5"-13"	AB	l	0,M	LOW	NONE	MOD	ROOTS FEW FINE
13"-15"	C	s	0,M	LOW	NONE	HIGH	ROOTS NONE, DISCONTINUOUS, GRAVEL 5%
15"-41"	Bg	l	0,M	LOW	m,2,D,Fe-x,M	MOD	ROOTS FEW VERY FINE

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance
f - few
c - common
m - many

Redox Size
1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast
F - faint
D - distinct
P - prominent

Redox Type
Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location
M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: Y
Investigator(s): Joel Butterworth, Paul Weller	Date: December 13, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: #5338, KNIFE @ TOP OF PEBBLE LINE	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1-2%
Soil Map Unit: 127	Soil Series as Observed:
General Comments: FINISHED GRADE IS 0.2' LOWER THAN EXISTING GRADE	
Dominant Plant Species: BRASSICA, GEDI, FESTUCA, LOLIUM, ERODIUM, HYPOCRUS	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 35"
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-3"	A	l	0, m	Low	NONE	Mod	ROOTS MANY VERY FINE
3"-6"	Bw	ls	0, m	Low	c, 3, F, Fe-x, M	HIGH	ROOTS FEW VERY FINE
6"-7"	—	PEBBLES	—	—	—	HIGH	ROOTS NONE, 90% PEBBLES, SMALL ROUNDED, DISCONTINUOUS
7"-35"	C	grls	0, m	Low	NONE	HIGH	ROOTS NONE, 15-65% GRAVEL, ROUNDED

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	Redox Location
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

"16"

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: 108-030-021
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 2-3
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: GIELOW
General Comments: APPARENT SURFACE INUNDATION	
Dominant Plant Species: BROMUS, DESCHAMPSIA SP, CHEINT	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 25
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-2	A	l	m	L	C, 2, D, Fe-x, M	MOD.	
2-25	AC	vgrsl	sg	L	NONE	HIGH	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

"26"

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: 108-030-02 2
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 2-3
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: FLUVAQUENTS
General Comments:	
Dominant Plant Species: FESTUCA SP (?), CYNECH	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 28
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-5	A	SL	M	L/M	NONE	MOD	
5-26	AC	L & GRSL	SG	L	IN CERTAIN STRATIFICATIONS ONLY	MOD	
26-28	AB/C	L	M	L/A	M,3,P, Fe-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

"3b"

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: 108-030-02 3
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 2-3
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed:
General Comments:	
Dominant Plant Species: POA PRA, FESTUCA, MINOR RUMEX	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 22
Depth to Restrictive Layer (in.): NONE	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-6	A1	l	m	m	NONE	MOD	
6-17	A2	l	m	l	c, 2, D, Fe-x, M	MOD	
17-22	Bg	vfsl	m	l	m, 3, D, Fe-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

"46"

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: FORD	Pit No.: 108-030-02 4
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe **sharpshooter** hand auger	Photo Number:	

Land Surface Shape: (slightly) **planar** concave convex	Landform: natural levee artificial levee swale **floodplain** basin
	Slope Gradient (%): 0-1
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: FLUVAQUENTS
General Comments: STRATIFIED	
Dominant Plant Species: FESTUCA SP (?), LOLIUM SP., MINOR RUMEX,	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition **upland**	Depth to Soil Saturation (in.):
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low **medium** high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-4	A	sl	m	L	f, 2, D, Fe-x, M	MOD	ROOT MAT AT BASE
4-19	A/C	vgrsl	sg	L	NONE	HIGH	
19-25	C	sl	m	L	M, 2, P, Fe-x, M	MOD	

[1]**Texture and Coarse Fragment Content**

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]**Soil Structure**

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]**Redoximorphic Feature Morphology**

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

LUSHER

108 - 030 - 04

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: LUSHER	Pit No.: 2
Investigator(s): Joel Butterworth, Paul Weller	Date: December 13, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1%
Soil Map Unit: 128	Soil Series as Observed:
General Comments: FINISHED GRADE IS 0.7' LOWER THAN EXISTING GRADE	
Dominant Plant Species: LOLIUM, FESTUCA, PHALARIS, CAREX,	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 45"
Depth to Restrictive Layer (in.): N/A (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-4"	A1	l	2,gr	HIGH	NONE	MOD	ROOTS MANY FINE
4"-6"	A2	l	2,gr	MOD	m,1,D,Fe-x,PL	MOD	ROOTS MANY FINE, Ox RHIZ
6"-23"	BA	fsl	0,M	LOW	C,2,D,Fe-x,M	MOD	ROOTS COMMON FINE
23"-45"	Bg	sil	0,M	LOW	m,3,D,Fe-x,M	MOD	ROOTS FEW FINE

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	Redox Location
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: LUSHER	Pit No.: AA
Investigator(s): Joel Butterworth, Paul Weller	Date: December 13, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex SLIGHTLY HUMMOCKY, DISTURBED LOOKING	Landform: natural levee artificial levee swale floodplain basin Slope Gradient (%): 1-2%
Soil Map Unit: 127	Soil Series as Observed: FLUVAQUENTS
General Comments: FINISH GRADE IS 1.4' BELOW EXISTING GRADE, ALL COARSE TEXTURED LAYERS ARE CONTINUOUS	
Dominant Plant Species: TRIFOLIUM, FESTUCA, ERODIUM, HYPOCRUS, GEDI	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 46"
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-2"	A1	l	1-sbk	MOD	NONE	MOD	ROOTS COMMON FINE, CHARCOAL PRESENT
2"-9"	A2	sil	0, M	LOW	NONE	MOD	ROOTS FEW FINE
9"-18"	C1	grs	0, M	LOW	NONE	HIGH	ROOTS NONE, 35% GRAVEL
18"-20"	Bg1	fls	0, M	LOW	m, 2, D, Fe-x, M	HIGH	ROOTS NONE
20"-33"	Bg2	fls	0, M	LOW	m, 3, D, Fe-x, M	HIGH	ROOTS NONE
33"-37"	C2	xgrls	0, M	LOW	NONE	HIGH	ROOTS NONE, 70% GRAVEL
37"-46"	C3g	sil	0, M	LOW	m, 3, F, Fe-x, M	MOD	ROOTS NONE

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	Redox Location
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: LUSHER	Pit No.: BB
Investigator(s): Joel Butterworth, Paul Weller	Date: December 13, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: #5340, KNIFE @ TOP OF C	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin TRANSITIONAL
	Slope Gradient (%): 1-2%
Soil Map Unit: 127	Soil Series as Observed: FLUVAQUENTS
General Comments: FINISHED GRADE IS 1.0' LOWER THAN EXISTING GRADE	
Dominant Plant Species: GEDI, LOLIUM, FESTUCA, PHALARIS, TRIFOLIUM	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 45"
Depth to Restrictive Layer (in.): N/A (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-4"	A	l	3gr	MOD	NONE	MOD	ROOTS COMMON FINE
4"-11"	BA	fsl	0,M	LOW	NONE	MOD	ROOTS FEW FINE
11"-16"	B	ls	0,M	LOW	c,2,F,Fe-x,M	HIGH	ROOTS FEW FINE
16"-21"	C	vgrs	0,M	LOW	NONE	HIGH	ROOTS NONE, 55% GRAVEL, ROUNDED, CONTINUOUS
21"-45"	Bg	sil	0,M	LOW	m,3,D,Fe-x,M	MOD	ROOTS NONE

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2-5mm)	Redox Location
3 - coarse (5-20mm)	M - soil matrix
4 - very coarse (20-76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: LUSHER	Pit No.: CC
Investigator(s): Joel Butterworth, Paul Weller	Date: December 13, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: #5343, KNIFE @ TOP OF C3	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin LOW ARTIFICIAL LEVEE, 30' +/- TO EAST, 85' +/- TO TOP OF BANK
	Slope Gradient (%): 1-2 %
Soil Map Unit: 127	Soil Series as Observed: FLUVAQUENTS
General Comments: FINISHED GRADE IS 0.2' LOWER THAN EXISTING GRADE	
Dominant Plant Species: GEDI, TRIFOLIUM, FESTUCA, LOLIUM, HYPOCRUS	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 47"
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-2"	A1	l	2, gr	MOD	NONE	MOD	ROOTS COMMON FINE
2"-5"	A2	sil	1, sbk	LOW	e, 2, D, Fe-x-M	MOD	ROOTS FEW FINE
5"-11"	C1	fsl	0, M	LOW	NONE	HIGH	ROOTS FEW FINE
11"-14"	C2	l	0, M	LOW	NONE	MOD	ROOTS NONE
14"-30"	C3	cos	0, M	LOW	NONE	HIGH	ROOTS NONE, 10% GRAVEL ROUNDED, CONTINUOUS
30"-47"	Bg	sil, vfsl	0, M	LOW	m, 2, D, Fe-x, M & PL	MOD	ROOTS NONE,

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	Redox Location
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: LUSHER	Pit No.: DD
Investigator(s): Joel Butterworth, Paul Weller	Date: December 13, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: #5349, KNIFE @ TOP OF Bg	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1-2%
Soil Map Unit: 127/128 BOUNDARY	Soil Series as Observed:
General Comments: FINISH GRADE IS 1.5' BELOW EXISTING GRADE	
Dominant Plant Species: FESTUCA, LOLIUM, TRIFOLIUM, GEDI, HYPOCHUS	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 50"
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-3"	A1	l	3,gr	HIGH	NONE	MOD	ROOTS MANY, FINE
3"-7"	A2	l+	2,sbk	MOD	f, F, D, Fe-x, PL	MOD	ROOTS COMMON FINE
7"-15"	C1	ls	0,0	LOW	NONE	HIGH	ROOTS FEW, FINE
15"-18"	C2	grs	0,0	LOW	NONE	HIGH	ROOTS NONE, 15% GRAVEL ROUNDED, CONTINUOUS
18"-40"	Bg	l	0,0	LOW	m, 2, D, Fe-x, M	MOD	ROOTS NONE
40"-50"	Cg	sil+	0,0	LOW	c, 1, P, Fe-x, M	MOD	ROOTS NONE, GLEYED

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2-5mm)	Redox Location
3 - coarse (5-20mm)	M - soil matrix
4 - very coarse (20-76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

"1a"

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: LUSTGR	Pit No.: 108-030-04
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 0 – 1
Soil Map Unit: GIELOW	Soil Series as Observed: GIELOW
General Comments:	
Dominant Plant Species: JUNCUS SP, MENPUL, DESCHAMPSIA SP, PHALARIS SP	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 21
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high N/A Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0–10	A	l	abk, 2	L	m, 2, P, Fe-x, M	MOD.	ROOT MAT AT BASE
10–16	C1	grsl	sg	VL	NONE	HIGH	
16–21	C2	s	sg	VL	"	HIGH	
21+	2Ab	cl	m	L	m, 2, P, Fe-x, M	MOD	RELATIVELY MOIST

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

"2a"

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: LUSHER	Pit No.: 108-030-04 2
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: GIELOW	Soil Series as Observed: ?
General Comments:	
Dominant Plant Species: BROHOR, AVENA SP, LOLIUM SP, DECHAMPSIA SP	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 24
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-7	A	sl	sg	M	NONE	MOD	
7-13	C1	ls	sg	L	NONE	HIGH	
13-19	C2	grls	sg	L	NONE	HIGH	
19-24	2Ab/C3	sil	m	M	M, 2, D, Fe-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

"3a"

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: LUSHER	Pit No.: 108-030-04 3
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe **sharpshooter** hand auger	Photo Number:	

Land Surface Shape: (slightly) **planar** concave convex SOMEWHAT DISTURBED, ESPECIALLY TO EAST	Landform: natural levee artificial levee swale **floodplain*** basin Slope Gradient (%): 1-2
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed:
General Comments: GLASS SHARD (SLIGHTLY WORN) AT 8"	* NEAR TOE OF NATURAL LEVEE (?)
Dominant Plant Species: TAECAPMED, BROHOR, CENSOL, AVENA SP	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition **upland**	Depth to Soil Saturation (in.): NONE TO 28
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low **medium** high Comments: DIFFICULT TO ASSESS WITH REGARD TO REDOX BECAUSE OF GRAVELLY MATERIAL FROM 2 TO 26, WHICH DOES NOT PROMOTE

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments (REDOX)
							1/4" ORGANIC MAT AT SURFACE*
0-2	A	l	m	LOW	C, 2, D, Fe-x, PL	MOD.	* FROM INUNDATION ?
2-11	AC	xgrsl	sg	LOW	NONE	HIGH	
11-26	C	vgrls	sg	LOW	NONE	HIGH	
26-29	2Ab/C	sil	m	MOD	C, 2, D, Fex-M	MOD	RELATIVELY MOIST

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance
f - few
c - common
m - many

Redox Size
1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast
F - faint
D - distinct
P - prominent

Redox Type
Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location
M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

"4a"

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: LUSHER	Pit No.: 108-030-04
Investigator(s): Joel Butterworth	Date: August 15, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: GIELOW	Soil Series as Observed: GIELOW
General Comments:	
Dominant Plant Species: LOLIUM SP, HORMARGUS, DECHAMPSIA SP	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 24
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-2	A1	l	m	MOD	M, 2, D, Fe-x, RC	MOD	
2-11	A2	l	m	LOW-MOD	M, 2, D, Fe-x, M	"	
11-22	AC	sl	m	LOW	NONE	"	
22-26	C	sl	sg	LOW	C, 2, D, Fe-x, M	"	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

WILDLANDS

108 - 020 - 07

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: WILDLANDS/BENBOW	Pit No.: G
Investigator(s): Joel Butterworth, Paul Weller	Date: December 12, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: -0-	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1%
Soil Map Unit: 128	Soil Series as Observed: COLE
General Comments: FINISH GRADE 1' BELOW EXISTING GRADE	
Dominant Plant Species: LOLIUM, FESTUCA	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 49"
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-4"	A1	l	1,sbk	MOD	NONE	MOD	ROOTS COMMON FINE
4"-11"	A2	sil	1,sbk	MOD	NONE	MOD	ROOTS FEW, VERY FINE
11"-20"	BA	sil	1,sbk	LOW	c,1,D,Fe-x,PL	MOD	ROOTS FEW, VERY FINE
20"-46"	Bt	cl	2,sbk	LOW	m,2,D,Fe-x,M	MOD	ROOTS FEW, VERY FINE
46"-49"	BtC	cl-	0,M	MOD	m,2,F,Fe-x,M	MOD	ROOTS NONE

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	Redox Location
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: WILDLANDS/BENBOW	Pit No.: H
Investigator(s): Joel Butterworth, Paul Weller	Date: December 12, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1%
Soil Map Unit: 128	Soil Series as Observed: COLE
General Comments: FINISH GRADE 1.2' BELOW EXISTING GRADE	
Dominant Plant Species: LOLIUM, FESTUCA, CAREX	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 48"
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-5"	A1	sil	2, gr	Mod	NONE	Mod	ROOTS MANY FINE, FEW MEDIUM
5"-15"	A2	l	0, M	Mod	NONE	Mod	ROOTS FEW FINE, FEW MEDIUM
15"-30"	Bg	sil	0, M	Low	m, 2, D, Mn-x Fe-x, M	Mod	ROOTS FEW VERY FINE
30"-48"	BgC	l	0, M	Low	m, 3, D, Fe-x, M	Mod	ROOTS FEW VERY FINE

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance
f - few
c - common
m - many

Redox Size
1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast
F - faint
D - distinct
P - prominent

Redox Type
Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location
M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: WILDLANDS/BENBOW	Pit No.: I
Investigator(s): Joel Butterworth, Paul Weller	Date: December 12, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 5321 KNIFE @ TOP OF Btg	
Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin	
	Slope Gradient (%): 1%	
Soil Map Unit: 128	Soil Series as Observed: SIMULAR TO COLE	
General Comments: FINISH GRADE IS 1.4' BELOW EXISTING GRADE		
Dominant Plant Species: FESTUCA, LOLIUM		
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 42"	
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:	

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-4"	A1	l	3, gr	Mod	NONE	Mod	ROOTS COMMON FINE
4"-14"	A2	l	1, sbk	Low	NONE	Mod	ROOTS FEW FINE
14-21"	BA	vfsl	0, M	Low	NONE	Mod	ROOTS FEW FINE
21-32"	Btg	sicl-	1, sbk	Low	m, 2, D, Mn-x Fe-x, M	Mod	ROOTS FEW FINE
32-42"	Bg	cl	0, M	Low	m, 3, D, Fe-x, M	Mod	ROOTS NONE

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance
f - few
c - common
m - many

Redox Size
1 - fine (<2mm)
2 - medium 2–5mm)
3 - coarse (5–20mm)
4 - very coarse (20–76mm)
5 - extremely coarse (>76mm)

Redox Contrast
F - faint
D - distinct
P - prominent

Redox Type
Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
D - depletion

Redox Location
M - soil matrix
P - ped face
PL - pore lining
RC - root channel (ox. rhizospheres)

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: WILDLANDS/BENBOW	Pit No.: J
Investigator(s): Joel Butterworth, Paul Weller	Date: December 12, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1%
Soil Map Unit: 128	Soil Series as Observed: UNDETERMINED
General Comments: FINISH GRADE 0.5' BELOW EXISTING GRADE	
Dominant Plant Species: FESTUCA, PHALARIS, LOLIUM	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 37"
Depth to Restrictive Layer (in.): N/A (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-3"	A1	l+	2,gr	MOD	NONE	MOD	ROOTS COMMON FINE
3"-9"	A2	l	2,gr	MOD	NONE	MOD	ROOTS COMMON FINE
9"-26"	C	sil	0,M	LOW	NONE	MOD	ROOTS FEW FINE
26"-37"	Cg	l	0,M	LOW	C,3,F,Fe-x,M	MOD	ROOTS NONE

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

BEN BOW

108-020-06

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: WILDLANDS/BENBOW	Pit No.: K
Investigator(s): Joel Butterworth, Paul Weller	Date: December 12, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1%
Soil Map Unit: 128	Soil Series as Observed:
General Comments: FINISH GRADE IS 0.5' LOWER THAN EXISTING GRADE	
Dominant Plant Species: FESTUCA, LOLIUM, CAREX, RUBUS (ON 3 SIDES OF PIT)	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 39"
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-4"	A1	l	2 gr	Mod	None	Mod	Roots common fine, few medium
4"-11"	A2	l	0, m	Mod	c, 2, F, Fe-x, M	Mod	Roots common fine, few medium
11"-19"	BA	fl s&fs l	0, m	Low	None	Mod-MH	Roots common fine
19"-39"	Bg	sicl	1, abk	Low	m, 3, D, Fe-x, M	Mod	Roots few fine

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfs l - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

WILDLANDS

108-060-01

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: WILDLANDS	Pit No.: D
Investigator(s): Joel Butterworth, Paul Weller	Date: December 12, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 5318 KNIFE AT TOP OF C HORIZON	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1%
Soil Map Unit: 127	Soil Series as Observed:
General Comments: FINISH GRADE 0.3' BELOW EXISTING GRADE, UPPER 4" OF HORIZON C HAS LAMINATIONS	
Dominant Plant Species: LOLIUM, FESTUCA, PHALARIS, JUN PAT, TRIFOLIUM	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 63"
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-9"	A	fsl	1, gr	HIGH	NONE	MOD	ROOTS MANY FINE
9-25"	Bg	sil	1, sbk	LOW	M, 2, D, Fe-x, M	MOD	ROOTS COMMON FINE
25"-63"	C	l	0, M	VERY LOW	m, 2, P, Fe-x, M	MOD	MODERATELY CONSOLIDATED FEW, VERY FINE ROOTS

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: WILDLANDS	Pit No.: E
Investigator(s): Joel Butterworth, Paul Weller	Date: December 12, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:# 5319, KNIFE @ SAND LENSE	
Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin	
	Slope Gradient (%): 2%	
Soil Map Unit: 127	Soil Series as Observed:	
General Comments: FINISH GRADE 0.3' BELOW EXISTING GRADE, DISCONTINUOUS SAND LENSE AT 15-16"		
Dominant Plant Species: FESTUCA; LOLIUM, GEDI, JUN TEN		
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 55"	
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:	

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-4"	A1	l	3, gr	HIGH	NONE	MOD	ROOTS MANY FINE
4"-12"	A2	grl	3, gr	HIGH	c, 2, D, Fe-X, M	MOD to HIGH	20% GRAVEL ROOTS COMMON FINE
12"-24"	Bg	sil	0, M	LOW	c, 3, P, Fe-X, M	MOD	ROOTS FEW VERY FINE
24"-55"	BgC	l	0, M	LOW	c, 3, P, Fe-X, M	MOD	ROOTS NONE

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	Redox Location
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: WILDLANDS	Pit No.: F
Investigator(s): Joel Butterworth, Paul Weller	Date: December 12, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 5320 KNIFE @ BOTTOM OF A HORIZON	
Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin	
	Slope Gradient (%): 1-2%	
Soil Map Unit: 127	Soil Series as Observed:	
General Comments: FINISH GRADE 0.75' LOWER THAN EXISTING GRADE, CHARCOAL PRESENT @ 31"		
Dominant Plant Species: LOLIUM, FESTUCA, CAREX		
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 57"	
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:	

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-14"	A	sl, ls	0, M	MOD	NONE	MOD TO HIGH	5% GRAVEL ROOTS MANY FINE & MEDIUM
14"-19"	B1	vfsl	0, M	LOW	NONE	MOD	ROOTS FEW MEDIUM
19-57"	B2	sil	0, M	LOW	m, 2, D, Fe-x, M	MOD	ROOTS FEW VERY FINE

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cost - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	Redox Location
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

"5c"

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: WILDLANDS	Pit No.: 108-070-09 5
Investigator(s): Joel Butterworth	Date: August 16, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin (SUBTLE)
	Slope Gradient (%): 0-1
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: FLUVAQUENTS
General Comments:	
Dominant Plant Species: UNIDENTIFIABLE GRASSES, POA DEA(?), MINOR JUNPAR	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 27
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-7	A1	FSL	SG & M	MOD	NONE	MOD	ok
7-14	A2	FSL	M	LOW	C, 2, D, Fe-x, M	MOD	
14-27	C	FSL	M	LOW	M, 2, P, Fe-x, M	MOD	DISTINCT BOUNDARY ON REDOX; MAY BE RELICTUAL.

