

# Chapter 7 Mitigation Work Plan

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This chapter describes the MMP mitigation work plan and its implementation. This chapter provides information pertaining to the mitigation strategies for the onsite and offsite mitigation areas, the general mitigation implementation techniques, and specific information related mitigation techniques for the onsite and offsite mitigation areas.

The mitigation work plan covers both onsite and offsite mitigation efforts. Caltrans will implement and manage mitigation at the onsite mitigation area. Caltrans will implement mitigation at the offsite mitigation parcels and MCRCD will manage mitigation at the offsite mitigation parcels.

## 7.1 Mitigation Strategy

Mitigation for project construction impacts will occur at onsite and offsite mitigation areas. A general summary of the mitigation strategies by resource and impact category is provided in Table 7-1. The locations of the onsite mitigation areas are shown in Appendix D. The locations of the offsite mitigation areas are shown in Appendix C and on Figures 2-1a and 2-1b.

Project construction will result in temporary and permanent impacts on jurisdictional wetland and riparian habitat and other waters of the U.S. Mitigation will include the following actions:

- Temporary impacts will be mitigated through onsite wetland and riparian habitat re-establishment (Appendix D) and offsite compensation (Appendices C and E).
- Permanent impacts on wetlands will be mitigated offsite through wetland establishment and wetland rehabilitation of the offsite mitigation parcels (Appendices C and E and Figures 2-1a and 2-1b).
- Permanent impacts on other waters will be mitigated through rehabilitation of riparian corridors on the offsite mitigation parcels (Appendices C and E and Figures 2-1a and 2-1b), stream repair at Haehl and Upp Creeks in the project footprint (Appendix F), offsite headcut and erosion repair (Appendix E), and financial contribution to/development of the Ryan Creek culvert project outside the project footprint and Little Lake Valley.

Wetland mitigation construction at the offsite mitigation parcels is planned to occur in areas near or adjacent to existing wetlands and will result in temporary impacts on wetlands. Temporary impacts on offsite wetland mitigation parcels will be re-established and the re-established acres will not be credited toward mitigating for project impacts.

**Table 7-1. Summary of Onsite and Offsite Mitigation Strategies**

Resource	Impact Category	Location of Mitigation	Mitigation Strategy
Wetlands (wet meadow)	Temporary	Onsite	Re-establishment of temporary impact areas
			Repair for wetland mitigation construction impacts
	Permanent	Offsite	Wetland establishment
			Wetland rehabilitation
Wetland (riparian wetland)	Temporary	Onsite	Re-establishment of temporary impact areas
	Permanent	Offsite	Wetland rehabilitation
Other waters	Temporary	Onsite	Onsite rehabilitation
			Stream repair at Haehl and Upp Creeks
	Permanent	Offsite	Onsite erosion and headcut repair
			Rehabilitation of offsite riparian corridors adjacent to existing other creeks
			Financial contribution to and development of the Ryan Creek culvert project

Onsite mitigation will be implemented in the project footprint. Temporarily affected wetland and riparian habitat in the project footprint will be re-established to pre-project conditions or better. Design drawings for the onsite mitigation actions described in this chapter are presented in Appendix D. Appendix D includes a plan view of the planting plan; plant lists by habitat type; and planting details for the onsite mitigation areas.

Offsite mitigation for wetland and other waters impacts will be implemented on 24 parcels in Little Lake Valley, some of which are adjacent to or partially within the bypass alignment. Offsite mitigation will occur over entire parcels or on portions of parcels. For the purpose of this document the offsite mitigation action areas are called mitigation units. A mitigation unit is defined as a geographic area in which a particular mitigation action will occur. For example, on Ford (APN 108-020-04), the proposed actions include: one wetland establishment area, three Type 3, and one Type 4 wetland rehabilitation areas. Each of these mitigation action areas will be implemented and assessed as an individual unit.

Table 7-2 summarizes habitat establishment and rehabilitation actions at the offsite mitigation parcels. Appendices C - F show wetland establishment, re-establishment, and rehabilitation areas and other waters rehabilitation areas.