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2--5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

WILDLANDS

108 - 070 - 09

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: WILDLANDS	Pit No.: A
Investigator(s): Joel Butterworth, Paul Weller	Date: December 12, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 5314* KNIFE @ TOP OF Bg	
Land Surface Shape: (slightly) planar concave convex SLIGHTLY HUMMOCKY	Landform: natural levee artificial levee swale floodplain basin (TRANSITIONAL) Slope Gradient (%): 1-2%	
Soil Map Unit: 127	Soil Series as Observed:	
General Comments: FINISH GRADE = 1' BELOW EXISTING		
Dominant Plant Species: LOLIUM, FESTUCA, GEDI		
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 63"	
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:	

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-6"	A1	l	2, gr	M	C, 1, D, Fe-X, M	M	ROOTS MANY FINE, MF
6"-23"	A2	sil	1, sbk	L	C, 2, D, Fe-X, M	M	ROOTS COMMON FINE
23"-43"	Bg1	l	0, M	L	M, 3, D, Fe-X, M	M	ROOTS FEW, VERY FINE
43"-63"	Bg2	l+	0, M	L	M, 3, D, Fe-X, M	M	NO ROOTS, DENSER THAN Bg1

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: WILDLANDS	Pit No.: B
Investigator(s): Joel Butterworth, Paul Weller	Date: December 12, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 0	

Land Surface Shape: (slightly) planar concave convex SLIGHTY HUMMOCKY	Landform: natural levee artificial levee swale floodplain basin TRANSITIONAL
	Slope Gradient (%): 1 TO 2 %
Soil Map Unit: 127	Soil Series as Observed:
General Comments: FINISH GRADE 0.75' BELOW EXISTING	
Dominant Plant Species: FESTUCA, LOLIUM, POA PRAT(?), JUN PAT, JUN TEN	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): 70"
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments: ZONE FROM 40"-46" CONTAINS 15% ANGULAR GRAVEL

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-9"	A1	l	2, gr	Mod	None	Mod	MANY FINE ROOTS
9"-22"	A2	l	0, M	Low	C, 2, D, Fe-x, M	Mod	ROOTS COMMON FINE
22"-37"	Bg1	vfsl	0, M	Low	M, 2, D, Fe-x, M	Mod	ROOTS FEW FINE
37"-51"	Bg2	l+	0, M	Low	M, 3, D, Fe-x, M	Mod	ROOTS NONE,
51"-70"	Ab	sicl	0, M	HIGH	C, 2, F, Fe-x, M	Mod	ROOTS NONE, BURIED SOIL

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: WILDLANDS	Pit No.: C
Investigator(s): Joel Butterworth, Paul Weller	Date: December 12, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 5315 KNIFE @ TOP OF LOAMY SAND LENSE	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin TRANSITION
	Slope Gradient (%): 1-2%
Soil Map Unit: 127	Soil Series as Observed:
General Comments: FINISH GRADE 0.5' BELOW EXISTING STRATIFIED LOAMY SAND LAYER BETWEEN 22-23", CONTINUOUS	
Dominant Plant Species: LOLIUM, FESTUCA, POA, PHALARIS MINOR JUN PAT	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 47"
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-6"	A1	l	1, gr	Mod	None	Mod	Roots many fine
6"-18"	A2	l	0, M	Mod	c, 2, F, Fe-x, M	Mod	Roots common fine
18"-37"	B	sil & ls	0, M	Low	m, 2, D, Fe-x, M	Mod-Mod-High	Stratified Roots few fine
37"-47"	Bg	cl-	0, M	Low	m, 2, D, Fe-x, M	Mod	Roots none

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	Redox Location
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

"1c"

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: WILDLANDS	Pit No.: 108-070-09 1
Investigator(s): Joel Butterworth	Date: August 16, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1–2
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: FLUVAQVENTS
General Comments:	
Dominant Plant Species: DOARRA (?), FESTUCA (?), MINOR JUNCUS	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 22
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-2	A1	l	SG	HIGH	F, 1, D, Fe-x, RC	MOD	
2-16	A2	l	M	MOD	NONE	MOD	
16-22	Bg	sil	M	LOW	M, 2, D, Fe-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - anguiar blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance
- f - few
- c - common
- m - many

Redox Size
- 1 - fine (<2mm)
- 2 - medium 2–5mm)
- 3 - coarse (5–20mm)
- 4 - very coarse (20–76mm)
- 5 - extremely coarse (>76mm)

Redox Contrast
- F - faint
- D - distinct
- P - prominent

Redox Type
- Fe-x - iron concentration (soft mass)
- Fe-nc - iron nodule or concretion
- Mn-x - manganese concentration (soft mass)
- Mn-nc - manganese nodule or concretion
- D - depletion

Redox Location
- M - soil matrix
- P - ped face
- PL - pore lining
- RC - root channel (ox. rhizospheres)

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

"2c"

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: WILDLANDS	Pit No.: 108-070-09 2
Investigator(s): Joel Butterworth	Date: August 16, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): 1-2
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: FLUVAQUENTS
General Comments:	
Dominant Plant Species: POA PRA, FESTUCA (?), LOLIUM (?),	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 25
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-1	A1	l	SG	HIGH	NONE	MOD	
1-12	A2	l	M	HIGH	M, 2, D, Fe-x, M	MOD	OK
12-25	C	FSL	M	LOW	ALONG STRATA: M, 2, D, Fe-x, M	MOD	STRATIFIED

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

"3c"

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: WILDLANDS	Pit No.: 109-070-09 3
Investigator(s): Joel Butterworth	Date: August 16, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex LOCAL, SMALL DEPRESSION	Landform: natural levee artificial levee swale floodplain basin Slope Gradient (%): 0-1
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: FLUVAQUENTS
General Comments:	
Dominant Plant Species: POA PRA (?), FESTUCA (?), JUN PAT,	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments: N/A

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-1	A1	VFSL	GR	HIGH	M, 1, D, Fe-x, RC	MOD	
1-7	A2	VFSL	M	MOD	M, 2, D, Fe-x, M	MOD	
7-23	C	FSL	M	LOW	M, 3, P, Fe-x, M	MOD	

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

SOIL PROFILE AND SITE DESCRIPTION FORM:
WETLAND ESTABLISHMENT SUITABILITY ASSESSMENT

"4c"

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: WILDLANDS	Pit No.: 108-070-09 4
Investigator(s): Joel Butterworth	Date: August 16, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number:	

Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin
	Slope Gradient (%): (TOE) 1-2
Soil Map Unit: FLUVAQUENTS	Soil Series as Observed: FLUVAQUENTS
General Comments:	
Dominant Plant Species: POA PRA (?), FESTUCA (?) (PASTURE GRASSES)	
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 23
Depth to Restrictive Layer (in.): (NONE)	Overall Soil and Site Suitability for Wetland Establishment: low medium high Comments:

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0-1	A1	SL	GR	HIGH	NONE	MOD	
1-9	A2	SL	SG	MOD	C, 2, D, Fe-x, M RC	MOD	1/2" GRAVEL LENS AT BASE OK
9-23	C	FSL	SG	LOW	M, 2, P, Fe-x, M	MOD	VERY FINELY STRATIFIED

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	**Redox Location**
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

BENBOW

108 - 040 - 13

ICF INTERNATIONAL SOIL PROFILE AND SITE DESCRIPTION FORM: WETLAND ESTABLISHMENT/RESTORATION SUITABILITY ASSESSMENT

Client/Project: Caltrans/Willits Bypass Wetland Mitigation	Parcel Name: BEN BOW 13	Pit No.: L
Investigator(s): Joel Butterworth, Paul Weller	Date: December 12, 2011	
Method of Excavation: backhoe sharpshooter hand auger	Photo Number: 5323, KNIFE ON EXISTING GRADE	
Land Surface Shape: (slightly) planar concave convex	Landform: natural levee artificial levee swale floodplain basin	
	Slope Gradient (%): 0-3%	
Soil Map Unit: 115	Soil Series as Observed: Cole	
General Comments: FINISH GRADE IS 1.0' LOWER THAN EXISTING GRADE		
Dominant Plant Species: FESTUCA, LOLIUM, PLANTAGO		
Jurisdictional Status at Pit: existing wetland (reference) wetland-upland transition upland	Depth to Soil Saturation (in.): NONE TO 40"	
Depth to Restrictive Layer (in.): N/A ☑ (Check if no restrictive layer)	Overall Soil and Site Suitability for Wetland Establishment: low medium high n/a Comments:	

Depth (in.)	Horizon	Texture[1]	Structure[2]	Organic Matter - inferred	Redox Features[3]	Permeability - inferred	Comments
0"-4"	A1	l	3-gr	HIGH	NONE	MOD	ROOTS MANY COMMON
4"-9"	A2	cl-	2-sbk	HIGH	NONE	MOD	ROOTS MANY COMMON
9"-24"	B+1	cl-	1-sbk	LOW	C,2,F,Fe-x,M	MOD	ROOTS FEW FINE
24"-36"	B+2	cl-	2-sbk	LOW	C,2,D,Fe-x,M	MOD	ROOTS FEW VERY FINE
36"-40"	C	l	0,M	LOW	M,3,F,Fe-x,M	MOD	ROOTS FEW VERY FINE

[1]Texture and Coarse Fragment Content

Texture		Coarse Fragments
cos - coarse sand	vfsl - very fine sandy loam	gr - gravelly
s - sand	l - loam	vgr - very gravelly
fs - fine sand	sil - silt loam	xgr - extremely gravelly
vfs - very fine sand	si - silt	cb - cobbly
lcos - loamy coarse sand	scl - sandy clay loam	vcb - very cobbly
ls - loamy sand	cl - clay loam	xcb - extremely cobbly
lfs - loamy fine sand	sicl - silty clay loam	st - stony
lvfs - loamy very fine sand	sc - sandy clay	vst - very stony
cosl - coarse sandy loam	sic - silty clay	xst - extremely stony
sl - sandy loam	c - clay	
fsl - fine sandy loam		

"-" = "light" (as in a clay textural class with relatively low clay content)
"+" = "heavy" (as in a clay textural class with relatively high clay content)

[2]Soil Structure

Structure Type	Structure Grade
gr - granular	0 - structureless
abk - angular blocky	1 - weak
pl - platy	2 - moderate
pr - prismatic	3 - strong
sg - single grain	
m - massive	

[3]Redoximorphic Feature Morphology

Redox Abundance	Redox Type
f - few	Fe-x - iron concentration (soft mass)
c - common	Fe-nc - iron nodule or concretion
m - many	Mn-x - manganese concentration (soft mass)
	Mn-nc - manganese nodule or concretion
Redox Size	D - depletion
1 - fine (<2mm)	
2 - medium 2–5mm)	Redox Location
3 - coarse (5–20mm)	M - soil matrix
4 - very coarse (20–76mm)	P - ped face
5 - extremely coarse (>76mm)	PL - pore lining
	RC - root channel (ox. rhizospheres)
Redox Contrast	
F - faint	
D - distinct	
P - prominent	

Appendix B Representatiave Photographs of Soil Pits



Photo at Profile C, Wildlands parcel 108-070-09. Overview of pit vicinity



Photo of Profile Q, Ford parcel 108-020-04. Profile is silty clay loam, silt loam, and loam to a depth of 37 inches. Knife is at the top of the loamy sand C horizon, which is well below the finish grade elevation. The soil was determined to be suitable for wetland establishment.



Photo of Profile O, Ford parcel 108-020-04. Profile contains very gravelly sand and coarse sand layers at or near the finish grade elevation. These layers were continuous through the pit and were assumed to extend to Outlet Creek. Knife is at the top of the very gravelly sand C horizon.



Photo of Profile Y, Ford parcel 108-030-02. Profile contains loamy sand layer and a discontinuous and undulating pebbly layer at or near the finish grade elevation, with a thick zone of gravelly loamy sand below seven inches depth. All but the pebbly layer was continuous through the pit and were assumed to extend to Outlet Creek. Knife is at the top of the pebbly layer.



Photo of Profile BB, Lusher parcel 108-030-04. Profile contains loamy sand layer at or near the finish grade elevation, with a five inch thick very gravelly sand layer beginning at 16 inches depth. This layer was continuous through the pit and were assumed to extend to Outlet Creek. Knife is at the top of the very gravelly loamy sand layer.



Photo of Profile I, Wildlands parcel 108-020-07. Profile is very fine sandy to silty clay loam throughout, with a thin very fine sandy loam layer to remain at the finish grade elevation. Knife is at the top of the silty clay loam Btg horizon.



Photo of Profile E, Wildlands parcel 108-060-01. Profile is silt loam to gravelly loam with a one inch thick, discontinuous sand lens beginning at 15 inches depth. A moderately permeable gravelly loam (20% gravel content) will remain at the finish grade elevation. Knife is at the top of the sand lens.



Photo of Profile A, Wildlands parcel 108-070-09. Profile is silt loam to heavy loam throughout. A moderately permeable silt loam will remain at the finish grade elevation. Knife is at the top of the loam Bg1 horizon.



Photo of Profile L, Benbow parcel 108-040-13. Profile is silt loam to light clay loam throughout. A moderately permeable light clay loam will remain at the finish grade elevation. Knife is at ground level.

Appendix C Soil Pit Location Map

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	MEN	101	R69.4/78.9		

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MATCH TO SHEET G-2

LIMIT OF GRADING

LIMIT OF WORK

Soil Pits

1a August 2011 Soil Pits

BB December 2011 Soil Pits

SOIL PIT LOCATIONS GROUP 2 WETLANDS SHEET 1

SCALE 1"=50'

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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DGN FILE => Soil-1.dgn

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EA 000000

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01	MEN	101	R69.4/78.9		

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MATCH TO SHEET G-1

MATCH TO SHEET G-3

LIMIT OF WORK

LIMIT OF GRADING

-0.2′

-0.5′

-0.2′

-0.2′

1325 1326 1327 1328 1329 1330

Soil Pits

1a August 2011 Soil Pits

BB December 2011 Soil Pits

SOIL PIT LOCATIONS GROUP 2 WETLANDS SHEET 2

SCALE 1"=50′

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CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	MEN	101	R69.4/78.9		

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Soil Pits

1a August 2011 Soil Pits

BB December 2011 Soil Pits

MATCH TO SHEET G-2

LIMIT OF WORK

LIMIT OF GRADING

-0.2′

-0.2′

-0.2′

1325 1326 1330

SOIL PIT LOCATIONS GROUP 2 WETLANDS SHEET 3

SCALE 1"=50′

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01	MEN	101	R69.4/78.9		

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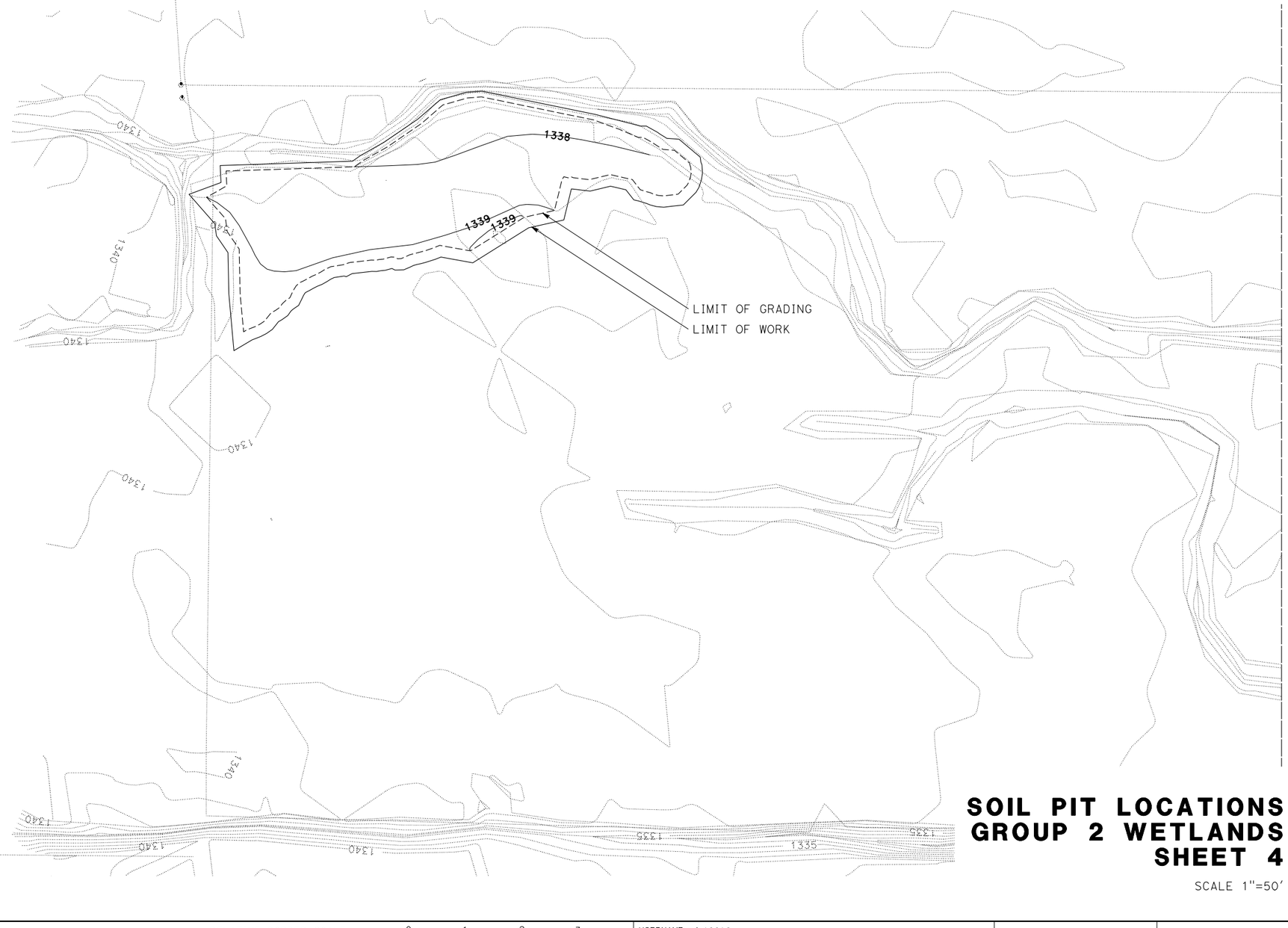
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01	MEN	101	R69.4/78.9		

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Soil Pits

1a ⊗ August 2011 Soil Pits

BB ⊕ December 2011 Soil Pits



SOIL PIT LOCATIONS GROUP 2 WETLANDS SHEET 5

SCALE 1"=50'

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DGN FILE => Soil-5.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	MEN	101	R69.4/78.9		

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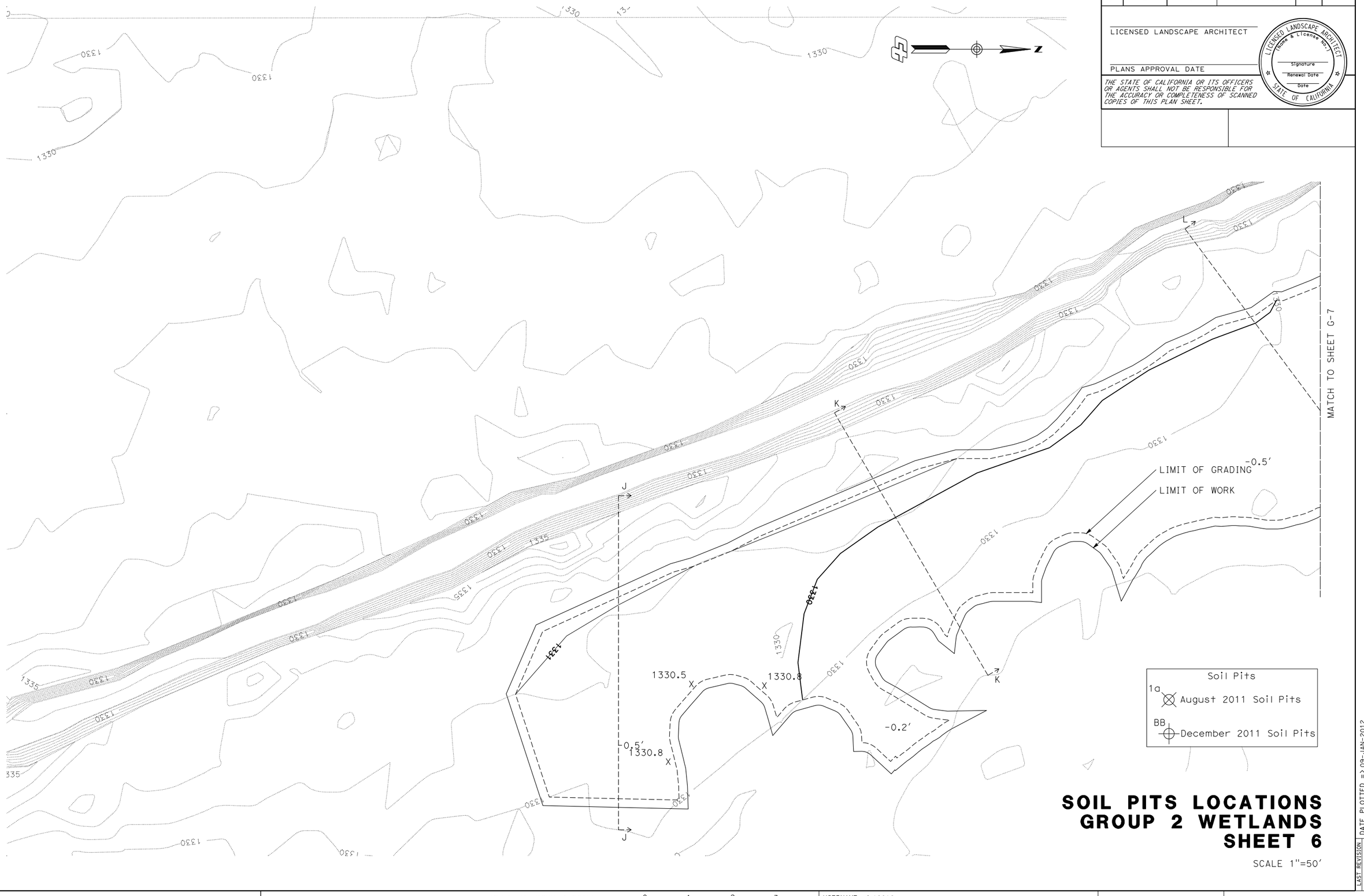

SOIL PITS LOCATIONS GROUP 2 WETLANDS SHEET 6

SCALE 1"=50'

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DGN FILE => Soil-6.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	MEN	101	R69.4/78.9		

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Soil Pits

1a August 2011 Soil Pits

BB December 2011 Soil Pits

SOIL PITS LOCATIONS GROUP 2 WETLANDS SHEET 7

SCALE 1"=50'

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TIME PLOTTED => 12:34

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RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => 19016

DGN FILE => Soil-7.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	MEN	101	R69.4/78.9		

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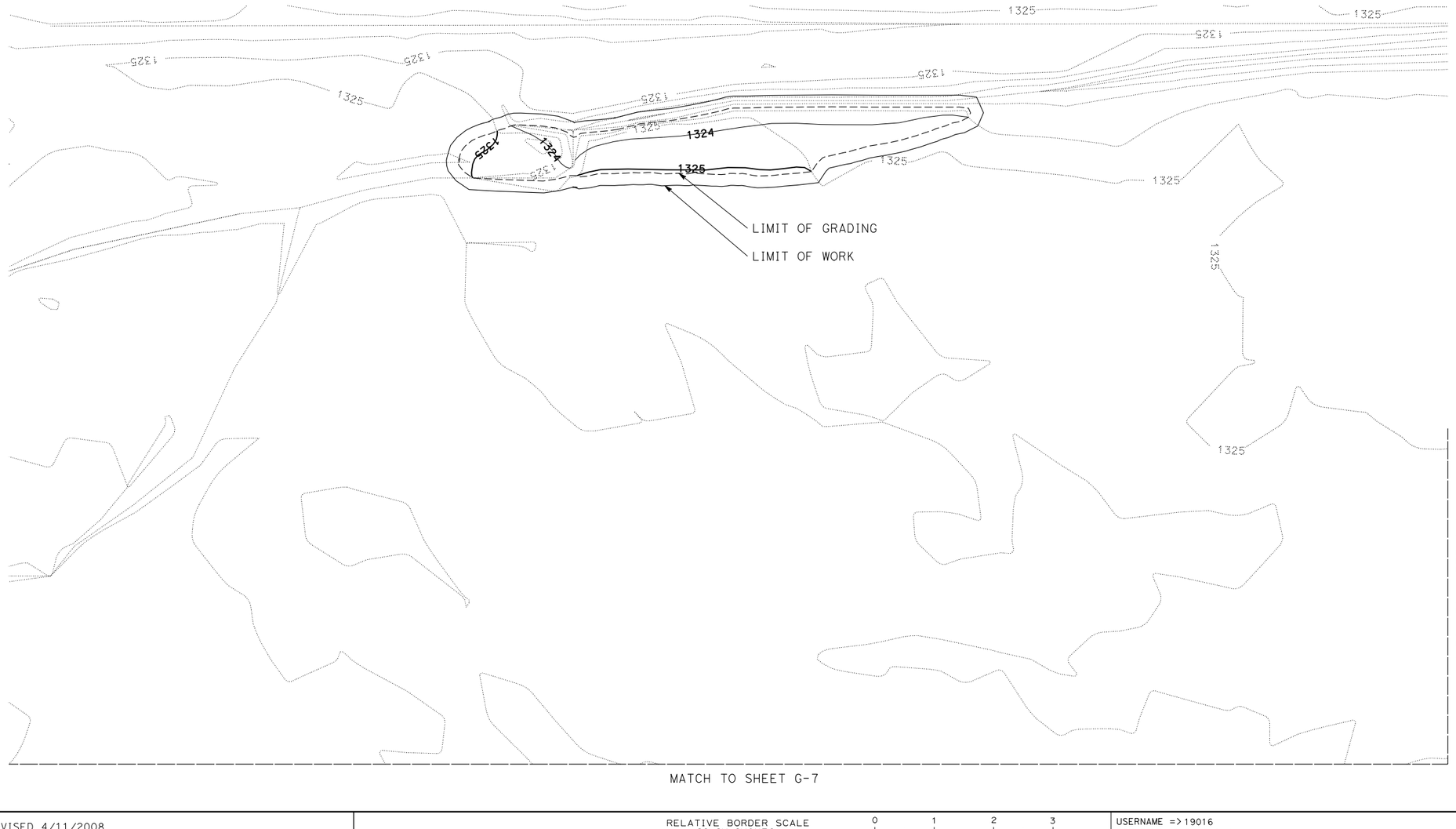

Soil Pits
1a August 2011 Soil Pits
BB December 2011 Soil Pits

SOIL PITS LOCATIONS GROUP 2 WETLANDS SHEET 8

SCALE 1"=50'

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RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => 19016
DGN FILE => Soil-8.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	MEN	101	R69.4/78.9		

LICENSED LANDSCAPE ARCHITECT

PLANS APPROVAL DATE

LICENSED LANDSCAPE ARCHITECT — Name & License No. — Signature — Renewal Date — Date — STATE OF CALIFORNIA

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Soil Pits

1a ⊗ August 2011 Soil Pits

BB ⊕ December 2011 Soil Pits

MATCH TO SHEET G-8

MATCH TO SHEET G-7

LIMIT OF GRADING

LIMIT OF WORK

1325 1324 1326 1327 1328 1330

SOIL PITS LOCATIONS
GROUP 2 WETLANDS
SHEET 9

SCALE 1"=50'

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RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => 19016
DGN FILE => Soil-9.dgn

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	MEN	101	R69.4/78.9		

LICENSED LANDSCAPE ARCHITECT

PLANS APPROVAL DATE

LICENSED LANDSCAPE ARCHITECT
Name & License No.
Signature
Renewal Date
Date
STATE OF CALIFORNIA

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Soil Pits
1a August 2011 Soil Pits
BB December 2011 Soil Pits

SOIL PITS LOCATIONS GROUP 2 WETLANDS SHEET 10

SCALE 1"=50'

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DATE PLOTTED => 09-JAN-2012
TIME PLOTTED => 12:23

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => 19016
DGN FILE => Soil-10.dgn

CU 00000

EA 000000

Appendix K Vegetation Sampling of Proposed (Group 1) Wetland Establishment Sites

Memorandum

Date:	August 10, 2010
To:	Dave Wickens U.S. Army Corps of Engineers, San Francisco District 1455 Market Street San Francisco, CA 94103-1398
Cc:	Laurie Monarres, U.S. Army Corps of Engineers Melissa Scianni, U.S. Environmental Protection Agency Jeremiah Puget, North Coast Regional Water Quality Control Board Craig Martz, California Department of Fish and Game
From:	Shanna Zahner California Department of Transportation
Subject:	Willits Bypass Project—Vegetation Sampling at Proposed Wetland Establishment Sites

1. Introduction

This technical memorandum addresses item 6 under the "Wetland Establishment" heading on the Willits Bypass Project (bypass project) "punch list" prepared by the North Coast Regional Water Quality Control Board (RWB), U.S. Army Corps of Engineers (USACE), and U.S. Environmental Protection Agency (USEPA) following a meeting held at the RWB Santa Rosa office on July 12 and 13, 2010. The punch list includes items necessary for permitting the bypass project under the Clean Water Act (CWA) Section 404. The punch list is meant to be a summary of all agency requests for information up to the meeting date of July 12 and 13. The list was also designed to capture all the information requested in a letter to Caltrans received from the USACE dated July 9, 2010 (July 9 letter). The July 9 letter also includes a section under wetland establishment which requests information on the existing conditions of the vegetation on the wetland establishment sites [bullets occurring after item 4.c.1.] Required items include:

1) Existing conditions: We generally have a list of the species that occur on site from the delineation that were completed. For each wetland establishment site we need:

- Species characteristics such as: ~~densities, age, health~~[1], natives/nonnative.
- Percent cover.
- ~~Community structure (canopy stratification)~~[1].
- Map showing the correct location of plant communities with representative site photos.

[1] During the July 12 and 13 meeting, the items shown as strikethrough were agreed to be removed from the requirements. The target wetland habitats to be established are wet meadow and mixed marsh, which include herbaceous plants. Therefore information which would be collected on woody plants was eliminated.

- Proposed site should be located adjacent to existing waters of the U.S. or a high functioning buffer adjacent to waters of the U.S. to create a wildlife corridor. Provide documentation of this connectivity.[2]

2. Context for Work

As part of the compensatory mitigation program for the Willits Bypass Project, wetland establishment (i.e., wet meadow or mixed marsh) is proposed on six offsite mitigation parcels in Little Lake Valley (Table 1). For ease of discussion the Goss, MGC Plasma Middle, and MGC Plasma North offsite mitigation parcels, which are adjacent to each other, are discussed together.

Table 1. Proposed Wetland Establishment Sites at the Offsite Mitigation Parcels

Offsite Mitigation Parcel	Assessor's Parcel Number	Proposed Wetland Establishment (acres)
Ford	108-010-06	2.854
Goss	103-230-02	0.553
MGC Plasma Middle	103-250-14	0.233
MGC Plasma North	103-230-06	6.691
Niesen	108-040-02	5.666
Watson East	037-221-30	8.336
	Total	**24.333**

3. Suitability for Wetland Establishment

On each establishment parcel, vegetation was sampled quantitatively to document existing conditions as part of justification for proposing establishment at the parcel (Figure 1). Information from the vegetation sampling will also be used to confirm the plant palettes and seed mixes for each establishment site. The following areas of each establishment parcel were sampled:

- Existing herbaceous vegetation within the proposed wetland establishment site.
- Existing vegetation in the surrounding herbaceous wetlands within 100 meters of the establishment site.
- Existing vegetation in the proposed wetland establishment monitoring reference site.

Please note that other information on hydrology and soils collected and developed as part of justification for proposing establishment on the offsite mitigation parcels is presented in separate technical memoranda.

4. Methods

4.1 Objectives

The intent of this study was to sample existing wetland vegetation present on the establishment parcels and use that information, then to identify the types of wetland plant communities and map

[2] This information is included in the Watershed Information Technical Memorandum dated August 10, 2010.

those communities on the parcels. In addition, the plant community information would be used to further refine plant palettes and seed mixes for each proposed established wetland site.

The vegetation was sampled in the proposed establishment sites, in surrounding existing wet meadow and/or mixed marsh, and in the proposed wetland establishment monitoring reference sites to collect quantitative data on plant cover that would be used to calculate the following wetland habitat characteristics (from the Mitigation and Reporting Plan [MRP; RWB 2010]):

- relative percent vegetation cover by native wetland species,
- absolute percent vegetation cover by native wetland plants,
- absolute percent vegetation cover by wetland species,
- native species richness, and
- absolute percent cover by invasive species.

4.2 Field Data Collection

Each offsite mitigation parcel where wetland establishment is proposed was sampled, with the exception of MGC Plasma Middle, which is immediately south of MGC Plasma North. Only a very small portion of this parcel is proposed to be graded to establish wetlands; the majority of the grading will occur on the adjacent MGC Plasma North and Goss parcels.

The sampling method generally followed the California Native Plant Society (CNPS) field sampling protocol (Sawyer and Keeler-Wolf 1995). Vegetation sampling was conducted on July 21, 22, 23, 26 and 27, 2010 by botanists experienced in California wetland and invasive plant identification and survey methods.

Transects were established in the proposed establishment sites, surrounding existing wet meadow and/or mixed marsh, and in the proposed wetland establishment monitoring reference sites. The transects were uniformly distributed across each area being sampled. Before the field survey, a series of parallel transects spaced approximately 100 meters apart, oriented parallel across the parcel's width were plotted on field maps. These transects were adjusted in the field to better represent vegetation diversity in each of the three areas being sampled. Once established, each transect was subdivided into 100 meter segments and each 100 meter segment was sub-sampled. Transect segments that were greater than 50 meters long but less than 100 meters long were also sampled. The location of transects, sampling plots, and the USACE verified jurisdictional wetlands is shown in Figure 1.

Within each 100 meter segment on the transect a 50 meter long point transect was established, centered in a 50 meter by 5 meter plot. The start point of each plot was randomly located along each 100 meter segment using a random number between 0 and 50. Point intercept sampling (Elzinga et al 1998) was performed at 0.5 meter intervals beginning at 0.5 meter and ending at 50.0 meters along each 50 meter transect. At each interval a point was projected vertically into the vegetation and each species intercepted by a point was recorded on a data collection form.

In addition to the point intercept sampling in the plot, a full census of species occurring in the plot (both native and nonnative) was conducted and recorded on a data collection form. As applicable, each plant species was assigned a wetland indicator status following Reed (1988). See Attachment 2

for the definition of wetland indicator status in Reed (1988). Plants with an indicator status of FAC or wetter were classified as wetland plants. Scientific names of plants follow Reed (1988) and *The Jepson Manual* (Hickman 1993) as updated by the Jepson Interchange, an online database maintained by the Jepson and University Herbaria (University of California Berkeley 2010).

Ground-level digital images of each plot were taken and the compass direction of the image was recorded on a data collection form (Attachment 1).

Percent cover for each species and plant community type was determined from the point intercept data. Species richness was determined by the full census survey of the plot.

4.3 Identification of Plant Communities

A plant community can be defined as a recognizable assemblage of plants that is relatively homogeneous in structure and plant composition and that can be distinguished from adjacent communities by a clear boundary (Grossman et al. 1998). Plant communities were identified following the classification system in *A Manual of California Vegetation* (Sawyer et al. 2009), which is a hierarchical system that combines broad habitat type and ecological modifiers at the highest levels of the hierarchy, and floristics (i.e., dominant plant species) at the lowest levels. The basic lower level vegetation unit recognized in the field is the alliance, identified using both qualitative and quantitative data, and based on the dominant plant species in the upper layer of vegetation or characteristic species.

Identification of plant communities was based on the quantitative vegetation data collected. The point-intercept data collected in the field was used to calculate the absolute and relative cover of each species. Absolute and relative cover was also calculated for native versus nonnative species, and wetland versus upland species. Using these data, the plant community in each plot was identified as an alliance as described in Sawyer et al. (2009) if it met *either* 1) the bolded narrative description of the alliance (provided at the start of each alliance description), *or* 2) one of the membership rules described for the alliance by other authors. Plant communities that did not meet a vegetation alliance description in Sawyer et al. (2009) were identified according to previous plant community lists (Holland 1986; DFG 2003; DFG 2007).

Once plant communities were identified using the quantitative data, polygons were drawn around the boundaries of each plant community using a combination of field reconnaissance and aerial photograph interpretation (Figure 2). Plant communities were only mapped for herbaceous communities since the goal for the wetland establishment areas will be to establish herbaceous wetland communities.

5. Results

Figure 1 shows the location of the vegetation sampling transects and plots. Figure 2 shows the location of herbaceous plant community types. Attachment 1 shows ground-level digital images of each plot and the compass direction of the digital image. In most cases the digital images are in order of plot start (west side of plot) and plot end (east side of plot). Attachment 2 contains a list of the plants observed in each plot as well as their wetland indicator status (Reed 1988), whether they are native or nonnative (Hickman 1993) and whether they are considered invasive as defined in the MMP (California Department of Transportation 2010, Appendix H, Table 2-1).

In total, 28 plots were sampled at the wetland establishment parcels. Since the intention of this study was to determine the existing wetland plant communities present on the parcels and to use that information to determine the type of wetland plant community to be established at each wetland establishment site, the following discussions highlight the differences between the observed current upland wetland establishment sites and the surrounding existing wetlands.

5.1 Summary of Cover Types, Species Richness and Plant Community Types Observed

A summary of the vegetation characteristics of each plot (including relative percent vegetation cover by native wetland species, absolute percent vegetation cover by wetland species, native species richness, and absolute percent cover by invasive species) is provided in Table 2. The plant community types are provided for each plot in Table 3. The rationale for assigning each plot to a particular plant community type is also provided in Table 3.

Table 2. Summary of Vegetation Characteristics at Offsite Mitigation Parcels where Wetland Establishment is Proposed

		Species Richness (Number of Species in Plot)			Wetland Plant Cover			Invasive Species
Mitigation Parcel	Plot	Total	Native	Nonnative	Absolute % Cover Wetland Plants	Relative % Cover Native Wetland Plants	Absolute % Cover Native Wetland Plants	Absolute % Cover
Ford	Plot 1	16	3	13	21	0	0	16
Ford	Plot 2	20	7	13	13	34	47	0
Ford	Plot 3	21	4	17	35	0	0	14
Ford	Plot 4	22	9	13	100	23	28	0
Ford	Plot 5	6	5	1	218	100	218	0
Goss	Plot 1	15	4	11	94	10	10	0
Goss	Plot 2	16	5	11	91	15	14	0
MGC Plasma North	Plot 1	20	7	13	108	25	27	0
MGC Plasma North	Plot 2	26	9	17	89	35	35	0
MGC Plasma North	Plot 3	23	8	15	95	18	18	0
MGC Plasma North	Plot 4	32	14	18	96	35	39	0
MGC Plasma North	Plot 5	27	8	19	93	31	34	0
Niesen	Plot 1	21	6	15	166	35	74	0
Niesen	Plot 2A	22	12	10	128	69	96	0
Niesen	Plot 2B	22	6	16	61	4	9	0
Niesen	Plot 3A	30	5	25	74	0	0	0
Niesen	Plot 3B	28	11	17	23	1	2	18
Niesen	Plot 5	21	4	17	69	0.5	1	0
Niesen	Plot 6	37	10	27	133	7	15	0
Niesen	Plot 7	28	7	21	100	0.5	1	0
Watson East	Plot 1	22	6	16	102	25	26	0
Watson East	Plot 2	24	7	17	88	27	29	0
Watson East	Plot 3	29	8	21	111	22	32	0
Watson East	Plot 4	33	16	17	111	29	39	0
Watson East	Plot 5	30	8	22	67	19	22	1
Watson East	Plot 6	32	12	20	135	52	79	0
Watson East	Plot 7	31	16	15	123	58	94	0

Table 3. Vegetation Alliances and Plant Community Types Identified at Each Offsite Mitigation Parcel where Wetland Establishment is Proposed

Parcel	Plot	Vegetative Alliance and Source (*Scientific Name*)	Comments
Ford	1	Annual Brome Grassland (Sawyer et al. 2009) (*Bromus* [*diandrus*, *hordeaceus*]–*Brachypodium distachyon* semi-natural herbaceous stand)	1. *B. hordeaceus* relative cover = 45%, total non-native relative cover = 89% 2. Meets one membership rule of >80% relative cover of B. hordeaceus co-dominant with non-natives. 3. Nearly meets a second membership rule of >50% relative cover of *B. hordeaceus*.
	2	Wet Montane Meadow (Holland 1986) *or* Rush Riparian Grassland (DFG 2003)	1. 34% relative cover of natives. 2. Several different species are dominant and data does not meet any membership rules in Sawyer et al. 2009.
	3	Annual Brome Grassland (Sawyer et al. 2009) (*Bromus* [*diandrus*, *hordeaceus*]–*Brachypodium distachyon* semi-natural herbaceous stand)	1. *B. hordeaceus* relative cover = 28%, total non-native relative cover = 95% 2. Meets one membership rule of >80% relative cover of *B. hordeaceus* co-dominant with non-natives.
	4	Wet Montane Meadow (Holland 1986) *or* Rush Riparian Grassland (DFG 2003)	1. 23% relative cover of natives. 2. Several different species are dominant and data does not meet any membership rules in Sawyer et al. 2009.
	5	Hardstem Bulrush Marsh (Sawyer et al. 2009) (*Schoenoplectus acutus* herbaceous)	1. *S. acutus* = 215% absolute cover. 2. Meets membership rule.
Goss	1	Bent Grass–Tall Fescue Meadow (Sawyer et al. 2009) (*Agrostis* (*gigantea*, *stolonifera*)–*Festuca arundinacea* semi-natural herbaceous stand)	1. Relative cover of *F. arundinacea* = 74%. 2. Meets verbal description of alliance but not membership rule.
	2	Bent Grass–Tall Fescue Meadow (Sawyer et al. 2009) (*Agrostis* (*gigantea*, *stolonifera*)–*Festuca arundinacea* semi-natural herbaceous stand)	1. Relative cover of *F. arundinacea* = 73%. 2. Meets verbal description of alliance but not membership rule.
MGC Plasma North	1	Bent Grass–Tall Fescue Meadow (Sawyer et al. 2009) (*Agrostis* (*gigantea*, *stolonifera*)–*Festuca arundinacea* semi-natural herbaceous stand)	1. Relative cover of *F. arundinacea* = 71%. 2. Meets verbal description of alliance but not membership rule
	2	Bent Grass–Tall Fescue Meadow (Sawyer et al. 2009) (*Agrostis* (*gigantea*, *stolonifera*)–*Festuca arundinacea* semi-natural herbaceous stand)	1. Relative cover of *F. arundinacea* = 47%. 2. Notably high relative cover of native perennial *Danthonia californica* = 21%. 3. Meets verbal description of alliance but not membership rule.
	3	Perennial Rye Grass Field (Sawyer et al. 2009) (*Lolium perenne* semi-natural herbaceous stand)	1. Relative cover of *L. multiflorum* = 35%, relative cover of all nonnatives = 82%. No plant with cover greater than *L. multiflorum*. 2. Meets verbal description of alliance but not membership rules.

Parcel	Plot	Vegetative Alliance and Source (*Scientific Name*)	Comments
	4	Bent Grass–Tall Fescue Meadow (Sawyer et al. 2009) (*Agrostis* (*gigantea*, *stolonifera*)–*Festuca arundinacea* semi-natural herbaceous stand)	1. Relative cover of *F. arundinacea* and *Agrostis* sp. = 39%. 2. Meets verbal description of alliance but not membership rule.
	5	Bent Grass–Tall Fescue Meadow (Sawyer et al. 2009) (*Agrostis* (*gigantea*, *stolonifera*)–*Festuca arundinacea* semi-natural herbaceous stand)	1. Relative cover of *F. arundinacea* = 49%. 2. Notably high relative cover of native perennial *Danthonia californica* = 17%. 3. Meets verbal description of alliance but not membership rule.
Niesen	1	Italian Ryegrass Grassland (DFG 2003)	1. Pasture is highly disturbed and covered mostly by two low growing annuals, *Juncus bufonius* and *Lythrum hyssopifolia*. 2. Community was classified by plant with highest cover that has a community defined by DFG 2003.
	2A (NW)	Wet Montane Meadow (Holland 1986) *or* Rush Riparian Grassland (DFG 2003)	1. Relative cover of native *Phalaris arundinacea* = 53%, relative cover of rushes = 13%. 2. Data does not meet any membership rules in Sawyer et al. 2009.
	2B (43m)	Wet Montane Meadow (Holland 1986)	1. Relative cover of nonnative *Phleum pretense* = 59%, very little cover of rushes. 2. Data does not meet any membership rules in Sawyer et al. 2009.
	3A	Annual Brome Grassland (Sawyer et al. 2009) (*Bromus* [*diandrus*, *hordeaceus*]–*Brachypodium distachyon* semi-natural herbaceous stand)	1. Relative *B. hordeaceus* cover = 36%, relative nonnative cover = 99%. 2. Meets verbal description of alliance with cover of nonnatives.
	3B	Annual Brome Grassland (Sawyer et al. 2009) (*Bromus* [*diandrus*, *hordeaceus*]–*Brachypodium distachyon* semi-natural herbaceous stand)	1. Relative *B. hordeaceus, B. diandrus* cover = 42%, relative nonnative cover = 97% 2. Meets verbal description of alliance with cover of nonnatives.
	5	Annual Brome Grassland (Sawyer et al. 2009) (*Bromus* [*diandrus*, *hordeaceus*]–*Brachypodium distachyon* semi-natural herbaceous stand)	1. Relative *B. hordeaceus* cover = 21%, relative nonnative cover = 90% 2. Meets verbal description of alliance with cover of nonnatives.
	6	Bent Grass–Tall Fescue Meadow (Sawyer et al. 2009) (*Agrostis* (*gigantea*, *stolonifera*)–*Festuca arundinacea* semi-natural herbaceous stand)	1. Relative cover of *F. arundinacea* = 43%, no other species with greater cover. 2. Meets verbal description of alliance but not membership rule.
	7	Bent Grass–Tall Fescue Meadow (Sawyer et al. 2009) (*Agrostis* (*gigantea*, *stolonifera*)–*Festuca arundinacea* semi-natural herbaceous stand)	1. Relative cover of *F. arundinacea* = 40%, no other species with greater cover. 2. Meets verbal description of alliance but not membership rule.