As part of mitigation implementation, Caltrans is currently preparing mitigation construction plans and special provisions for contractor use based on the design drawings in Appendices D - F. Additional information in the mitigation construction plans and special provisions includes plant quantities for each wetland and other waters mitigation planting area, text special

Table 7-2. Mitigation Establishment and Rehabilitation Actions for the Offsite Mitigation Parcels

Parcel Name	Assessor's Parcel Number (APN)	Location of Work Plan Components	Establishment or Rehabilitation Goal	Establishment and Rehabilitation Actions Summary							Establishment and Rehabilitation Action(s) Described	Habitat Functions and Values Affected by Establishment and Rehabilitation Action									
				Improve Hydrology	Expand Habitat	Increase Habitat Complexity	Control Invasive Plants	Plant and Seed Native Wetland Species	Plant Native Riparian Species	Land Management Improvements		Groundwater Recharge	Sediment Retention	Nutrient Removal	Biomass Increase	Wildlife Diversity	Aquatic Diversity	Restore connectivity of wildlife movement corridors	Improve land management operations		
Benbow	108-020-06	Section: 7.3.1.5, Appendix C	Wetland Establishment	X	X			X			Establish wet meadow	X	X	X	X		X				
Benbow	108-030-07	Section: 7.3.1.4 Appendix C	Wetland Rehabilitation			X					Discontinue grazing from designated portion of the parcel	X	X	X	X		X				
						X						Allow for successional development of native vegetation communities	X	X	X	X		X			
										X			Repair, replace, or add perimeter fences and gates, as needed								X
										X			Remove interior fences and gates between other non-grazed parcels, as needed							X	X
					X					X			Remove water troughs, if applicable								X
								X		Remove debris, if applicable								X			
Benbow	108-040-13	Section: 7.3.1.3, Appendix C	Wetland Establishment	X	X			X			Establish wet meadow	X	X	X	X		X				
			Wetland Rehabilitation			X						Discontinue grazing	X	X	X	X		X			
						X						Allow for successional development of native vegetation communities in designated locations	X	X	X	X		X			
										X		Plant herbaceous wetland species in designated wet meadow areas in designated locations		X	X	X					
					X	X		X				Plant native tree and shrub species in designated wet meadow areas in designated locations		X	X	X	X				
										X		Plant herbaceous wetland species in designated wet meadow areas		X	X	X					
					X	X		X				Plant native tree and shrub species in designated wet meadow areas		X	X	X	X				
										X		Repair, replace, or add perimeter fences and gates, as needed									X
										X		Remove interior fences and gates between other non-grazed parcels								X	X
				X					X		Remove water troughs, if applicable									X	
						X		Remove debris, if applicable									X				
Benbow	007-010-04	Section: 7.3.1.2, Appendix C	Wetland Rehabilitation		X	X			X		Plant native riparian species in riparian corridor		X	X	X	X					
				X				X		Repair unstable headcut		X									
									X	Fence riparian corridor to exclude cattle from riparian corridors		X	X	X	X				X		
Benbow	007-010-04	Section: 7.3.1.2, Appendix C	Wetland Rehabilitation			X					Discontinue grazing	X	X	X	X		X				
						X					Allow for successional development of native vegetation communities	X	X	X	X		X				
										X		Plant herbaceous wetland species in designated wet meadow areas		X	X	X					
					X	X		X				Plant native tree and shrub species in designated wet meadow areas		X	X	X	X				
										X		Repair or replace perimeter fences and gates, as needed									X
										X		Remove interior fences and gates between other non-grazed parcels								X	X
					X					X		Remove water troughs, if applicable									X
										X		Remove debris, if applicable									X
Benbow	007-010-04	Section: 7.3.1.2, Appendix C	Other Waters Rehabilitation		X	X			X		Plant native riparian species in riparian corridor		X	X	X	X					
									X	Fence riparian corridor to exclude cattle from riparian corridors		X	X	X	X				X		