Parcel	Plot	Vegetative Alliance and Source (*Scientific Name*)	Comments
Watson East	1	Perennial Rye Grass Field (Sawyer et al. 2009) (*Lolium perenne* semi-natural herbaceous stand)	1. Relative cover of *L. multiflorum* = 53%, relative cover of all nonnatives = 75%. 2. Sawyer et al. 2009 does not recognize distinction between *L. perenne* and *L. multiflorum* 3. Meets verbal description of alliance but not membership rules.
	2	Perennial Rye Grass Field (Sawyer et al. 2009) (*Lolium perenne* semi-natural herbaceous stand)	1. Relative cover of *L. multiflorum* = 39%, relative cover of all nonnatives = 73%. 2. Meets verbal description of alliance but not membership rules.
	3	Perennial Rye Grass Field (Sawyer et al. 2009) (*Lolium perenne* semi-natural herbaceous stand)	1. Relative cover of *L. multiflorum* = 40%, relative cover of all nonnatives = 78%. 2. Meets verbal description of alliance but not membership rules.
	4	Perennial Rye Grass Field (Sawyer et al. 2009) (*Lolium perenne* semi-natural herbaceous stand)	1. Relative cover of *L. multiflorum* = 19%, relative cover of all nonnatives = 71%. No plant with cover greater than *L. multiflorum*. 2. Meets verbal description of alliance but not membership rules.
	5	Perennial Rye Grass Field (Sawyer et al. 2009) (*Lolium perenne* semi-natural herbaceous stand)	1. Relative cover of *L. multiflorum* = 20%, relative cover of all nonnatives = 81%. No plant with cover greater than *L. multiflorum*. 2. Meets verbal description of alliance but not membership rules.
	6	Wet Montane Meadow (Holland 1986) *or* Rush Riparian Grassland (DFG 2003)	1. Relative cover of two highest plants was *Mentha pulegium* = 20% and *Juncus ensifolius* = 26%. 2. Data does not meet any membership rules in Sawyer et al. 2009.
	7	Wet Montane Meadow (Holland 1986) *or* Rush Riparian Grassland (DFG 2003)	1. Relative cover of *Mentha pulegium* = 19% and perennial *Juncus* sp. = 35%. 2. Data does not meet any membership rules in Sawyer et al. 2009.

5.1.1 Ford Offsite Mitigation Parcel

5.1.1.1 Cover Types and Species Richness

Two plots were established in the proposed wetland establishment site and three in the adjacent wetlands on the Ford parcel.

For the two plots in the establishment site (1 and 3), vegetation was dominated by nonnative upland annual grasses, with few native or wetland plants. In fact, native wetland species were absent and absolute percent cover of all wetland species was 21% and 35% in the two plots with the main wetland species in both plots being Italian rye grass. Native species richness was low, with only three or four native species present. Yellow star thistle, an invasive plant, was common, with absolute cover of 14% and 16% in the two plots.

The three existing wetland plots (2, 4 and 5)consisted of two wet montane meadow/rush riparian grassland communities (plots 2 and 4) and one hardstem bulrush marsh community (plot 5).

The two sampled wet montane meadow/rush riparian grassland communities contained a diverse mix of native and nonnative wetland and upland plants. Relative percent cover of native wetland species was moderate at 23% and 34%, and absolute percent cover of all wetland species was approximately 100% in each plot. Native species richness was moderate, with seven and nine native species in the two plots. No invasive plants were recorded in either plot.

The hardstem bulrush marsh community was overwhelmingly dominated by hard stem bulrush, a native perennial obligate wetland plant, which was virtually the only plant present and formed 98% of the relative cover in the plot. Native species richness was low, with five native species recorded. No invasive plants were present in the marsh.

5.1.1.2 Plant Community Types Observed

Two sample plots were established within upland grassland proposed for wetland establishment (plots 1 and 3), and three transects were established in adjacent existing wetlands (plots 2, 4, and 5). A map of these plant communities is shown in Figure 2. The upland grasslands were assigned to the annual brome grassland alliance (Sawyer et al. 2009), and were dominated by soft brome, associated with several other nonnative annual grasses; native forbs had very low cover in this plant community.

Two wetland plots could not be identified as any alliance after Sawyer et al. (2009) and were closest to Holland's (1986) wet montane meadow or DFG's (2003) rush riparian grassland. This community type was characterized by higher diversity and a mix of native and nonnative plants, with no clear dominant species. The third wetland plot was overwhelmingly dominated by hard stem bulrush and was assigned to the hardstem bulrush marsh alliance (Sawyer et al. 2009).

5.1.2 Goss/MGC Plasma North Offsite Mitigation Parcels

5.1.2.1 Cover Types and Species Richness

Three plots were sampled in the proposed wetland establishment site (MGC plots 2, 4 and 5), one in a reference site (Goss plot 2), and four plots in adjacent wetlands on the Goss/MGC Plasma North

parcels (MGC plot 1 and 3, and Goss plots 1 and 3). The third plot on the Goss parcel was mowed on the date of the survey (July 26, 2010), so photographs were taken (Attachment 1) and a species list was collected for species richness, but no point counts were taken.

All but one of the sampled plots, both in the establishment site and adjacent existing wetlands, were assigned to the bent grass-tall fescue meadow alliance; the exception was identified as perennial rye grass field alliance. This was located at MGC plot 3 in the existing wetlands. The plots sampled on Goss/MGC Plasma North were relatively similar and were characterized by a relative percent cover of native wetland species ranging from 18% - 35% at MGC Plasma North, slightly lower at Goss at 10%-15%.

Absolute percent cover of all wetland species was 89% to 108%; tall fescue, a nonnative wetland plant, was the dominant species with 26% to 78% absolute cover in the plots. Native species richness was generally moderate, with only 7 to 9 native species present in most plots; the exception was MGC Plasma North plot 4, which had 14 native species, many of them wetland species. No invasive plants were recorded in any of the plots.

5.1.2.2 Plant Community Types Observed

The sampled plant communities on the Goss/MGC Plasma North parcels were perennial grasslands dominated by nonnative grasses. The dominant grasses were tall fescue and Italian ryegrass, and most sampled plots were assigned to the bent grass-tall fescue meadow alliance (Sawyer et al. 2009). This plant community is found in coastal prairie sites where the nonnative grasses have replaced native grasses such as California oatgrass. However, California oatgrass was common in the seven plots, with absolute cover of 5% to 21%. Other wetland native plants were also present, such as sedges and rushes. Overall, however, nonnative plants were dominant, with relative cover ranging from 62% to 82%.

5.1.3 Niesen Offsite Mitigation Parcel

5.1.3.1 Cover Types and Species Richness

Eight plots were established in the proposed Niesen wetland establishment parcel, one in a reference site (plot 6), four in the proposed establishment site (plots 1, 3A, 3B and 5), and three plots in adjacent wetlands (plots 2A, 2B, and 7).

For the four plots in the establishment site, three were assigned to the annual brome grassland alliance and one to the Italian rye grass field alliance. The reference site plot (plot 6) and one of the adjacent wetland plots (plot 7) were assigned to the bent grass-tall fescue alliance, and the remaining two wetland plots (plots 2A and 2B) could not be identified as any alliances after Sawyer et al. (2009) and were matched to wet montane meadow (Holland 1986)/rush riparian grassland (DFG 2003).

The sampled upland annual brome grassland and bent grass-tall fescue meadow plots were characterized by very low relative percent cover of native wetland plants (usually less than 2% cover). Absolute percent cover of all wetland species was more variable, ranging from 23% to 133%; the nonnative tall fescue and Harding grasses were the dominant wetland species. Native species richness varied from 4-11 native species recorded. One invasive species, yellow star thistle, was present in one plot (plot 3B), with absolute cover of 18%.

The characteristics of the wet montane meadow and Italian rye grass field were variable; the proposed wetland establishment site plot 1 (Italian rye grass field) had 35% relative cover of native wetland plants, consisting entirely of toad rush, a small native annual rush. The two wet montane meadow plots had relative cover by native wetland plants of 4% and 69% and absolute wetland plant covers of 61% and 128%. Native species richness varied from 6-12 native species recorded. No invasive plants were recorded in these plots.

5.1.3.2 Plant Community Types Observed

The plant communities sampled on the Niesen parcel were perennial grasslands, most of which were strongly dominated by nonnative plants—in six of the eight plots sampled, relative cover of nonnative plants was 90% or greater. Three of the sampled plots were annual brome grasslands dominated by upland plants, three were nonnative grasslands dominated by grasses with FAC or FACW indicator status, and two could not be matched to any alliance after Sawyer et al. (2009) and were assigned to Holland's (1986) wet montane meadow.

5.1.4 Watson East Offsite Mitigation Parcel

5.1.4.1 Cover Types and Species Richness

Two plots were established in the proposed wetland establishment sites (plots 1 and 5), one in a reference site (plot 7), and four plots in adjacent wetlands on the Watson East parcel (plots 2, 3, 4 and 6).

The two proposed wetland establishment sites, and three of the existing wetland plots were assigned to the perennial rye grass field alliance (Sawyer et al. 2009). The reference site plot (plot 7) and the existing wetland plot east of the north wetland establishment site (plot 6) could not be identified as an alliance after Sawyer et al. (2009) and were matched to wet montane meadow (Holland 1986)/rush riparian grassland (DFG 2003).

The sampled perennial rye grass field plots were relatively homogenous and were characterized by 19% to 29% relative cover of native wetland plants and 67% to 111% absolute cover of all wetland species. Perennial rye grass was the dominant species. Native species richness was generally moderate, with 6 to 8 native species present in all but one plot, in which 16 native species were recorded. The invasive species yellow star thistle was present in the north proposed wetland establishment site (plot 5), with an absolute cover of 1%.

The wet montane meadow plots, including the reference site plot, had higher relative cover of native wetland plants, 52% and 58%, and high absolute cover -- 135% and 123%. Native species richness was high, with 12 and 16 native species present in each plot. No invasive species were recorded in these plots.

5.1.4.2 Plant Community Types Observed

The plant communities sampled on the Watson East parcel were placed in two groups: five plots were assigned to the perennial rye grass field alliance (Sawyer et al. 2009) and the other two most closely matched Holland's (1986) wet montane meadow or DFG's (2003) rush riparian grassland. These two groups of plots were located in different portions of the parcel, perhaps because of the dominant hydrology on the parcel being wetter in the north and drier in the south. The drier

perennial rye grass field plots were located on the southeast portions of the parcel, and the wetter wet montane meadow plots were located in the northeast portion of the parcel, with the exception of the north wetland establishment site which occurrs on a high spot amidst surrounding wetter areas.

The perennial rye grass field occurs on seasonally moist to wet sites that are disturbed regularly by cattle grazing. Relative cover of nonnative plants was high, ranging from 71% to 81%. The two wet montane meadow plots were characterized by a high relative cover of native plants (55% and 64%) and a high species richness with no single species dominant; common species included the nonnative pennyroyal and the native spreading rush and sword-leaved rush.

6. Discussion

Caltrans is proposing to establish wetlands on six offsite mitigation parcels: Ford, Goss, MGC Plasma Middle, MGC Plasma North, Niesen, and Watson East. Previously, only target habitat types (e.g., wet meadow and mixed marsh) were identified for each wetland establishment site. Based on the plant community identifications developed as part of the July 2010 vegetation surveys at these proposed wetland establishment sites, the target plant communities can now be identified for each site. Table 4 lists the target habitat and plant community for each wetland establishment site.

Table 4. Proposed Wetland Establishment Sites at the Offsite Mitigation Parcels

Offsite Mitigation Parcel	Assessor's Parcel Number	Proposed Wetland Establishment Habitat Type	Proposed Wetland Establishment Plant Community
Ford	108-010-06	Mixed marsh and wet meadow	Wet Montane Meadow and Hardstem Bulrush Marsh
Goss/	103-230-02/		
MGC Plasma Middle/	103-250-14/	Wet meadow	Bent Grass-Tall Fescue Meadow
MGC Plasma North	103-230-06		
Niesen	108-040-02	Wet meadow	Wet Montane Meadow
Watson East	037-221-30	Wet meadow	Wet Montane Meadow

7. References

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Old Outlet Creek

Outlet Creek

Redwood Hwy

Ford Transect 1

Plot 1

Ford Transect 5

Plot 5

Ford Transect 3

Plot 3

Ford Transect 2

Plot 2

FORD
108-010-06

Ford Transect 4

Plot 4

Wetland Establishment Monitoring Reference Site

Offsite Mitigation Parcel
Transects
Plot Location
Wetland Establishment - 100m Buffer
Wetland Establishment Site
Monitoring Reference Site
Reference Plots

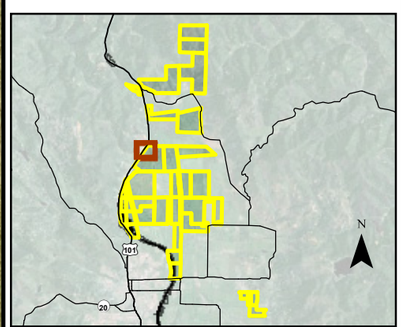
Existing Jurisdictional Wetlands

Mixed Marsh
Other Waters
Riparian Scrub
Riparian Woodland
Swale
Vernal Pool
Wet Meadow

Project Bypass Footprint

Permanent Impact Area
Temporary Impact Area
Right of Way

N



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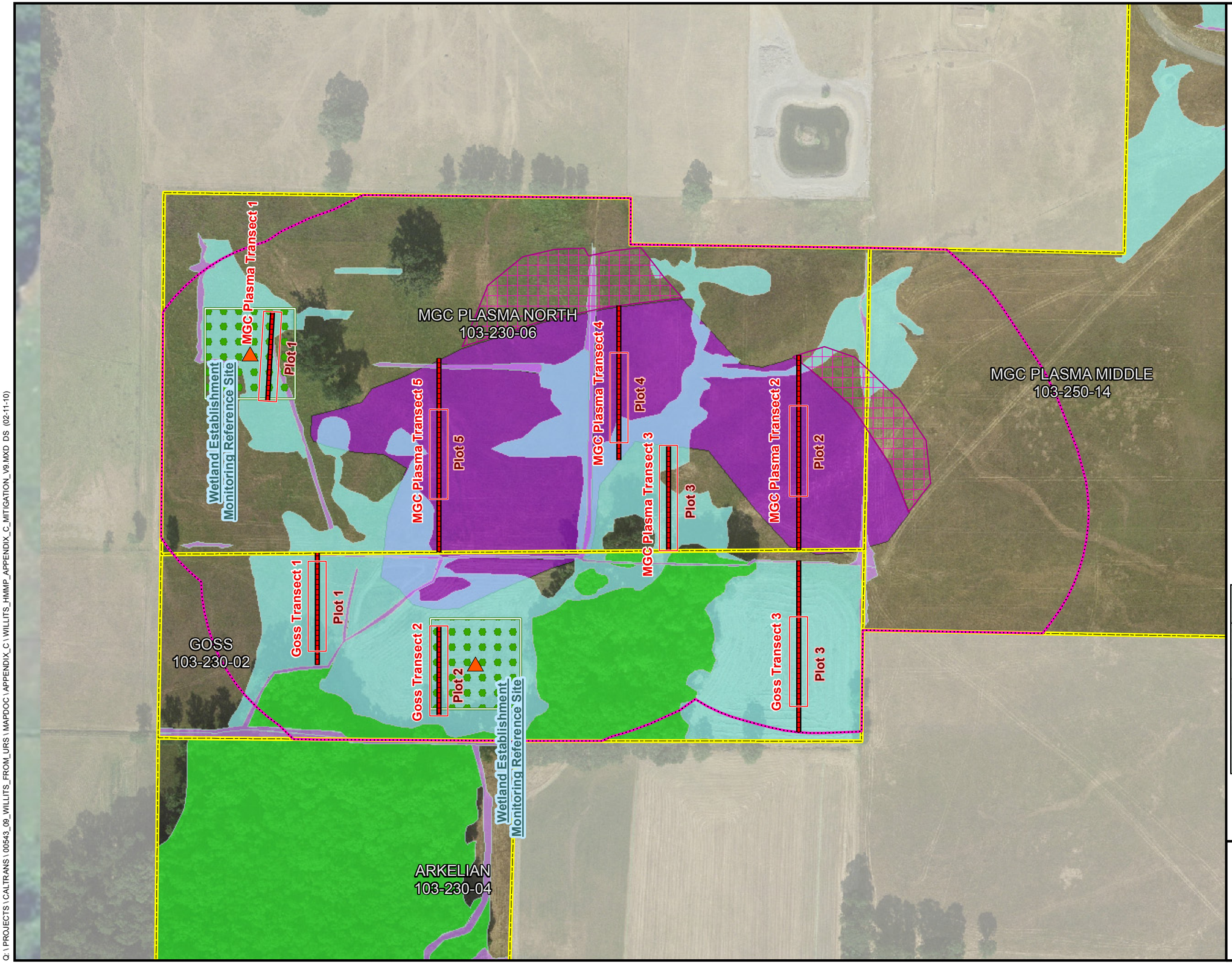
Scale in Feet

Figure 1
Ford
APN 108-010-06

Proposed Willits Bypass
August 2010 Plant Community
Survey Transect Locations



Offsite Mitigation Parcel
Transects
Plot Location
Wetland Establishment - 100m Buffer
Wetland Establishment Site
Monitoring Reference Site
Reference Plots

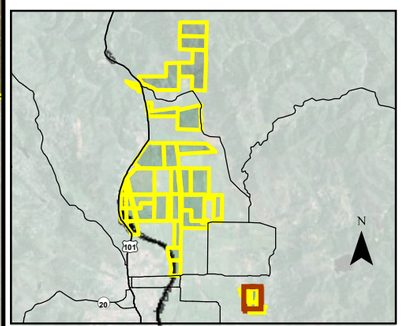
Existing Jurisdictional Wetlands

Mixed Marsh
Other Waters
Riparian Scrub
Riparian Woodland
Swale
Vernal Pool
Wet Meadow

Project Bypass Footprint

Permanent Impact Area
Temporary Impact Area
Right of Way

N



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Scale in Feet

Figure 1
Goss & MGC Plasma
103-230-02, 103-230-06, & 103-250-14
Proposed Willits Bypass
August 2010 Plant Community Survey Transect Locations

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LUSHER
038-060-08

LUSHER
108-030-03

LUSHER
108-030-04

Mill Creek

Niesen Transect 2

Plot 2A

Plot 2B

Niesen Transect 1

Plot 1

NIESEN
108-040-02

Redwood Hwy

Niesen Transect 7

Plot 7

Niesen Transect 6

Plot 6

Wetland Establishment Monitoring Reference Site

Plot 5

Niesen Transect 5

Niesen Transect 3

Plot 3A

Plot 3B

Offsite Mitigation Parcel
Transects
Plot Location
Wetland Establishment - 100m Buffer
Wetland Establishment Site
Monitoring Reference Site
Reference Plots

Existing Jurisdictional Wetlands

Mixed Marsh
Other Waters
Riparian Scrub
Riparian Woodland
Swale
Vernal Pool
Wet Meadow

Project Bypass Footprint

Permanent Impact Area
Temporary Impact Area
Right of Way

N

0 200

Scale in Feet

Figure 1
Niesen
APN 108-040-02

Proposed Willits Bypass
August 2010 Plant Community
Survey Transect Locations

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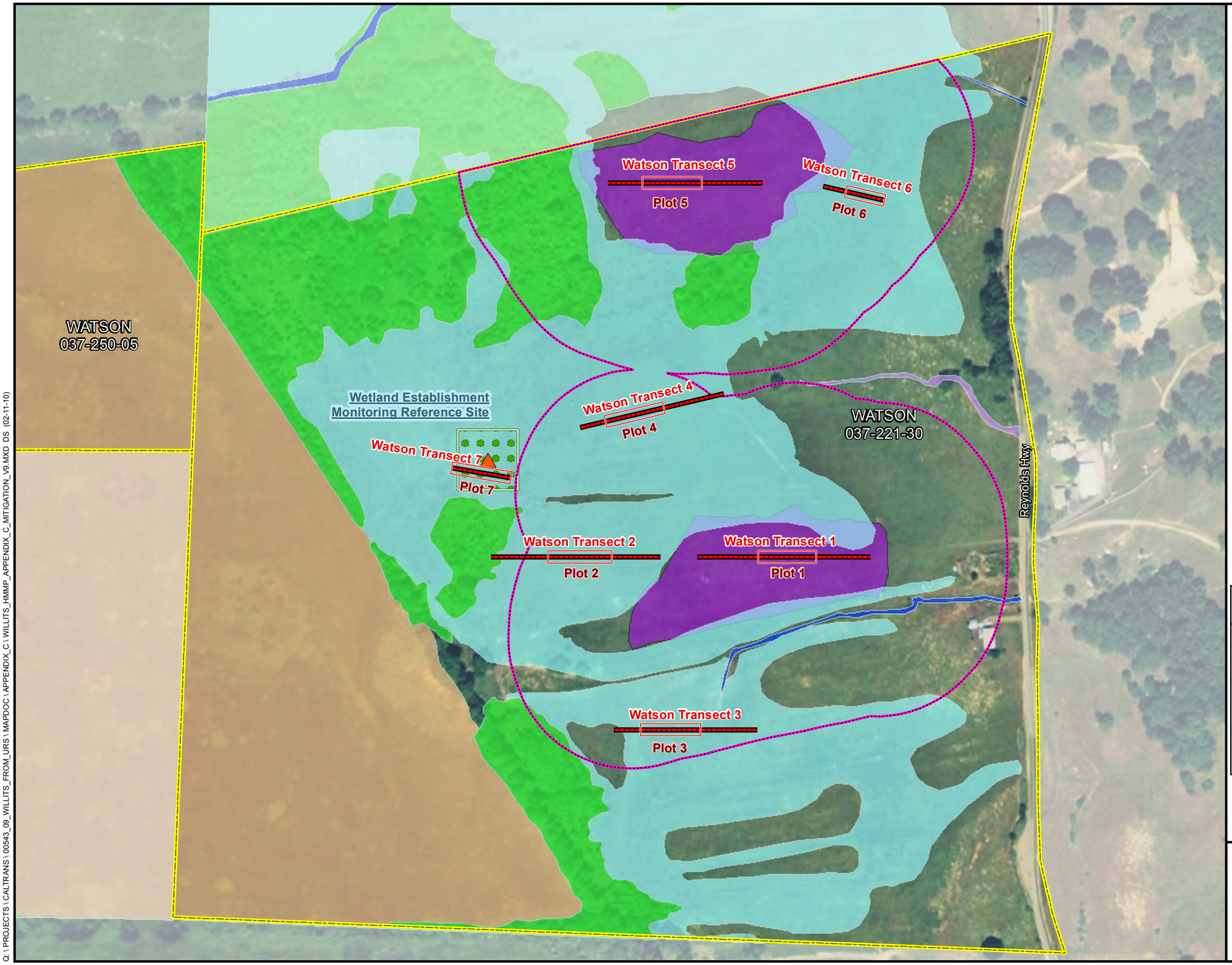


Offsite Mitigation Parcel
Transects
Plot Location
Wetland Establishment - 100m Buffer
Wetland Establishment Site
Monitoring Reference Site
Reference Plots

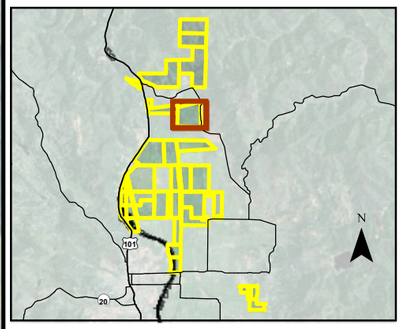
Existing Jurisdictional Wetlands

Mixed Marsh
Other Waters
Riparian Scrub
Riparian Woodland
Swale
Vernal Pool
Wet Meadow

Project Bypass Footprint

Permanent Impact Area
Temporary Impact Area
Right of Way

N



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Scale in Feet

Figure 1
Watson
APN 037-221-30

Proposed Willits Bypass
August 2010 Plant Community
Survey Transect Locations

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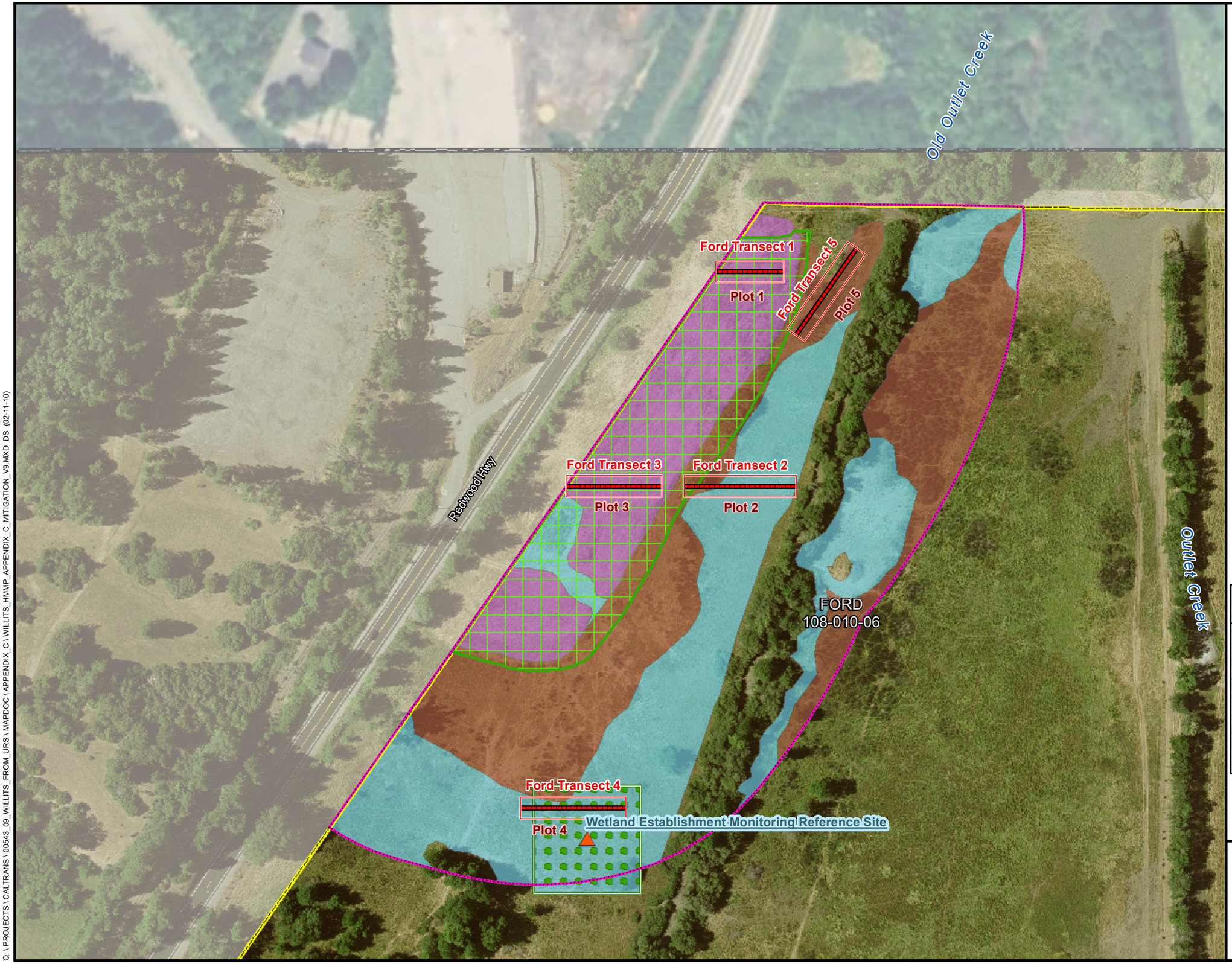


Offsite Mitigation Parcel
Wetland Establishment Site
Wetland Establishment - 100m Buffer
Transects
Plot Location
Monitoring Reference Site
Reference Plots

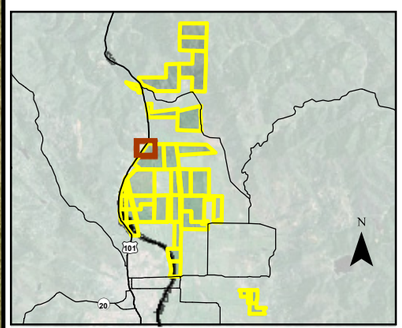
Vegetation Types

Annual Brome Grassland
Bent Grass - Tall Fescue Meadow
Hardstem Bulrush Marsh
Italian Ryegrass Grassland
Perennial Ryegrass Field
Wet Montane Meadow

Project Bypass Footprint

Permanent Impact Area
Temporary Impact Area
Right of Way

N



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Scale in Feet

Figure 2
Ford
APN 108-010-06

Proposed Willits Bypass
August 2010 Plant Community Map

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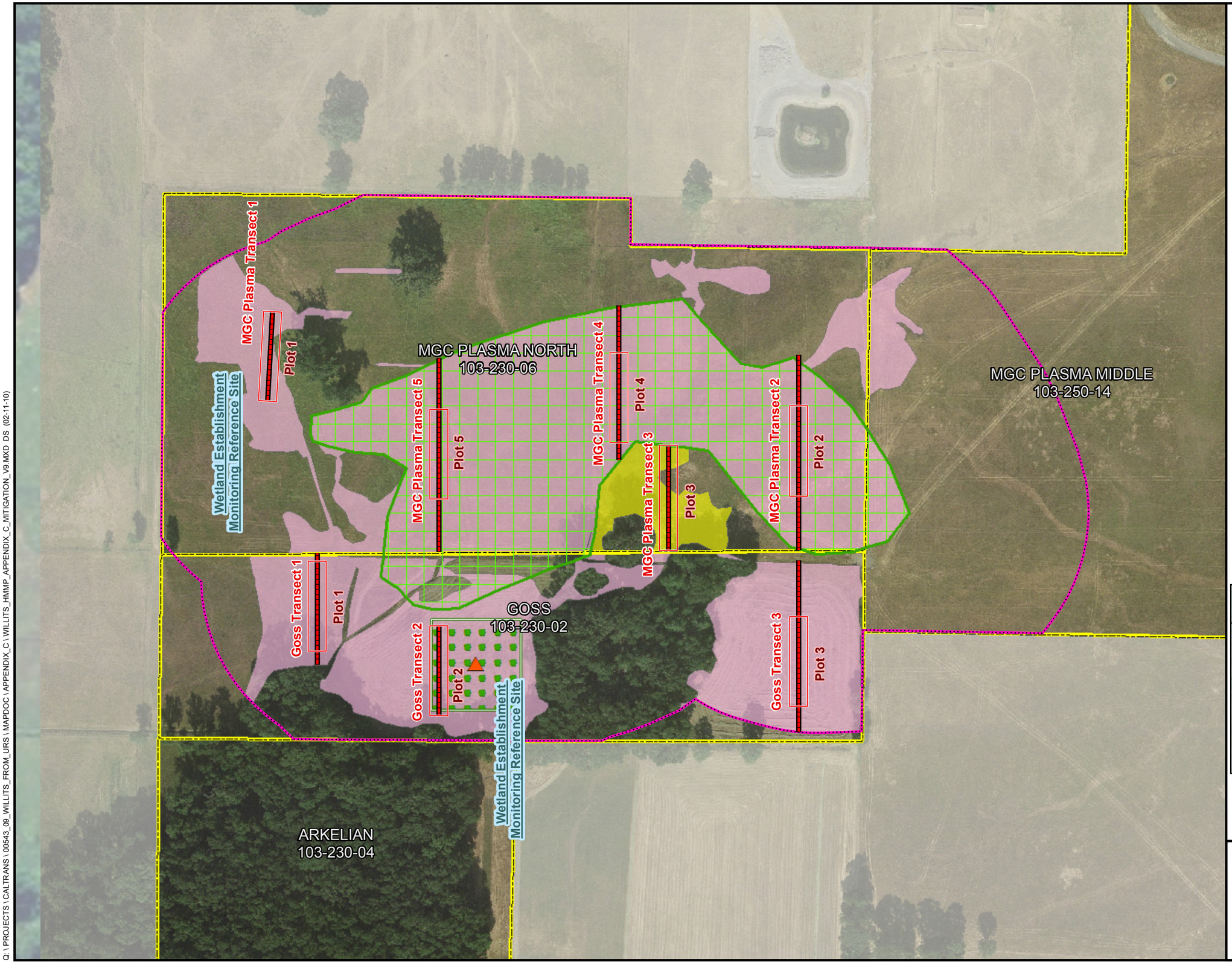


Offsite Mitigation Parcel
Wetland Establishment Site
Wetland Establishment - 100m Buffer
Transects
Plot Location
Monitoring Reference Site
Reference Plots

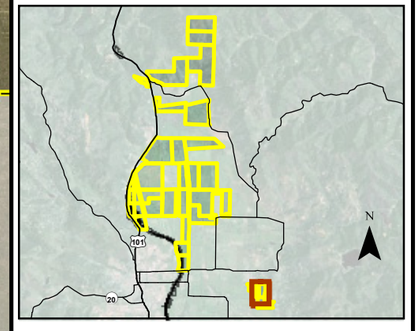
Vegetation Types

Annual Brome Grassland
Bent Grass - Tall Fescue Meadow
Hardstem Bulrush Marsh
Italian Ryegrass Grassland
Perennial Ryegrass Field
Wet Montane Meadow

Project Bypass Footprint

Permanent Impact Area
Temporary Impact Area
Right of Way

N



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Scale in Feet

Figure 2
Goss & MGC Plasma
103-230-02, 103-230-06, & 103-250-14

Proposed Willits Bypass
August 2010 Plant Community Map

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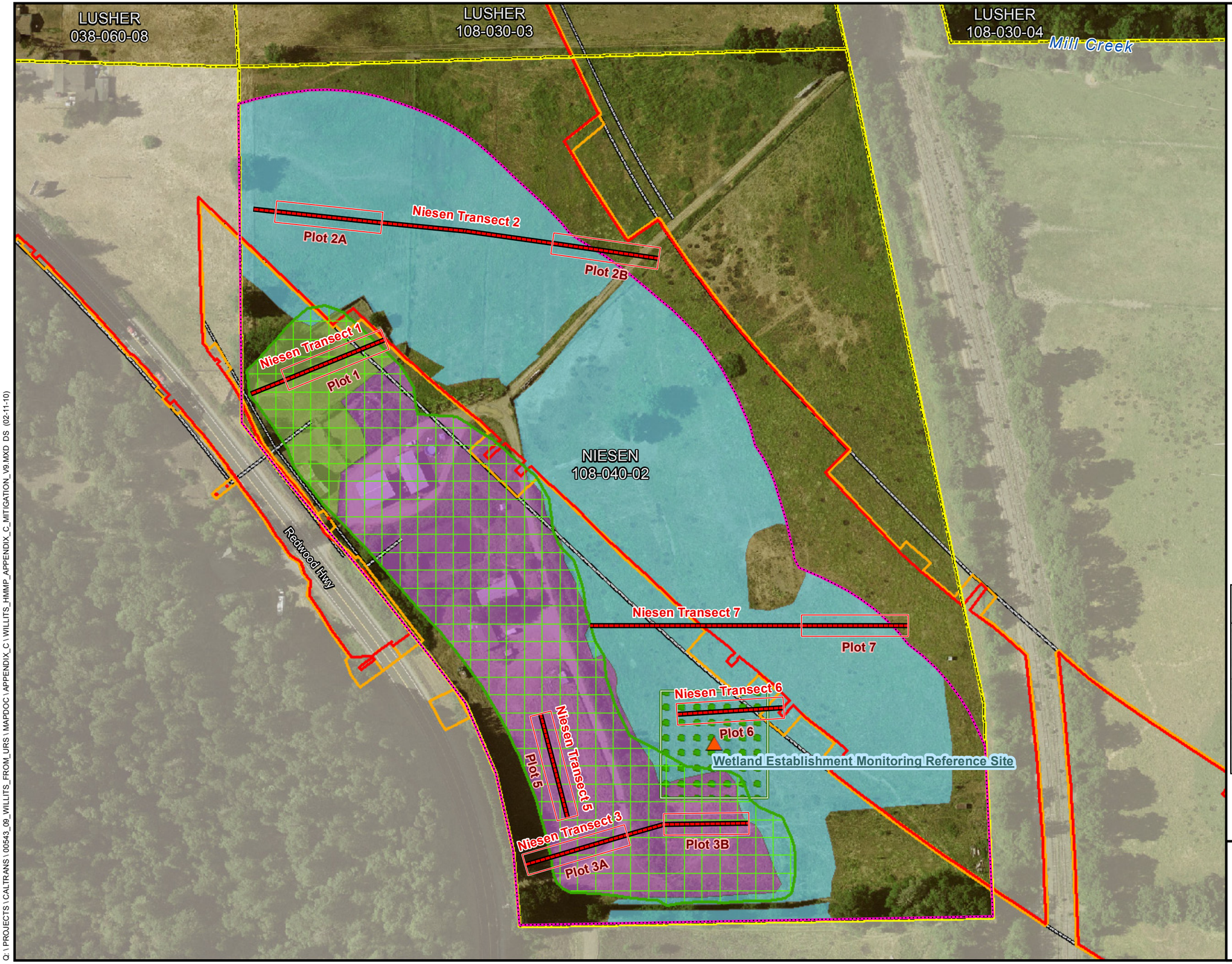


Offsite Mitigation Parcel
Wetland Establishment Site
Wetland Establishment - 100m Buffer
Transects
Plot Location
Monitoring Reference Site
Reference Plots

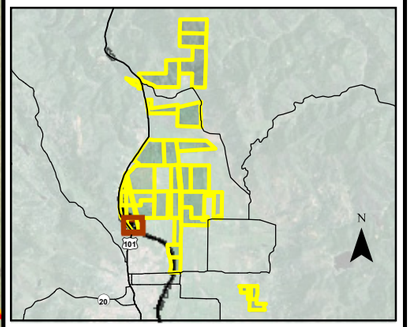
Vegetation Types

Annual Brome Grassland
Bent Grass - Tall Fescue Meadow
Hardstem Bulrush Marsh
Italian Ryegrass Grassland
Perennial Ryegrass Field
Wet Montane Meadow

Project Bypass Footprint

Permanent Impact Area
Temporary Impact Area
Right of Way

N



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Scale in Feet

Figure 2
Niesen
APN 108-040-02

Proposed Willits Bypass
August 2010 Plant Community Map

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Offsite Mitigation Parcel
Wetland Establishment Site
Wetland Establishment - 100m Buffer
Transects
Plot Location
Monitoring Reference Site
Reference Plots

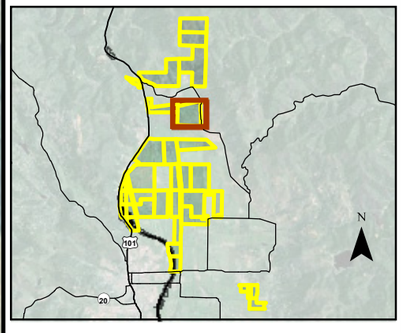
Vegetation Types

Annual Brome Grassland
Bent Grass - Tall Fescue Meadow
Hardstem Bulrush Marsh
Italian Ryegrass Grassland
Perennial Ryegrass Field
Wet Montane Meadow

Project Bypass Footprint

Permanent Impact Area
Temporary Impact Area
Right of Way

N



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Scale in Feet

Figure 2
Watson
APN 037-221-30

Proposed Willits Bypass
August 2010 Plant Community Map

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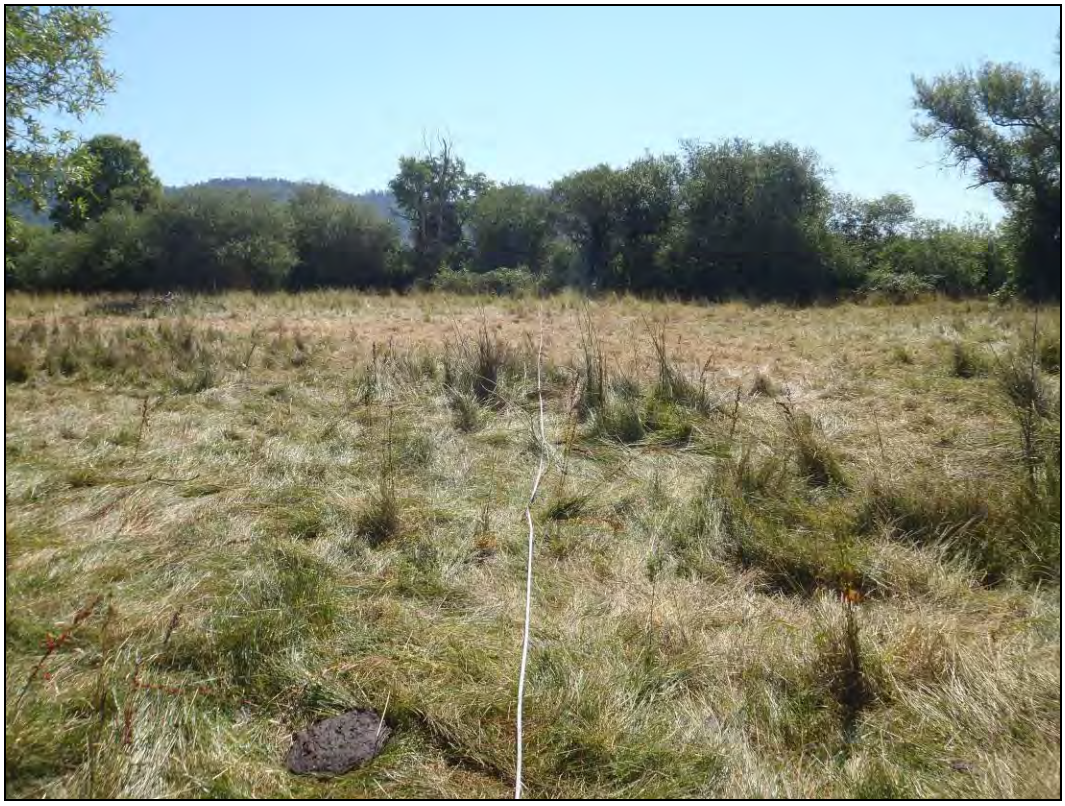
Attachment 1