Parcel Name	Assessor's Parcel Number (APN)	Location of Work Plan Components	Establishment or Rehabilitation Goal	Establishment and Rehabilitation Actions Summary							Establishment and Rehabilitation Action(s) Described	Habitat Functions and Values Affected by Establishment and Rehabilitation Action									
				Improve Hydrology	Expand Habitat	Increase Habitat Complexity	Control Invasive Plants	Plant and Seed Native Wetland Species	Plant Native Riparian Species	Land Management Improvements		Groundwater Recharge	Sediment Retention	Nutrient Removal	Biomass Increase	Wildlife Diversity	Aquatic Diversity	Restore connectivity of wildlife movement corridors	Improve land management operations		
Benbow	007-020-03	Section: 7.3.1.1, Appendix C	Wetland Rehabilitation			X					Discontinue grazing	X	X	X	X		X				
						X					Allow for successional development of native vegetation communities	X	X	X	X		X				
									X			Plant herbaceous wetland species in designated wet meadow areas		X	X	X					
										X		Repair, replace, or add perimeter fences and gates, as needed								X	
										X		Remove interior fences and gates between other non-grazed parcels							X	X	
					X					X		Remove water troughs, if applicable								X	
										X		Remove debris, if applicable								X	
		Other Waters Rehabilitation		X	X			X		Plant native riparian species in riparian corridor		X	X	X	X						
								X		Fence riparian corridor to exclude cattle from riparian corridors		X	X	X	X			X			
BROOKE	108-020-03	Section: 7.3.1.6, Appendix C	Wetland Rehabilitation			X					Discontinue grazing	X	X	X	X		X				
						X					Allow for successional development of native vegetation communities	X	X	X	X		X				
									X			Plant herbaceous wetland species in designated wet meadow areas		X	X	X					
					X	X			X			Plant native tree and shrub species in designated wet meadow areas		X	X	X	X				
										X		Repair or replace perimeter fences and gates, as needed									X
										X		Remove interior fences and gates between other non-grazed parcels							X	X	
					X					X		Remove water troughs, if applicable								X	
						X		Remove debris, if applicable								X					
Ford	108-010-06	Section: 7.3.1.11, Appendix C	Wetland Establishment	X	X			X			Establish wet meadow	X	X	X	X		X				
			Wetland Rehabilitation			X					Discontinue grazing	X	X	X	X		X				
				X	X			X			Plant native tree and shrub species in designated wet meadow areas		X	X	X	X					
									X		Repair, replace, or add perimeter fences and gates, as needed									X	
									X		Remove interior fences and gates between other non-grazed parcels							X	X		
				X					X		Remove water troughs, if applicable								X		
									X		Remove debris, if applicable								X		
		Other Waters Rehabilitation		X	X			X		Plant native riparian species in riparian corridor		X	X	X	X						
								X		Fence riparian corridor to exclude cattle from riparian corridors		X	X	X	X			X			
Ford	108-020-04	Section: 7.3.1.12, Appendix C	Wetland establishment	X	X			X			Establish wet meadow	X	X	X	X		X				
			Wetland Rehabilitation			X					Discontinue grazing from designated portions of the parcel	X	X	X	X		X				
									X		Plant herbaceous wetland species in designated wet meadow areas		X	X	X						
									X		Repair, replace, or add perimeter fences and gates, as needed									X	
									X		Remove interior fences and gates between other non-grazed parcels							X	X		
				X					X		Remove water troughs, if applicable								X		
									X		Remove debris, if applicable								X		
		Other Waters Rehabilitation		X	X			X		Plant native riparian species in riparian corridor		X	X	X	X						
								X		Fence riparian corridor to exclude cattle from riparian corridors		X	X	X	X			X			





Parcel Name	Assessor's Parcel Number (APN)	Location of Work Plan Components	Establishment or Rehabilitation Goal	Establishment and Rehabilitation Actions Summary							Establishment and Rehabilitation Action(s) Described	Habitat Functions and Values Affected by Establishment and Rehabilitation Action						
				Improve Hydrology	Expand Habitat	Increase Habitat Complexity	Control Invasive Plants	Plant and Seed Native Wetland Species	Plant Native Riparian Species	Land Management Improvements		Groundwater Recharge	Sediment Retention	Nutrient Removal	Biomass Increase	Wildlife Diversity	Aquatic Diversity	Restore connectivity of wildlife movement corridors
Wildlands	108-060-01	Section: 7.3.1.25, Appendix C	Wetland Establishment	X	X			X		Establish wet meadow	X	X	X	X		X		
			Wetland Rehabilitation			X				Discontinue grazing from designated portions of the parcel	X	X	X	X		X		
						X				Allow for successional development of native vegetation communities	X	X	X	X		X		
								X		Plant herbaceous wetland species in designated wet meadow areas		X	X	X				
									X	Repair, replace, or add perimeter fences and gates, as needed								X
										Remove interior fences and gates, if applicable							X	
					X					Remove water troughs, if applicable								X
									Remove debris, if applicable								X	
Other Waters Rehabilitation		X	X			X	Plant native riparian species in riparian corridor		X	X	X	X						
Wildlands	108-070-09	Section: 7.3.1.24, Appendix C	Wetland Establishment	X	X			X		Establish wet meadow	X	X	X	X		X		
			Wetland Rehabilitation			X				Discontinue grazing from designated portions of the parcel	X	X	X	X		X		
						X				Allow for successional development of native vegetation communities	X	X	X	X		X		
								X		Plant herbaceous wetland species in designated wet meadow areas		X	X	X				
					X	X		X		Plant native tree and shrub species in designated wet meadow areas		X	X	X	X			
									X	Repair, replace, or add perimeter fences and gates, as needed							X	
										Remove interior fences and gates, if applicable							X	
				X					Remove water troughs, if applicable							X		
						Remove debris, if applicable							X					
Other Waters Rehabilitation		X	X			X	Plant native riparian species in riparian corridor		X	X	X	X						
Wildlands	108-070-08	Section: 7.3.1.23, Appendix C	Wetland Rehabilitation			X				Discontinue grazing from designated portions of the parcel	X	X	X	X		X		
						X				Allow for successional development of native vegetation communities	X	X	X	X		X		
								X		Plant herbaceous wetland species in designated wet meadow areas		X	X	X				
					X	X		X		Plant native tree and shrub species in designated wet meadow areas		X	X	X	X			
									X	Repair, replace, or add perimeter fences and gates, as needed							X	
										Remove interior fences and gates, if applicable							X	
					X					Remove water troughs, if applicable							X	
									Remove debris, if applicable							X		
Other Waters Rehabilitation		X	X			X	Plant native riparian species in riparian corridor		X	X	X	X						
				X			Fence riparian corridor to exclude cattle from riparian corridor		X	X	X	X			X			