Ford Plot 1 – West 248°



Ford Plot 1 – East 72°



Ford Plot 2 – East 70°



Ford Plot 2 – West 250°



Ford Plot 3 – East 70°



Ford Plot 3 – West 250°



Ford Plot 4 – East 70°



Ford Plot 4 – West 250°



Ford Plot 5 – North 20°



Ford Plot 5 – South 200°



Goss Plot 1 – West 250°



Goss Plot 1 – East 70°



Goss Plot 2 – West 250°



Goss Plot 2 – East 70°



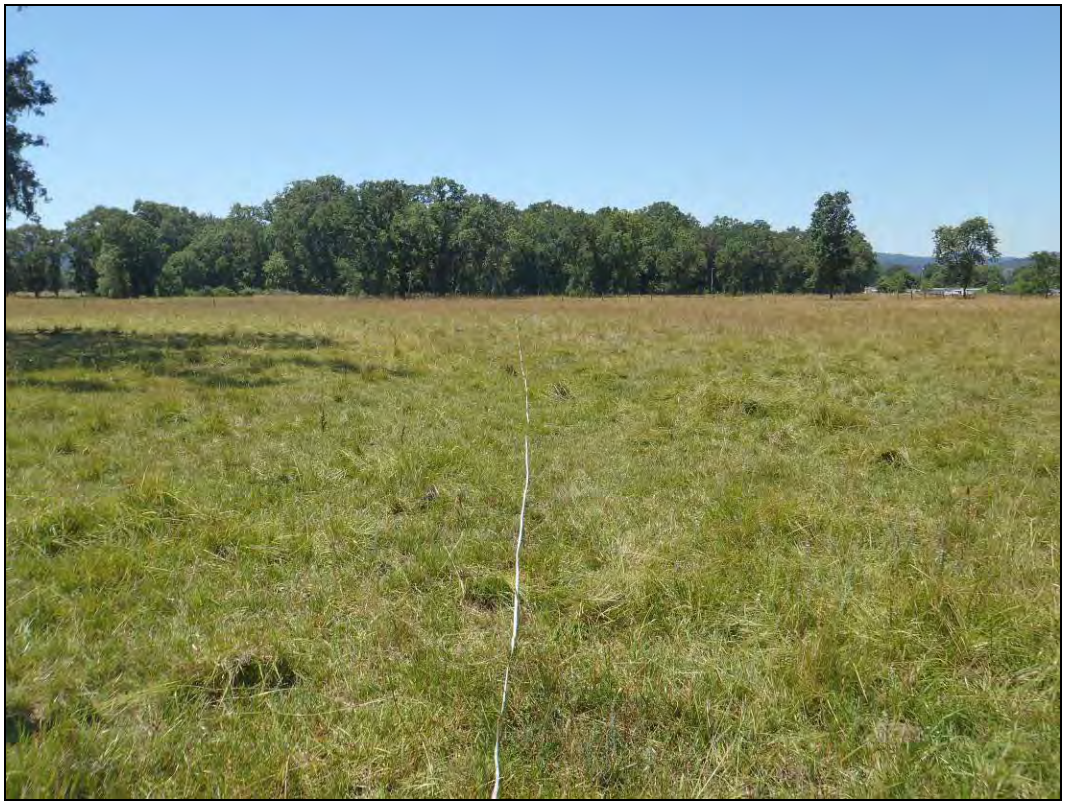
Goss Plot 3 – West 250°



Goss Plot 3 – East 70°



MCG Plasma North Plot1 – East 70°



MGC Plasma North Plot 1 – West 250°



MGC Plasma North Plot 2 – West 250°



MGC Plasma North Plot 2 – East 70°



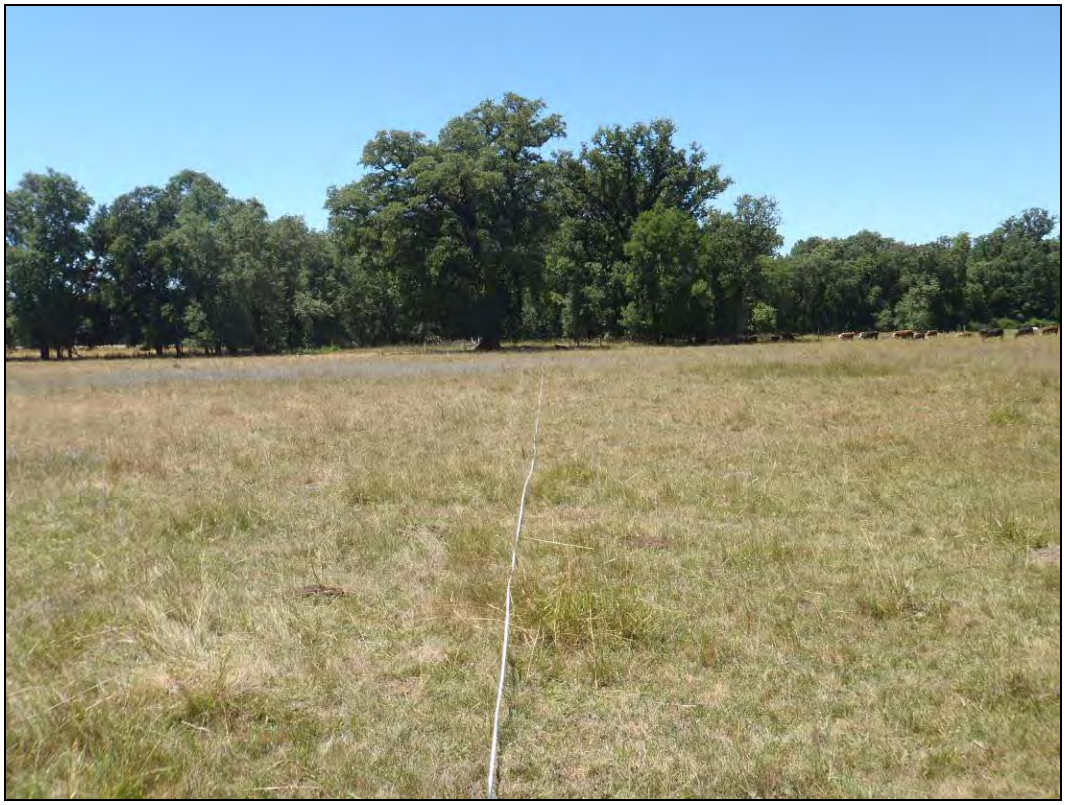
MGC Plasma North Plot 3 – West 250°



MGC Plasma North Plot 3 – East 70°



MGC Plasma North Plot 4 – East 70°



MGC Plasma North Plot 4 – West 250°



MGC Plasma North Plot 5 – West 250°



MGC Plasma North Plot 5 – East 70°



Niesen Plot 1 – Northeast 50°



Niesen Plot 2a – East 80°



Niesen Plot 2b – East 75°



Niesen Plot 3a – Northeast 40°



Niesen Plot 3b – East 70°



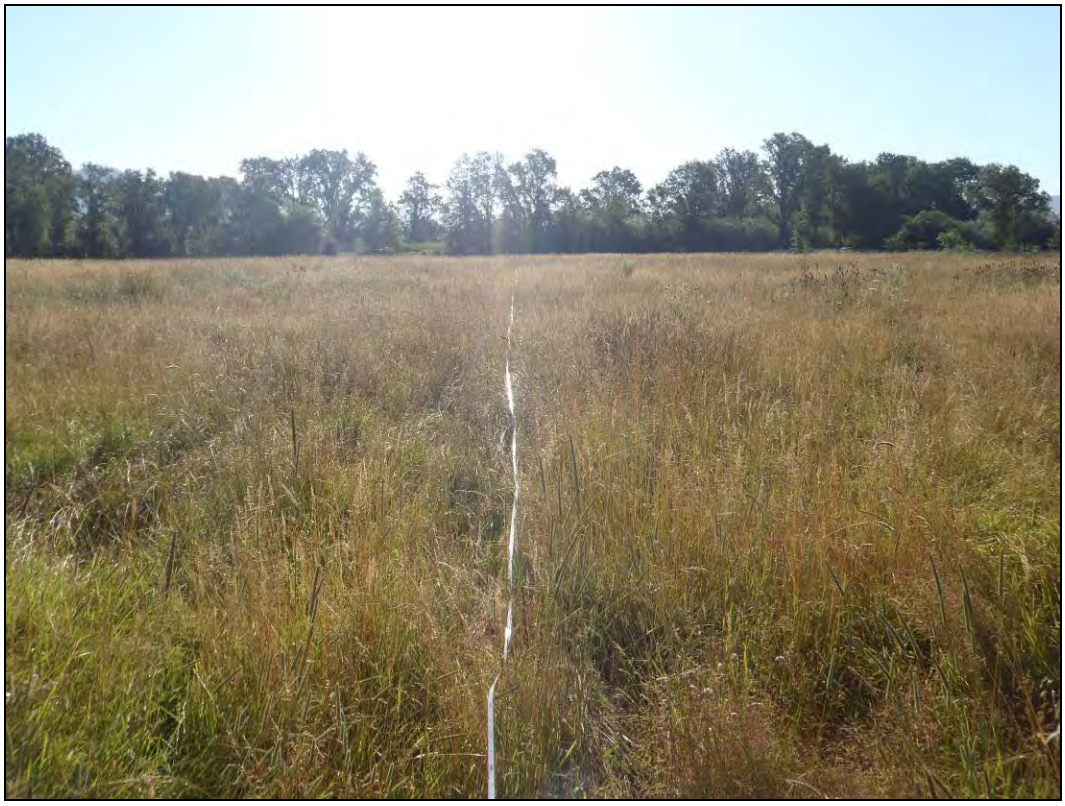
Niesen Plot 3b – West 250°



Niesen Plot 5 – West 315°



Niesen Plot 5 – Southeast 135°



Niesen Plot 6 – East 70°



Niesen Plot 6 – West 250°



Niesen Plot 7 – East 70°



Niesen Plot 7 – West 250°



Watson Plot 1 – West 260°



Watson Plot 1 – East 80°



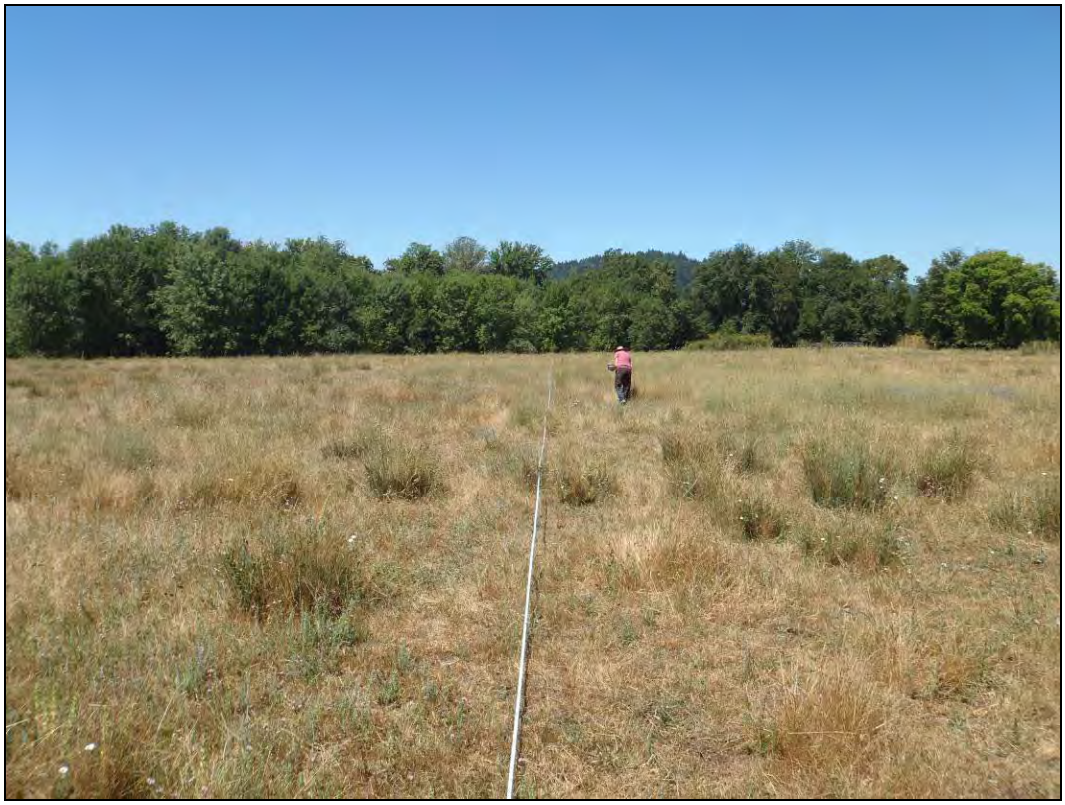
Watson Plot 2 – West 250°



Watson Plot 2 – East 70°



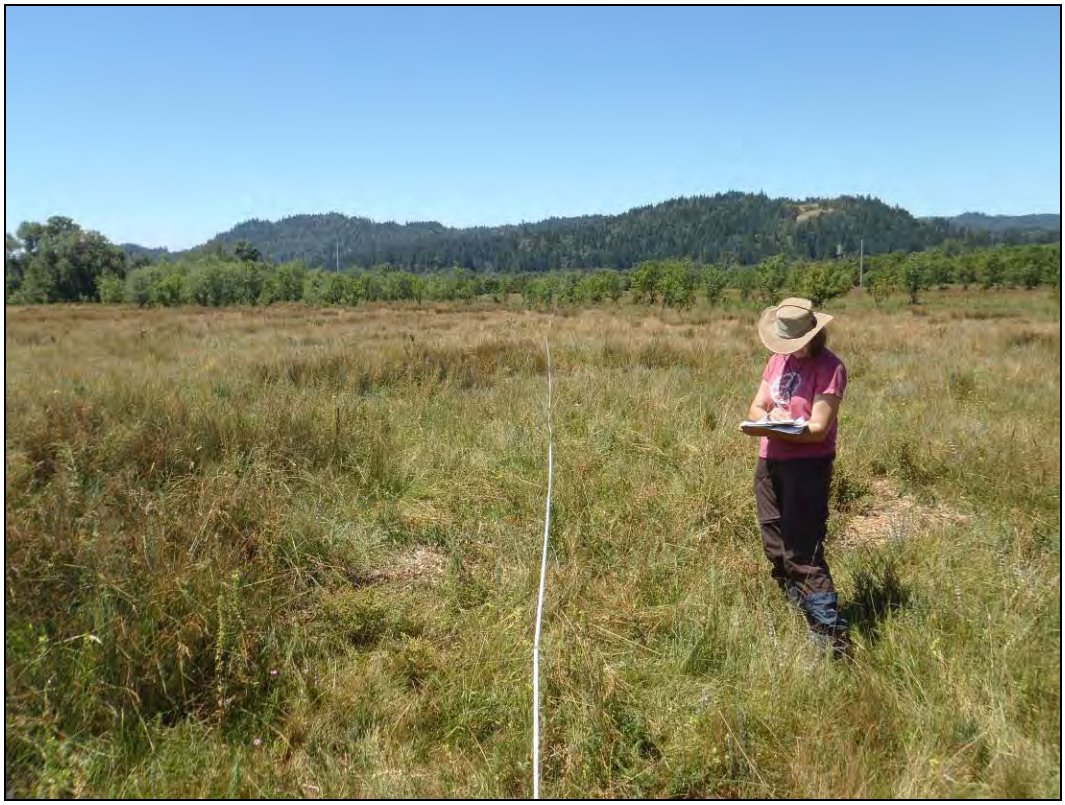
Watson Plot 3 – East 65°



Watson Plot 3 – West 245°



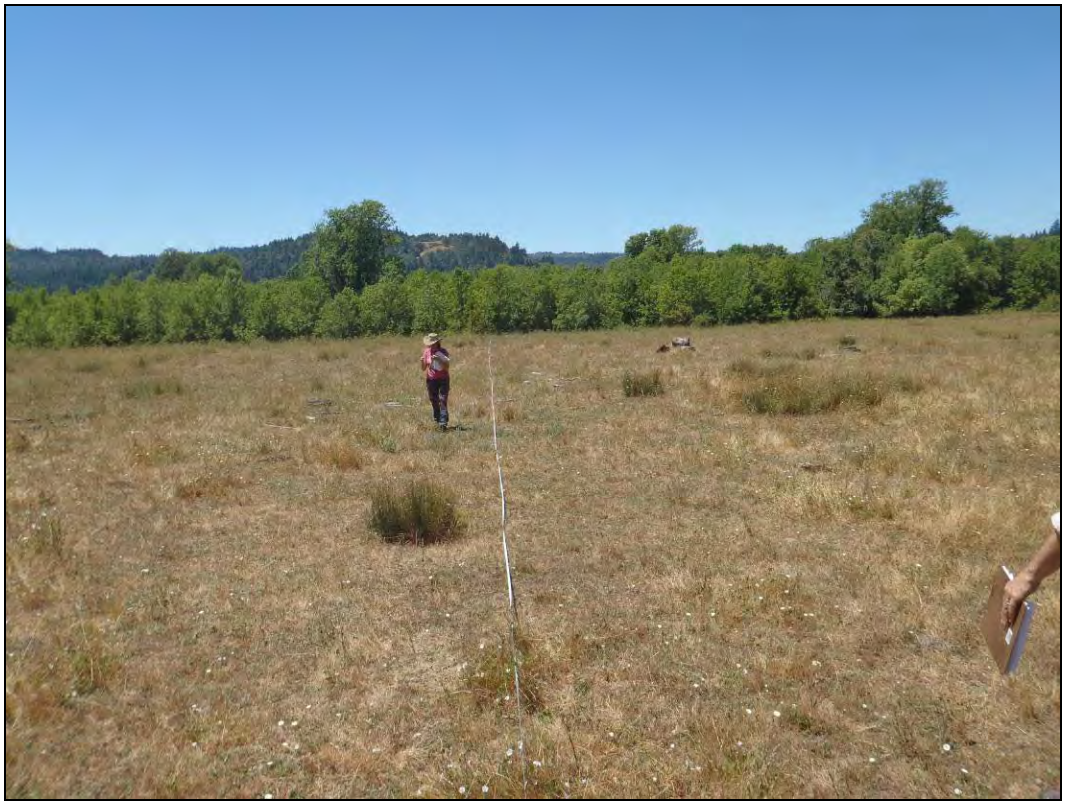
Watson Plot 4 – East 65°



Watson Plot 4 – West 245°



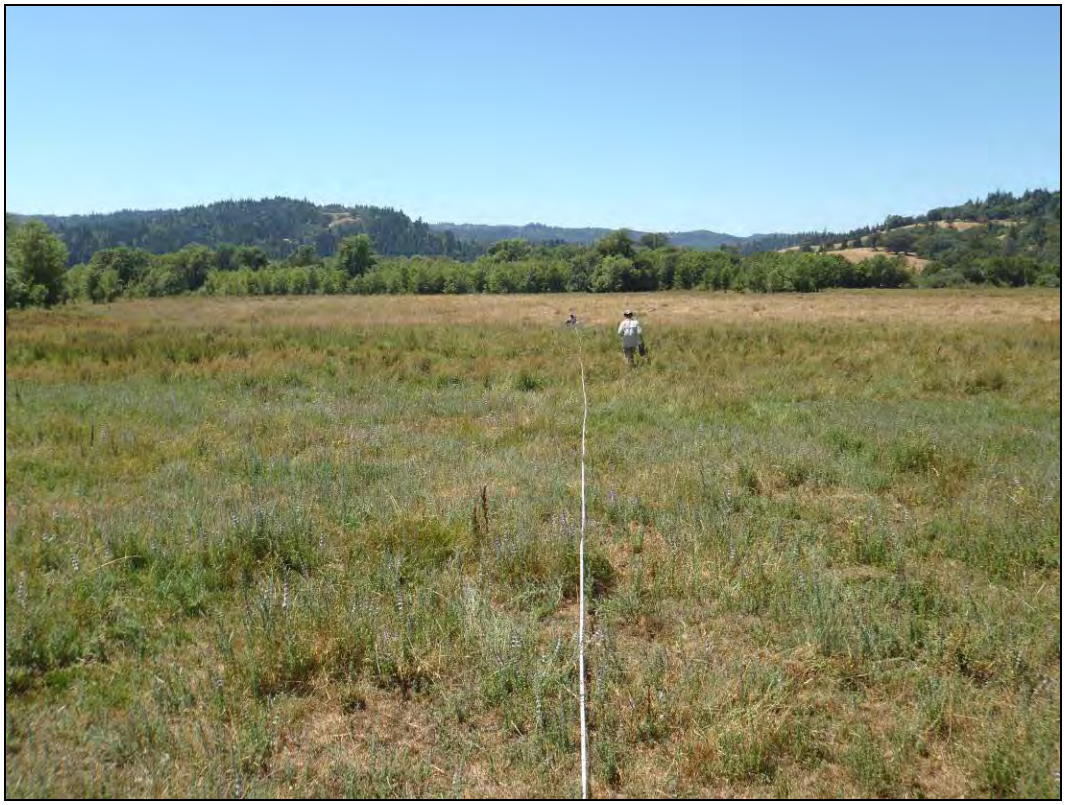
Watson Plot 5 – East 70°



Watson Plot 5 – West 250°



Watson Plot 6 – East 90°



Watson Plot 6 – West 270°



Watson Plot 7 – East 70°



Watson Plot 7 – West 250°

Attachment 2

Attachment 2. List of Plants Observed on Each Wetland Establishment Parcel with Wetland Indicator Status, Native/Nonnative Status, and Invasive Status

Species	Native/ Introduced[1]	Invasive (Y/N)[2]	Wetland Indicator Status[3]	Ford					Goss			Niesen								MGC Plasma North					Watson						
				T1	T2	T3	T4	T5	T1	T2	T3	T1	T2a	T2b	T3a	T3b	T5	T6	T7	T1	T2	T3	T4	T5	T1	T2	T3	T4	T5	T6	T7
Agrostis sp.	I	N	UPL			1	1					1						1	1	1			1	1						1	1
Aira caryophyllea	I	N	UPL	1		1									1	1	1						1	1					1		
Alisma plantago-aquatica	N	N	OBL					1																							
Alopecurus pratensis	I	N	FACW		1	1	1					1	1	1					1	1		1									
Anthemis cotula	I	N	FACU									1		1	1	1			1								1				
Asclepias fascicularis	N	N	FAC							1																					
Avena barbata	I	N	UPL			1					1														1				1		
Avena fatua	I	N	UPL	1																											
Beckmannia syzigachne	N	N	OBL					1																							1
Brachypodium distachyon	I	N	UPL																										1		
Briza minor	I	N	FACW-			1				1					1		1	1		1		1	1	1				1	1	1	
Brodiaea elegans ssp. *elegans*	N	N	UPL																				1								
Brodiaea sp.	N	N	UPL																												1
Bromus mollis (B. hordeaceus)	I	N	FACU-	1		1			1		1			1	1	1	1	1	1		1	1		1	1	1	1	1	1	1	
Camassia quamash (ssp. quamash)	N	N	FACW										1										1								1
Carex densa	N	N	OBL															1		1			1					1		1	1
Carex unilateralis	N	N	FACW				1																								1
Carex sp.	N	N	FACW		1				1		1		1					1			1	1		1							
Castilleja sp.	N	N	UPL			1																									
Centaurea solstitialis	I	Y	UPL	1		1										1									1				1		
Centaurium muehlenbergii	N	N	FAC	1		1			1	1				1	1	1		1	1	1	1	1	1	1		1	1	1	1		
Centaurium venustum	N	N	UPL										1																		
Cerastium viscosum (C. glomeratum)	I	N	FACU																	1											
Cichorium intybus	I	N	UPL	1		1	1		1						1		1	1	1	1		1	1	1	1	1	1	1	1	1	1
Cirsium vulgare	I	N	FACU							1				1		1		1	1												
Convolvulus arvensis	I	N	UPL	1	1		1	1	1	1	1	1		1	1		1	1	1	1		1	1	1	1	1	1	1	1		1
Croton setigerus	N	N	UPL																			1									
Cynosurus echinatus	I	N	UPL								1				1		1											1		1	
Cyperus eragrostis	N	N	FACW									1																	1		
Cyperus sp.	I	N	>=FAC																						1		1				
Danthonia californica	N	N	FACW						1	1	1									1	1	1	1	1					1		
Daucus carota	I	N	UPL															1	1								1				
Daucus pusillus	N	N	UPL												1																
Deschampsia danthonioides	N	N	FACW								1							1			1		1	1							
Dipsacus sylvestris (D. fullonum)	I	N	NI*												1			1	1												
Eleocharis macrostachya	N	N	OBL		1			1																	1	1			1		
Elymus glaucus	N	N	FACU																1												
Epilobium ciliatum	N	N	FACW				1						1																1		1	1
Boisduvalia glabella (Epilobium pygmaeum)	N	N	OBL									1		1		1		1					1		1	1	1	1		1	1
Eryngium aristulatum	N	N	OBL																		1		1					1			1
Euthamia occidentalis	N	N	OBL										1																		
Festuca arundinacea	I	N	FAC-		1		1		1	1	1							1	1	1	1	1	1	1				1		1	1

Species	Native/ Introduced[1]	Invasive (Y/N)[2]	Wetland Indicator Status[3]	Ford					Goss			Niesen							MGC Plasma North					Watson						
				T1	T2	T3	T4	T5	T1	T2	T3	T1	T2a	T2b	T3a	T3b	T5	T6	T7	T1	T2	T3	T4	T5	T1	T2	T3	T4	T5	T6	T7
Festuca occidentalis	N	N	UPL										1																		
Filago sp.	I	N	UPL													1															
Fraxinus latifolia	N	N	FACW										1															1			1
Galium divaricatum	I	N	UPL						1																		1		1		
Geranium dissectum	I	N	UPL	1																				1							
Glyceria sp.	N	N	OBL				1	1																							
Gnaphalium sp.	N	N	undetermined									1				1									1						
Hemizonia congesta ssp. *leucocephala*	N	N	UPL														1														
Hirschfeldia incana	I	N	UPL													1															
Holcus lanatus	I	N	FAC						1								1	1	1	1			1							1	
Hordeum brachyantherum	N	N	FACW																												1
Hordeum hystrix (H. marinum ssp. *gussoneanum)*	I	N	FAC	1	1									1	1		1	1				1				1	1	1	1	1	
Horkelia californica	N	N	UPL													1															
Hypericum perforatum	I	N	UPL								1				1																
Hypochaeris glabra	I	N	UPL																				1								
Hypochaeris radicata	I	N	UPL			1			1	1					1	1			1		1			1						1	
Juncus bufonius	N	N	FACW+									1		1		1		1	1	1	1		1	1	1	1	1	1	1		
Juncus effusus	N	N	OBL				1															1									
Juncus ensifolius	N	N	FACW		1		1								1								1			1	1	1			1
Juncus patens	N	N	FAC		1		1			1	1		1		1		1	1				1			1	1	1	1	1	1	1
Juncus phaeocephalus (var. phaeocephalus)	N	N	FACW		1																						1	1		1	
Juncus tenuis	N	N	FACW														1	1	1	1	1	1	1	1	1			1	1		
Juncus sp.	N	N	>=FAC										1	1															1		
Lactuca saligna	I	N	NI*							1			1									1					1				
Leontodon taraxacoides	I	N	UPL								1							1			1	1	1	1							
Elymus triticoides (Leymus)	N	N	FAC+		1		1				1								1												
Limnanthes sp.	N	N	OBL																											1	
Linum usitatissimum	I	N	UPL	1		1			1	1										1	1	1	1	1					1		
Lolium perenne (L. multiflorum)	I	N	FAC	1	1	1	1				1	1		1	1			1			1	1	1	1	1		1	1	1		1
Lolium perenne	I	N	FAC								1																			1	
Lotus oblongifolius	N	N	OBL																												1
Lotus corniculatus	I	N	FAC		1		1		1	1	1	1		1				1		1				1	1	1	1	1	1		1
Lotus purshianus var. *purshianus*	N	N	UPL															1	1				1								
Lupinus bicolor	N	N	UPL													1														1	
Lythrum hyssopifolia	I	N	FACW									1		1						1		1	1	1			1	1	1	1	1
Madia glomerata	N	N	FACU-																						1						
Madia sativa	N	N	UPL												1			1	1												
Madia sp.	N	N	UPL	1		1								1		1	1					1		1	1			1		1	
Mentha pulegium	I	N	OBL		1	1	1			1	1	1	1	1				1		1	1	1	1	1	1	1	1	1	1	1	1
Mimulus guttatus	N	N	OBL				1																							1	
Myosotis discolor	I	N	NI*																											1	
Myosotis sp.	I	N	undetermined																	1											

Species	Native/ Introduced[1]	Invasive (Y/N)[2]	Wetland Indicator Status[3]	Ford					Goss			Niesen								MGC Plasma North					Watson						
				T1	T2	T3	T4	T5	T1	T2	T3	T1	T2a	T2b	T3a	T3b	T5	T6	T7	T1	T2	T3	T4	T5	T1	T2	T3	T4	T5	T6	T7
Navarretia squarrosa	N	N	UPL									1				1															
Parentucellia viscosa	I	N	NI*	1									1	1		1		1	1	1			1	1	1	1	1	1	1	1	1
Polypogon monspeliensis	I	N	FACW+																							1					
Perideridia kelloggii	N	N	UPL																									1			1
Perideridia pringlei	N	N	UPL																											1	
Phalaris aquatica	I	N	FAC+						1	1	1				1		1	1	1		1			1	1	1	1		1	1	1
Phleum pratense	I	N	FACU		1	1	1				1							1	1	1	1	1	1			1		1		1	1
Plantago lanceolata	I	N	FAC-						1						1	1		1			1		1	1					1	1	
Plantago major	I	N	FACW-									1																			
Pleuropogon hooverianus	N	N	FACW								1																				
Poa annua	I	N	FACW-									1													1	1			1	1	
Poa pratensis (ssp. *pratensis)*	I	N	FACU		1		1				1	1	1	1	1		1	1	1	1	1					1	1	1		1	1
Polygonum arenastrum	I	N	UPL									1													1						
Polygonum sp.	N	N	>FAC																											1	
Polypogon monspeliensis	I	N	FACW+																						1						
Quercus lobata	N	N	FAC*												1	1															
Ranunculus sp. (leaves only)	N	N	undetermined										1							1								1		1	1
Rosa californica	N	N	FAC+								1																				
Rubus discolor (R. armeniacus)	I	N	FACW*								1				1																
Rumex acetosella	I	N	UPL	1		1									1	1	1				1		1								
Rumex conglomeratus	I	N	FACW		1		1						1													1	1	1	1	1	1
Rumex crispus	I	N	FACW-	1	1	1	1				1		1	1	1	1	1	1	1		1	1			1	1	1		1	1	
Rumex pulcher	I	N	FAC+									1	1											1	1						
Scirpus acutus var. *occidentalis*	N	N	OBL		1			1																							
Sonchus asper	I	N	FAC												1				1												
Sonchus oleraceus	I	N	NI*															1													
Spergularia rubra	I	N	FAC-												1																
Spergularia sp.	N	N	assume FAC									1		1																	
Spiranthes romanzoffiana (S. diluvialis)	N	N	OBL										1																		
Stachys sp.	N	N	undetermined				1						1															1			
Taeniatherum caput-medusae	I	N	UPL								1																				
Torilis arvensis	I	N	UPL								1				1																
Toxicodendron diversilobum	N	N	UPL								1																				
Trifolium dubium	I	N	FACU*			1				1			1			1	1	1	1		1		1					1			
Trifolium fragiferum	I	N	NI*		1							1		1															1			
Trifolium glomeratum	I	N	UPL												1																
Trifolium hirtum	I	N	UPL													1															
Trifolium repens	I	N	FACU+		1		1					1						1													1
Trifolium sp.	I	N	UPL	1		1																									
Trifolium subterraneum	I	N	UPL											1	1		1							1				1			
Trifolium variegatum	N	N	FACW-																									1			1
Verbascum blattaria	I	N	FACW																						1						

Species	Native/ Introduced[1]	Invasive (Y/N)[2]	Wetland Indicator Status[3]	Ford					Goss			Niesen								MGC Plasma North					Watson						
				T1	T2	T3	T4	T5	T1	T2	T3	T1	T2a	T2b	T3a	T3b	T5	T6	T7	T1	T2	T3	T4	T5	T1	T2	T3	T4	T5	T6	T7
Vicia hirsuta	I	N	UPL										1			1		1	1												
Vicia sativa	I	N	FACU												1			1	1											1	
Vicia villosa	I	N	UPL								1						1														
Vulpia bromoides	I	N	FACW			1			1	1				1	1		1	1			1	1		1		1	1		1		
Vulpia myuros(ssp. myuros)	I	N	FACU*												1	1	1				1										
Total Number of Species				**16**	**20**	**21**	**22**	**6**	**21**	**22**	**22**	**15**	**16**	**27**	**30**	**27**	**21**	**37**	**28**	**22**	**24**	**29**	**20**	**26**	**23**	**32**	**27**	**33**	**30**	**32**	**31**
Number of Native Species				***3***	***7***	***4***	***9***	***5***	***6***	***12***	***6***	***4***	***5***	***8***	***5***	***10***	***4***	***10***	***7***	***6***	***7***	***8***	***7***	***9***	***8***	***14***	***8***	***16***	***8***	***12***	***16***
Number of Introduced Species				***13***	***13***	***17***	***13***	***1***	***15***	***10***	***16***	***11***	***11***	***19***	***25***	***17***	***17***	***27***	***21***	***16***	***17***	***21***	***13***	***17***	***15***	***18***	***19***	***17***	***22***	***20***	***15***

Notes:

This list was compiled from ICF International site surveys in the study area in July, 2010. Nomenclature follows Reed (1988) and *The Jepson Manual* (Hickman 1993) and online updates.

[1] Native status from *The Jepson Manual* (Hickman 1993)

[2] Invasive status as defined in the Mitigation and Monitoring Plan (Caltrans 2010, Appendix H, Table 2-1)

[3] Wetland indicator status from Reed (1988) for Region 0, California:

OBL (obligate): almost always occurs in wetlands (99% probability of occurrence in wetlands).

FAC (facultative): equally likely to occur in wetlands or nonwetlands (34%–66% probability).

FACU (facultative upland): usually occurs in nonwetlands but occasionally occurs in wetlands (1%–33% probability).

FACW (facultative wetland): usually occurs in wetlands (67%-99% probability).

UPL (obligate upland): almost never occurs in wetlands (1% probability); in general, species that are not listed on the wetland plant list are assumed to be obligate upland species.

NI (no indicator): no indicator status assigned because regional status information is lacking; the indicator status assigned to the species in the nearest adjacent region is applied, in this case, Region 9 (Northwest).

Undetermined: cannot be assigned an indicator status because plant could not be identified to species.

A plus (+) modifier indicates more frequently found in wetlands, and a minus (-) modifier indicates less frequently found in wetlands; however, although these modifiers are used in Reed (1988), they are not used in the current Regional Supplements, e.g., FAC-, FAC, and FAC+ plants are all considered to be FAC.

An asterisk (*) placed after the indicator status signifies that the indicator status was derived from limited ecological information.

Appendix L Property Analysis Record for the U.S. Army Corps of Engineers Jurisdictional Wetland Mitigation and Monitoring Plan

Table L-1. PAR Analyis for the Willits Bypass Project - Short-Term Mitigation Maintenance and Monitoring Phase

Mitigation Feature	Activity / Action	Responsible Party	Description	Frequency	Actions Required	Unit	Number of Units	Cost/Unit	Total Cost
Biological Monitoring									
Wetland Establishment (Group 1)	Performance monitoring of wetland establishment sites (Group 1)	Caltrans and MCRCB	20.09 acres; assumes the total acreage of wetland establishment will be monitored	Yrs 1-5	Collect data on relative cover by wetland species, relative cover by native wetland species, absolute cover by invasive species, species richness, and hydroperiod	Labor hrs	1,000	$100	$100,000
	Performance monitoring of wetland establishment sites (Group 1)	Caltrans and MCRCB	20.09 acres; assumes the total acreage of wetland establishment will be monitored	Yrs 1-5	Travel between monitoring locations	Labor hrs	50	$100	$5,000
	GPS rental for wetland establishment sites (Group 1)	Caltrans and MCRCB	n/a	Yrs 1-5	n/a	Day	50	$100	$5,000
Wetland Establishment (Group 2)	Performance monitoring of wetland establishment sites (Group 2)	Caltrans and MCRCB	29.71 acres; assumes the total acreage of wetland establishment will be monitored	Yrs 1-10	Collect data on relative cover by wetland species, relative cover by native wetland species, absolute cover by invasive species, species richness, and hydroperiod	Labor hrs	3,000	$100	$300,000
	Performance monitoring of wetland establishment sites (Group 2)	Caltrans and MCRCB	29.71 acres; assumes the total acreage of wetland establishment will be monitored	Yrs 1-10	Travel between monitoring locations	Labor hrs	150	$100	$15,000
	GPS rental for wetland establishment sites (Group 2)	Caltrans and MCRCB	n/a	Yrs 1-10	n/a	Day	150	$100	$15,000
Wetland Establishment (Group 1 and Group 2)	Performance monitoring of wetland establishment sites (Group 1 and Group 2)	Caltrans and MCRCB	49.8 acres; assumes the total acreage of wetland establishment will be monitored	Yrs 1-5	Analyze data and organize for inclusion in annual monitoring reports	Labor hrs	200	$100	$20,000
	Performance monitoring of wetland establishment sites (Group 2)	Caltrans and MCRCB	29.71 acres; assumes the total acreage of wetland establishment will be monitored	Yrs 6-10	Analyze data and organize for inclusion in annual monitoring reports	Labor hrs	120	$100	$12,000
	Hydroperiod monitoring (Group 1 and Group 2)	Caltrans and MCRCB	22 locations	Yrs 1-5	Collect data in established wetlands	Labor hrs	2,700	$100	$270,000
	Hydroperiod monitoring (Group 2)	Caltrans and MCRCB	15 locations	Yrs 6-10	Collect data in established wetlands	Labor hrs	1,800	$100	$180,000
	Hydroperiod monitoring (Group 1 and Group 2)	Caltrans and MCRCB	22 locations	Yrs 1-10	Travel between monitoring locations	Labor hrs	450	$100	$45,000
	Hydroperiod monitoring (Group 1 and Group 2)	Caltrans and MCRCB	7 or 15 locations	Yrs 1-10	Analyze data and organize for inclusion in annual monitoring reports	Labor hrs	80	$100	$8,000
Wetland Re-establishment (Group A, B, and C)	Performance monitoring of wetland re-establishment sites (Group A, B and Group C wet meadows)	Caltrans and MCRCB	18.20 acres; assumes the total acreage of wetland re-establishment will be monitored	Yrs 1-5	Collect data on relative cover by wetland species, relative cover by native wetland species, absolute cover by invasive species, species richness,	Labor hrs	900	$100	$90,000
	Performance monitoring of wetland re-establishment sites (riparian)	Caltrans and MCRCB	2.32 acres; assumes the total acreage of wetland re-establishment will be monitored	Yrs 1-10	Collect data on plant survival and vigor (yrs 1-5), and percent vegetation cover (yrs 6-10)	Labor hrs	250	$100	$25,000
	Performance monitoring of wetland re-establishment sites (Group C wet meadows)	Caltrans and MCRCB	18.20 acres; assumes the total acreage of wetland re-establishment will be monitored	Yrs 1-5	Travel between monitoring locations	Labor hrs	65	$100	$6,500

Mitigation Feature	Activity / Action	Responsible Party	Description	Frequency	Actions Required	Unit	Number of Units	Cost/Unit	Total Cost
	Performance monitoring of wetland re-establishment sites (riparian)	Caltrans and MCRCB	2.32 acres; assumes the total acreage of wetland re-establishment will be monitored	Yrs 1-10	Travel between monitoring locations	Labor hrs	30	$100	$3,000
	GPS rental for wetland re-establishment sites (Group C)	Caltrans and MCRCB	n/a	Yrs 1-5	n/a	Day	45	$100	$4,500
	GPS rental for wetland re-establishment sites (riparian)	Caltrans and MCRCB	n/a	Yrs 1-10	n/a	Day	30	$100	$3,000
	Performance monitoring of wetland re-establishment sites (Group C wet meadows)	Caltrans and MCRCB	18.20 acres; assumes the total acreage of wetland re-establishment will be monitored	Yrs 1-5	Analyze data and organize for inclusion in annual monitoring reports	Labor hrs	200	$100	$20,000
	Performance monitoring of wetland re-establishment sites (riparian)	Caltrans and MCRCB	2.32 acres; assumes the total acreage of wetland re-establishment will be monitored	Yrs 1-10	Analyze data and organize for inclusion in annual monitoring reports	Labor hrs	120	$100	$12,000
	Hydroperiod monitoring (Group C wet meadow)	Caltrans and MCRCB	62 locations	Yrs 1-5	Collect data in established wetlands	Labor hrs	4,500	$100	$450,000
	Hydroperiod monitoring (riparian)	Caltrans and MCRCB	39 locations	Yrs 1-10	Collect data in established wetlands	Labor hrs	1,800	$100	$180,000
	Hydroperiod monitoring (Group C wet meadow)	Caltrans and MCRCB	62 locations	Years 1-5	Travel between monitoring locations	Labor hrs	450	$100	$45,000
	Hydroperiod monitoring (riparian)	Caltrans and MCRCB	39 locations	Years 1-10	Travel between monitoring locations	Labor hrs	180	$100	$18,000
	Hydroperiod monitoring (Group C wet meadow and riparian)	Caltrans and MCRCB	39 or 101 locations	Yrs 1-10	Analyze data and organize for inclusion in annual monitoring reports	Labor hrs	80	$100	$8,000

Mitigation Feature	Activity / Action	Responsible Party	Description	Frequency	Actions Required	Unit	Number of Units	Cost/Unit	Total Cost
Wetland Rehabilitation (Types 1)	Performance monitoring of wetland rehabilitation (wet meadow) sites (Type 1)	Caltrans and MCRCB	72.6 acres; assumes the total acreage of wetland rehabilitation will be monitored	Years 1-10	Collect data on absolute cover by wetland species, relative cover by wetland species, relative cover by native wetland species, absolute cover by invasive species	Labor hrs	7,260	$100	$726,000
	Performance monitoring of wetland rehabilitation (wet meadow) sites (Type 1)	Caltrans and MCRCB	72.6 acres; assumes the total acreage of wetland rehabilitation will be monitored	Years 1-10	Travel between monitoring locations	Labor hrs	360	$100	$36,000
	Performance monitoring of wetland rehabilitation (wet meadow) sites (Type 1)	Caltrans and MCRCB	72.6 acres; assumes the total acreage of wetland rehabilitation will be monitored	n/a	Analyze data and organize for inclusion in annual monitoring reports	Labor hrs	280	$100	$28,000
	GPS rental for wetland rehabilitation (Type 1)	Caltrans and MCRCB	n/a	Years 1-10	n/a	Day	360	$100	$36,000
Wetland Rehabilitation (Types 2 - 5)	Performance monitoring of wetland rehabilitation (wet meadow) sites (Type 2-5)	Caltrans and MCRCB	271.18 acres; assumes the total acreage of wetland rehabilitation will be monitored	Yrs 1-10	Collect data on relative cover by wetland species, relative cover by native wetland species, absolute cover by invasive species and hydroperiod	Labor hrs	27,100	$100	$2,710,000
	Performance monitoring of wetland rehabilitation (wet meadow) sites (Type 2-5)	Caltrans and MCRCB	271.18 acres; assumes the total acreage of wetland rehabilitation will be monitored	Yrs 1-10	Travel between monitoring locations	Labor hrs	1,350	$100	$135,000
	Performance monitoring of wetland rehabilitation (wet meadow) sites (Type 2-5)	Caltrans and MCRCB	271.18 acres; assumes the total acreage of wetland rehabilitation will be monitored	n/a	Analyze data and organize for inclusion in annual monitoring reports	Labor hrs	560	$100	$56,000
	GPS rental for wetland rehabilitation (Type 2-5)	Caltrans and MCRCB	n/a	Yrs 1-10	n/a	Day	1,350	$100	$135,000
Wetland Rehabilitation (woody species planting) (Type 3-5)	Performance monitoing of wetland rehabilitation (riparian wetland) sites (Type 3-5)	Caltrans and MCRCB	241.12 acres	Yrs 1-10	Collect data on plant survival and vigor (yrs 1-5), and percent vegetation cover (yrs 6-10)	Labor hrs	5,250	$100	$525,000
	Performance monitoing of wetland rehabilitation (riparian wetland) sites (Type 3-5)	Caltrans and MCRCB	241.12 acres	Yrs 1-10	Travel between monitoring locations	Labor hrs	775	$100	$77,500
	Performance monitoing of wetland rehabilitation (riparian wetland) sites (Type 3-5)	Caltrans and MCRCB	241.12 acres	Yrs 1-10	Analyze data and organize for inclusion in annual monitoring reports	Labor hrs	480	$100	$48,000
	GPS rental for wetland rehabilitation (riparian wetland) (Type 5)	Caltrans and MCRCB	n/a	Yrs 6-10	n/a	Day	25	$100	$2,500

Mitigation Feature	Activity / Action	Responsible Party	Description	Frequency	Actions Required	Unit	Number of Units	Cost/Unit	Total Cost
Other Waters Rehabilitation	Preformance monitoring of Other Waters (non-wetland riparian) rehabilitation sites	Caltrans and MCRCB	19.2 acres	Yrs 1-10	Collect data on plant survival and vigor yrs 1-5, and percent vegetation cover (yrs 6-10)	Labor hrs	1,065	$100	$106,500
	Preformance monitoring of Other Waters (non-wetland riparian) rehabilitation sites	Caltrans and MCRCB	19.2 acres	Yrs 1-10	Travel between monitoring locations	Labor hrs	160	$100	$16,000
	Preformance monitoring of Other Waters (non-wetland riparian) rehabilitation sites	Caltrans and MCRCB	19.2 acres	Yrs 1-10	Analyze data and organize for inclusion in annual monitoring reports	Labor hrs	240	$100	$24,000
	GPS rental for other waters	Caltrans and MCRCB	n/a	Yrs 6-10	n/a	Day	35	$100	$3,500
Monitoring and Reporting	Biological Monitoring Report	Caltrans and MCRCB	Annual biological monitoring report	Yrs 1-10	Prepare draft and final biological monitoring report	Labor hrs	3,500	$100	$350,000
	Aerial photo	MCRCD	Ortho-rectified color photo	Yr 10	Monitor canopy cover using aerial photo	Item	1	$4,000	$4,000
								Sub-Total Biological Monitoring Cost	**$6,859,000**
Short-Term Maintenance									
Short-Term Maintenance	Short-term Plant Maintenance Inspections	MCRCD	Land management for 412 acres	Yrs 4-10	Inspection for invasive species control, assess plant protection and health.	Labor hrs	2,520	$65	$163,800
	Short-term Plant Maintenance Labor	MCRCD	Land management for 412 acres	Yrs 4,5	Labor for invasive species control, assess plant protectin and health	Day	160	$2,880	$460,800
	Short-term Plant Maintenance Labor	MCRCD	Land management for 412 acres	Yrs 6-10	Labor for invasive species control, assess plant protectin and health	Day	130	$2,880	$374,400
	Invasive Plant Species Control Labor	MCRCD	Conduct invasive species control. Approx 1900 ac.	Yrs 1-10	Hand labor to remove invasive plant species	Day	300	$2,880	$864,000
	Project Coordination and Management	MCRCD	Supervise planning/management of approx. 412 of mitigation land	Yrs 1-10	Coordinate all aspects of mitigation project management, including manage monitoring contracts, grazing leases, coordinate annual maintenance work, review biological monitoring report	Labor hrs	900	$100	$90,000
								Sub-Total Habitat Maintenance Cost	**$1,953,000**
Legal/Emergency Fund									
Legal and Emergency Fund	Legal and Emergency Fund	MCRCD	1% of long term endowment	Yr 1	Establish fund	Lump Sum	1	$117,812	$117,813
								Sub-Total Legal/Emergency Fund	**$117,813**
								Sub-Total Short-Term Cost	**$8,929,813**
								10% Contingency	**$892,981**
								10% Administration	**$982,279**
								First Two Monitoring Years of Long Term Monitoring Period*	**$475,652**
								Total Short Term Cost	**$11,280,725**

*The first two years of long term monitoring have been included in the short-term calculations because of the way interest rates and long-term endowments are calculated and structured.

Table L-2. PAR Assumptions for Short-Term Maintenance and Monitoring Periods

Mitigation Feature/Category	Assumptions
General Assumptions	1 Field Day = 10 hrs.
	1 staff day = 8 hrs
	Takes 2 people 30 minutes to monitor 1 quadrat. Includes set up, data collection, photo and move to next location. Therefore 2 people can monitor 20 quadrats in 1 field day.
	Takes 2 people 1 hour to monitor one line-intercept transect. Includes set up, data collection, photo, and move to next location. Therefore 2 people can monitor 10 transects in 1 field day.
	8-person Landscape Crew costs $2880 a day: $45/hr x 8 people = $360 per hr x 8 hr day = $2880 per day
	Monitoring method assumed 10 quadrats per acre
	The first two years of long term monitoring have been included in the short-term calculations because of the way interest rates and long-term endowments are calculated and structured.
Wetland Establishment Monitoring (Group 1 and 2)	49.8 acres to be monitored (20.09 Group 1 and 29.71 Group 2)
	Monitoring period: Group 1 = 5 years; Group 2 = 10 years
	Collect data on relative cover by wetland plant species, relative cover by native wetland species and absolute cover by invaive species, and hydroperiod. **Group 1: 5 years, Group 2: 10 years**
	Group 1: 10 x 20.09 acres = 201 quadrats per yr to be monitored/20 quad per day = 10 days x 10 hr days x 2 people = **200hr/yr; 2**00 hrs/year x 5 years = **1000 hr**
	Group 2: 10 x 29.71 acres = 297 quadrats per yr to be monitored/20 quad per day = 15 days x 10 hr days x 2 people = **300hr/yr;** 300 hrs x 10 yrs = **3000 hrs**
	Group 1: 1 hr travel per day of field work x 10 days; 10 hrs x 5 yrs = **50 hrs**
	Group 2: 1 hr travel per day of field work x 15 days; 15 hrs x 10 yrs = **150 hrs**
	Group 1 GPS rental: 10 days/yr x 5 yrs = 50 days x $100/day = **$15000**
	Group 2 GPS rental: 15 days/yr x 10 yrs = 150 days x $100/day = **$30000**
	Years 1-5 Analyze data and organize for inclusion in annual monitoring report. 5 staff days x 8 hr days = 40 hrs/yr; 40 hrs x 5 yrs = 200 hrs
	Years 6-10 Analyze data and organize for inclusion in annual monitoring report. 3 staff days x 8 hr days = 24 hrs/yr; 24 hrs x 5 yrs = 120 hrs

Table L-2. PAR Assumptions for Short-Term Maintenance and Monitoring Periods

Mitigation Feature/Category	Assumptions
	Hydroperiod Monitoring
	Group 1 = 7 locations; Group 2 = 15 locations
	Group 1 =5 monitoring years, Group 2 = 10 monitoring years
	Group 1 and 2 (Years 1 - 5)
	Assume 1 person can monitor 8 locations in 1 day; 22 locations total/ 8 locations/day = **3 days/monitoring event**
	Assume monitoring twice a month for 9 months = 3 days/event x 18 days per yr x 10 hrs per day = **540 hrs/yr**
	Group 1 and Group 2 (Years 1 - 5): 540hrs x 5 yrs = **2,700 hrs**
	Group 2 (Years 6 - 10)
	15 wetlands/8 wetlands/day = 2 days/event; 2 days x 18 events/yr; 36 event/yr
	36 events/yr x 10hrs/day x 5 yrs = **1,800 hrs**
	Group 1: 54 days/yr x 5 yrs = 270 days; Group 2: 36 events/yr x 5 yr = 180 day; 1 hr travel per day of field work x 450 days = 18 hrs x 10 yrs = **180 hrs; 450 hrs**
	Analyze data and organize for includsion in annual monitoing report. 1 staff day x 8 hrs = 8 hrs
	8 hrs x 10 yrs = **80 hrs**
Wetland Re-establishment Monitoring (Group A, B, and C)	20.52 acres to be monitored (18.20 wet meadow; 2.32 riparian)
	Collect data on relative cover by wetland plant species., relative cover by native wetland species & absolute cover by invasive species, and hydroperiod. **Group A,B,C wet meadow: 5 years;**
	Group A,B,C wet meadow: 10 x 18.2 acres = 182 quadrats per yr to be monitored/20 quad per day = 9 days x 10 hr days x 2 people = **180hr/yr; 180** hrs/year x 5 years = **900 hr**
	Group C riparian cover: 10 x 2.32 acres = 23 quadrats per year to be monitored/20 quad per day = 1 days x 10 hr days x 2 people = 20 hr/yr; 20 hrs/year x 10 years = **200 hr**
	Group C riparian survival: Assume 10' O.C. plant spacing (436 plants/acre) or 1011plants total; 1000 plans per day per person = 1 days x 10 hr days = 10 hrs; 10 hrs/yr x 5 yrs = **50 hr**
	Group A,B, C wet meadow: 1 hr travel per day of field work x 9 days; 9 hrs x 5 yrs = **45 hrs**
	Group C riparian cover: 1 hr travel per day of field work x 3 days; 3 hrs x 10 yrs = **30 hrs**
	Group A, B, C wet meadow GPS rental: 9 days/yr x 5 yrs = 45 days x $100/day = **$4500**
	Group C riparian cover GPS rental: 3 days/yr x 10 yrs = 30 days x $100/day = **$3000**
	Years 1-5 Analyze data and organize for inclusion in annual monitoring report. 5 staff days x 8 hr days = 40 hrs/yr; 40 hrs x 5 yrs = **200 hrs**
	Years 6-10 Analyze data and organize for inclusion in annual monitoring report. 3 staff days x 8 hr days = 24 hrs/yr; 24 hrs x 5 yrs = **120 hrs**

Table L-2. PAR Assumptions for Short-Term Maintenance and Monitoring Periods

Mitigation Feature/Category	Assumptions
	Hydroperiod Monitoring
	Assume 101 locations (39 Group C riprian wetland sites, 62 Group C wet meadow sites)
	Group C riparian: 10 monitoring years, Group C wet meadow: 5 monitoring years
	Assume 1 person can monitor 20 locations in 1 day
	Years 1-5: Assume monitoring all Group C twice a month for 9 months = 90 days per yr x 10 hrs per day = 900 hrs/yr; 900 hrs/yr x 5 yrs = **4500 hrs**
	Years 6-10: Assume monitoring Group C riparian twice a month for 9 months = 36 days per yr x 10 hrs per day = 360 hrs/yr; 360 hrs/yr x 5 yrs = **1800 hrs**
	1 hr travel per day of field work x 18 days = 18 hrs x 10 yrs = **180 hrs**
	Analyze data and organize for includsion in annual monitoing report. 1 staff day x 8 hrs = 8 hrs
	8 hrs x 10 yrs = **80 hrs**
Other Waters Rehabilitation	19.2 acres to be monitored
	10 years of annual monitoring (5 years survival counts, 5 years transects)
	Plant Survival Monitoring and Vigor
	Assume 10 foot on center plant spacing (436 plants/acre) or 8363 plants total
	1000 plants per day per person = 8.3 days x 10 hr day = 83 hrs
	83 hrs/yr x 5 yrs = **415 hr**
	Transect Monitoring
	65 planting areas x 1 transect per area = 65 transects per year/10 transects per day = 6.5 days per year x 10 hr days x 2 people = 130 hrs per year
	130 hrs/yr x 5 yrs = **650 hr**
	1 hr travel per day of field work x 8 days (survival) x 2 people = 16 hrs x 5 yrs = **90 hrs**
	1 hr travel per day of field work x 7 days (transects) x 2 people = 14 hrs x 5 yrs = **70 hrs**
	Analyze data and organize for inclusion in annual monitoring report. 3 staff days x 8 hr days = 24 hrs. 24 hrs x 10 yrs= 240.
	GPS rental (transects): 7 days x $100/day = **$700/yr x 5 yrs = $3500**

Table L-2. PAR Assumptions for Short-Term Maintenance and Monitoring Periods

Mitigation Feature/Category	Assumptions
Wetland Rehabilitation Monitoring (wet meadow) (Type 1)	72.6 acres (total gross acreage of Type 1 rehabilitation)
	10 yrs of annual monitoring
	10 quad/ac x 72.6 ac = 726 quads per yr / 20 quads per day = 36.3 days per yr x 10 hr days x 2 people = 726 hrs per yr
	726 hrs/yr x 10 years = **7260 hr monitoring**
	1 hr travel per day of field work x 36 days = 36 hrs x 10 yrs = **360 hrs**
	Analyze data and organize for inclusion in annual monitoring report. 7 staff days x 8 hrs = 56hrs
	56 hr x 10 yrs = **280 hrs**
	GPS rental: 36 days x $100/day = **$3600/yr x 10 yrs = $25,200**
Wetland Rehabilitation Monitoring (wet meadow) (Type 2-5)	271.18 acres (total gross acreage of Type 2-5 rehabilitation)
	10 yrs of annual monitoring
	10 quad/ac x 271.18 ac = 2711 quads per yr / 20 quads per day = 135.5 days per yr x 10 hr days x 2 people = 2710 hrs per yr
	2710 hrs/yr x 10 years = **27,100 hr monitoring**
	1 hr travel per day of field work x 135 days = 135 hrs x 10 yrs = **1350 hrs**
	Analyze data and organize for inclusion in annual monitoring report. 7 staff days x 8 hrs = 56hrs. 56 hr x 10 yrs = 560 hrs
	GPS rental: 135 days x $100/day = **$13500/yr x 10 yrs = $135,000**
Wetland Rehabilitation Monitoring (woody species planting) (Type 3-5)	241.12 acres to be monitored
	10 yrs of annual monitoring (5 years survival, 5 year transects)
	Plant Survival and Vigor Monitoring
	Assume 10 foot on center plant spacing (436 plants/acre) or 105,076 plants total
	1000 plants per day per person = 105 days x 10 hr day = 1,050 hrs
	1210 hrs/yr x 5 yrs = **5250 hr**
	Assumes 48 planting areas x 1 transect per area = 48 transects per year/10 transects per day = 5 days per year x 10 hr days x 2 people = 100 hrs per year

Table L-2. PAR Assumptions for Short-Term Maintenance and Monitoring Periods

Mitigation Feature/Category	Assumptions
	Transect Monitoring (Type 5)
	100 hrs/yr x 5 yrs = **500 hr**
	1 hr travel per day of field work x 121 days (survival) = 105 hr x 5 yrs = **525 hrs**
	1 hr travel per day of field work x 1 days (transects) = 50 hr x 5 yrs = 250 hrs
	Analyze data and organize for inclusion in annual monitoring report. 2 staff days x 24 hrs = 48 hrs
	48 hrs x 10 yrs = **480 hrs**
	GPS rental: 5 days x $100/day = **$500/yr x 5 yrs = $2500**
Plant Maintenance Period	
	Years 1-3
	Maintenance costs for Years 1-3 are not included. It is assumed that this is the responsibility of the contractor and cost will be included in the mitigation construction cost estimates. Includes watering, weeding, replacement planting, noxious species control, assess plant protection and health, general site maintenance (fence repair, debris removal).
	Short Term Plant Maintenance Inspections
	Inspect established wetlands, rehibilitated wetlands and rehabilitated other waters for remaining performance monitoring period.
	Inspections for garbage, weeds, invasive species infestations, fencing, erosion and plant protection and health.
	Years 4 -10. Inspect 412 acres of land. Assume 2 people can inspect 90 acres a day; 412 acres/90 acres day = 4.6 days per inspection x 4 inspections per year = 18 days per yr x 2 people x 10 hrs/day = **360hr/yr x7 yrs = 2520 hrs**
	Short Term Maintenance Labor
	Years 4-10. Maintain 412 acres. Less intense than Years 1-3, including no watering anticipated.
	12 days per month x 5 months = 60 days x 2yrs = 120 days x $2880/day = $345,600
	20 additional days for remainder of the year x 2yrs = 40 days x $2,880day = $115,200
	Total of $345,600 + $115,200 = $460,800
	Years 6 - 10. Maintain 278 acres (this is 30% less acreage than years 4, 5, so reduce time by 30%).
	4 days per month* x 5 months = 20 days x 5 yrs = 100 days x $2880/day = $288,000
	6 additional days for remainder of year x 5 yrs = 30 days x $2880/day = $86,400
	Total of $144,000 + $86,400 = **$230,400**
Annual Biological Monitoring Report	Years 1-10. Includes wetland establishment, wetland rehabilitation (riparian), wetland rehabilitation (wetland meadow), other waters (non-wetland riparian), hydro-monitoring data
	Includes graphic summaries, photos.
	Draft – 250 hr x 10 yrs = 2500 hrs
	Final -100 hrs x 10 yrs = 1000 hrs
	Total 2500 + 1000 = **3500 hrs**

Willits Bypass Project
PAR Analysis for Off-Site Mitigation
Long-Term Costs

Table L-3. PAR Analyis for the Willits Bypass Project - Long-Term Mitigation Maintenance and Monitoring Phase

Mitigation Feature	Activity/ Action	Responsible Party	Description	Frequency	Actions Required	Unit	Number of Units	Cost/ Unit	Annual Cost (single occurrence cost)	Divide Years	Total Cost (annual set-aside)
Biological Monitoring											
Wetland Establishment (Groups 1 & 2)	Biological monitoirng for wetland establishment sites	MCRCD	Monitor 49.58 acres	year 15 and every 10 years thereafter	Relative cover by wetland plant species, native wetland plant species, and invasive species	Labor hours	500	$100	$50,000	10	$5,000
	Biological monitoirng for wetland establishment sites	MCRCD	Monitor 49.58 acres	year 15 and every 10 years thereafter	Travel time between monitoring locations	Labor hours	50	$100	$5,000	10	$500
	Biological monitoirng for wetland establishment sites	MCRCD	Monitor 49.58 acres	year 15 and every 10 years thereafter	Analyze data and organize for inclusion in monitoring report	Labor hours	80	$100	$8,000	10	$800
Wetland Rehabilitation (Types 1 -4)	Biological monitoring of wetland rehabilitation (wet meadow) sites	MCRCD	Monitor 324 acres	year 15 and every 10 years thereafter	Relative cover by wetland plant species, native wetland plant species, invasive species, absolute percent cover by tree and shrub species	Labor hours	3240	$100	$324,000	10	$32,400
	Biological monitoring of wetland rehabilitation (wet meadow) sites	MCRCD	Monitor 324 acres	year 15 and every 10 years thereafter	Travel time between monitoring locations	Labor hours	324	$100	$32,400	10	$3,240
	Biological monitoring of wetland rehabilitation (wet meadow) sites	MCRCD	Monitor 324 acres	year 15 and every 10 years thereafter	Analyze data and organize for inclusion in monitoring report	Labor hours	80	$100	$8,000	10	$800
Other Waters and Type 5 Rehabilitation	Biological monitoring of other waters and Type 5 rehabilitation	MCRCD	Monitor 40.3 acres	year 15 and every 10 years thereafter	Absolute percent cover by tree and shrub species; absolute percent cover by invasive species	Labor hours	200	$100	$20,000	10	$2,000
	Biological monitoring of other waters and Type 5 rehabilitation	MCRCD	Monitor 40.3 acres	year 15 and every 10 years thereafter	Travel time between monitoring locations	Labor hours	20	$100	$2,000	10	$200
	Biological monitoring of other waters and Type 5 rehabilitation	MCRCD	Monitor 40.3 acres	year 15 and every 10 years thereafter	Analyze data and organize for inclusion in monitoring report	Labor hours	64	$100	$6,400	10	$640
									Sub-Total Biological Monitoring Cost		**$45,580**
Habitat Maintenance											
General Inspections and Maintenance	General Inspections of Mitigation Lands	MCRCD	412 acres	Annual	Twice a year inspect mitigation parcels for fence repair, culvert repair, trash removal, erosion problems.	Labor hours	20	$65	$1,300	1	$1,300
	Habitat Maintenance	MCRCD	412 acres	Annual	Annual maintenance such as fence, debris, erosion	Days	12	$2,880	$34,560	1	$34,560
	Habitat maintenance oversite	MCRCD	412 acres	Annual	Oversee crew approx. 12 days per year	Labor hours	6	$100	$600	1	$600

Willits Bypass Project
PAR Analysis for Off-Site Mitigation
Long-Term Costs

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Table L-3. PAR Analyis for the Willits Bypass Project - Long-Term Mitigation Maintenance and Monitoring Phase

Mitigation Feature	Activity/ Action	Responsible Party	Description	Frequency	Actions Required	Unit	Number of Units	Cost/ Unit	Annual Cost (single occurrence cost)	Divide Years	Total Cost (annual set-aside)
	Fence Maintenance	MCRCD	Repair or replace fences and gates as needed	Annual	Fence Repair/maintenance Repair/replace 2% of fence annually	Linear foot	4,540	$5	$22,700	1	$22,700
	Invasive plant Species Control	MCRCD	Conduct invasive species control	Annual	Hand labor	Day	15	$2,880	$43,200	1	$43,200
	Invasive Plant Species Control	MCRCD	Conduct invasive species control	Annual	Oversite of work crews	Labor hrs	150	$100	$15,000	1	$15,000
	Invasive Plant Species Control	MCRCD	Conduct invasive species control	Annual	Purchase herbicide	Gal	10	$100	$1,000	1	$1,000
	Invasive Plant Species Control	MCRCD	Conduct invasive species control	Annual	Application using backpack sprayer	Labor hrs	40	$65	$2,600	1	$2,600
	Trash Removal / Disposal	MCRCD	Debris, fence material, etc.	Annual	Take trash to dump.	Ton	3	$40	$120	1	$120
										Sub-Total Habitat Maintenance Cost	**$121,080**
Field Equipment											
Field Equipment	Misc. Field Equipment Needs/Repair	MCRCD	Misc. field equipment repair, needs	Annual	As needed for land management activities	Item	1	$2,500	$2,500	1	$2,500
	Camera	MCRCD	Photo monitoring	Every 5 years	Photo monitoring	Item	1	$300	$300	5	$60
	Signage	MCRCD	Identify mitigation lands	Every 5 years	Identify mitigation lands	Item	20	$15	$300	5	$60
	GPS	MCRCD	GPS	Every 10 years	Locate monitoring location	Item	1	$10,000	$10,000	10	$1,000
										Sub-Total Field Equipment Cost	**$3,620**
Reporting											
Reporting	Aerial Photos	MCRCD	Ortho-rectified color photos	Every 10 years	Monitor canopy cover using aerial photos	Item	1	$4,000	$4,000	10	$400
	General Inspection Report	MCRCD	General Inspecition Report	Annual	Report includes map of mitigation area, photo documentation, maintenance or management actions, observations from general inspection, Inspection Sheet, endowment accounting, any recommendations for altered management practices.	Labor hours	40	$65	$2,600	1	$2,600
	Biological Monitoring Report	MCRCD	Biological Monitoring Report	year 15 and every 10 years thereafter	Enter field data into excel spreadsheet	Labor hours	80	$100	$8,000	10	$800
	Biological Monitoring Report	MCRCD	Biological Monitoring Report	year 15 and every 10 years thereafter	Summarize biological monitoring data and prepare report.	Labor hours	240	$100	$24,000	10	$2,400
										Sub-Total Reporting Cost	**$6,200**

Willits Bypass Project
PAR Analysis for Off-Site Mitigation
Long-Term Costs

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Table L-3. PAR Analyis for the Willits Bypass Project - Long-Term Mitigation Maintenance and Monitoring Phase

Mitigation Feature	Activity/ Action	Responsible Party	Description	Frequency	Actions Required	Unit	Number of Units	Cost/ Unit	Annual Cost (single occurrence cost)	Divide Years	Total Cost (annual set-aside)
Administration											
Administration	Project Coordination and Management	MCRCD	Supervise planning/management of 412.28 ac of mitigation land	Annual	Coordinate all aspects of mitigation project management, including monitoring contracts, annual maintenance work, review biological monitoring report	Labor hours	120	$100	$12,000	1	$12,000
	Budgeting Management	MCRCD	Manage budget	Annual	Track monthly expenditures, prepare annual expense report, submit to DFG, Caltrans	Labor hours	60	$65	$3,900	1	$3,900
	Audit	MCRCD	State Audit	Every 2 years	State Audit	Fee	1	$2,000	$2,000	2	$1,000
	Liability Insurance	MCRCD	Mitigation Parcels	Annual	Insurance for 412.28 acres	Item	1	$800	$800	1	$800
	Misc Office	MCRCD	Misc office expenses	Annual	Supplies such as paper, pens, staples, contribute to computer, printer, softward purchases, etc.	Item	1	$500	$500	1	$500
	Legal Fund	MCRCD	Legal/Emergency Fund	Annual	Maintan legal fund	Lump Sum	1	$50	$50	1	$50
										Sub-Total Administration Cost	**$18,250**
Financial Summary											
Financial Summary	Ongoing Annual Costs										$194,730
	Contingency Expense		10% contingency ($207,430 x 10%)	Ongoing Annual Cost	Fund is to cover unanticipated expenses, adaptive management.	Item	1	$19,473	$19,473	1	$19,473
										Sub-Total Ongoing Annual & Contingency Cost	**$214,203**
	Ongoing Administrative Costs		10% of total on-going annual costs ($228,173 x 10%)	Annual	Covers the off-site costs needed to manage the mitigation effort	Item	1	$21,420	$21,420	1	$21,420
										Total Annual Ongoing Cost	**$235,623**
	Funding Endowment		Establish endowment based on 2% return and annual ongoing cost of $237,826	Lump Sum	Receive endowment funds	Lump Sum Payment	$11,781,165				$11,781,165
										Endowment to Provide Annual Income of $237,826	**$11,781,165**

Table L-4. PAR Assumptions for Long-Term Maintenance and Monitoring Periods

Mitigation Feature/Category	Assumptions
General Assumptions	1 Field Day = 10 hrs.
	1 staff day = 8 hrs
	8-person Landscape Crew costs $2880 a day: $45/hr x 8 people = $360 per hr x 8 hr day = $2880 per day
	The first two long term monitoring years have been included in the short-term calculations because of the way interest rates and long-term endowments are calculated and structured.
Wetland Establishment Monitoring	49.8 acres to be monitored
	Collect data on relative cover by wetland plant species., relative cover by native wetland species and absolute cover by invasive speices, and hydroperiod. 10 x 49.8 acres = 498 quadrats per yr to be monitored/20 quad per day = 25 days x 10 hr days x 2 people = 500hr/yr.
	1 hr travel per day of field work x 25 day x 2 people; 50 hrs x 1 yrs = **50 hrs**
	Analyze data and organize for inclusion in annual monitoring report. 10 staff days x 8 hr days = 80 hrs/yr; 80 hrs x 1 yr = **80 hrs**
Other Waters and Type 5 Rehabilitation Monitoring	40.3 acres to be monitored
	Monitor once every ten years. Collect data on tree and shrub cover and absolute cover by invasive species
	Transect Monitoring
	100 planting areas x 1 transect per area = 100 transects per monitoring year/10 transects per day = 10 days per monitoring year x 10 hr days x 2 people = 200 hrs per year; **200 hrs/yr x 1 yrs = 200 hr**
	1 hr travel per day of field work x 10 days (transects) = 10 hrs x 1 monitoring yr x 2 people = **20 hrs**
	Analyze data and organize for inclusion in annual monitoring report. 8 staff days x 8 hr days = 64 hrs; **64 hrs x 1 yrs = 64 hrs**
Wetland Rehabilitation Monitoring (Types 1 - 4)	324 acres to be monitored
	10 quad/ac x 324 ac = 3240 quads per yr /20 quads per day = 162 days per yr x 10 hr days x 2 people = 3240 hrs per monitoringy yr; **3240 hrs/yr x 1 years = 3,240 hr monitoring**
	1 hr travel per day of field work x 162 days = 162 hrs x 1 monitoring yrs x people = **324 hrs**
	Analyze data and organize for inclusion in annual monitoring report. 10 staff days x 8 hrs = 80hrs; **80 hr x 1 yrs = 80 hrs**

Mitigation Feature/Category	Assumptions
Fence Repair/Maintenance	Assumes 10 miles of fence.
	Assume 2% of fence is repaired/replaced annually. Assumes (Grazing) Lessee also has responsibility for fence maintenance as part of the Grazing Lease.
	227,040 linear feet x 2% = 4,540 linear feet/yr x 5.00 linear foot = **$22,700 annually**
On-going Annual Maintenance Labor (fence maintenance, trash pick up, misc.)	Does not include invasive species work. 1 crew 1 day per month x $2880/day x 12 = **$34,560 annually.**
	Oversite of crew: 6 days x 10 hrs/day = **60 hrs annually**
On-going Annual Invasive Plant Species Control	1 crew 3 days/month x 5 months/year = 15 days/year x $2880/day = **$43,200 annually**
	Oversite of crew: 15 days x 10 hrs/day = **150 hrs annually**
General Inspection	1 inspection x10 hr = **10 hrs**
	2 inspection/yr = **20 hrs/yr**
General Inspection Annual Report	Report includes map of mitigation area, photo documentation of select mitigation areas, description of maintenance, management actions, observations from General Inspections, observations of Security Inspections, Inspection Sheet, endowment accounting, any recommendations for altered management practices.
	General Inspections, observations of Security Inspections, Inspection Sheet, endowment accounting, any recommendations for altered management practices.
	Estimate 40 hrs to organize information and 40 hrs to prepare draft and final report. Total 80 hrs.
Administrative Rate	This is to provide money for off-site project management costs needed to run an effective program. Since hours have been budgeted for several off-site expenses a lower rate (10%) was used.