Parcel Name	Assessor's Parcel Number (APN)	Location of Work Plan Components	Establishment or Rehabilitation Goal	Establishment and Rehabilitation Actions Summary							Establishment and Rehabilitation Action(s) Described	Habitat Functions and Values Affected by Establishment and Rehabilitation Action						
				Improve Hydrology	Expand Habitat	Increase Habitat Complexity	Control Invasive Plants	Plant and Seed Native Wetland Species	Plant Native Riparian Species	Land Management Improvements		Groundwater Recharge	Sediment Retention	Nutrient Removal	Biomass Increase	Wildlife Diversity	Aquatic Diversity	Restore connectivity of wildlife movement corridors
Wildlands	108-020-07	Section: 7.3.1.26, Appendix C	Wetland Establishment	X	X			X		Establish wet meadow	X	X	X	X		X		
			Wetland Rehabilitation			X				Discontinue grazing from designated portions of the parcel	X	X	X	X		X		
						X				Allow for successional development of native vegetation communities	X	X	X	X		X		
								X		Plant herbaceous wetland species in designated wet meadow areas		X	X	X				
									X	Repair, replace, or add perimeter fences and gates, as needed								X
									X	Remove interior fences and gates, if applicable							X	
				X				X	Remove water troughs, if applicable									X
			Other Waters Rehabilitation	X	X			X		Plant native riparian species in riparian corridor		X	X	X	X			
	X						Fence riparian corridor to exclude cattle from riparian corridor		X	X	X	X				X		
Wildlands	108-030-08	Section: 7.3.1.27, Appendix C	Wetland Rehabilitation			X				Discontinue grazing from designated portions of the parcel	X	X	X	X		X		
						X				Allow for successional development of native vegetation communities	X	X	X	X		X		
								X		Plant herbaceous wetland species in designated wet meadow areas		X	X	X				
					X	X		X		Plant native tree and shrub species in designated wet meadow areas		X	X	X	X			
									X	Repair, replace, or add perimeter fences and gates, as needed								X
									X	Remove interior fences and gates, if applicable							X	
					X				X	Remove water troughs, if applicable								
								X	Remove debris, if applicable									X
Other Waters Rehabilitation	X	X			X		Plant native riparian species in riparian corridor		X	X	X	X						
		X					Fence riparian corridor to exclude cattle from riparian corridor		X	X	X	X				X		

provisions (based on the information in this chapter), and a cost estimate (for bid evaluation and comparison purposes). It is recommended that the reader refer to Appendices C - F while reviewing this chapter to facilitate a full understanding of the project's mitigation program. Please note that units of measurement (i.e., metric or English) vary in Appendices D – F for the grading and planting plans for offsite mitigation parcels.

### 7.1.1 Offsite Mitigation Design Approach

When determining the wetland mitigation potential at the offsite mitigation parcels, the following local habitat conditions at each parcel were evaluated in the field and from related literature.

- **Jurisdictional and nonjurisdictional habitat types and characteristics**—species composition and plant densities/cover information from existing habitat types were considered as part of mitigation design efforts, including development of mitigation seed mixes and plant palettes and performance standards and success criteria (Chapter 9).
- **Soils and topography**—soils information from wetland delineation reports, soil surveys, and field observations were used to identify appropriate wetland establishment and rehabilitation actions.
- **Hydrology**—in most cases, drainages on the offsite mitigation parcels are a combination of historical flow paths and modified alignments for improved drainage and simplified maintenance practices to control parcel hydrology, vegetation, and sediment accumulation. Modifying the hydrology of the parcels through the grading of some of these existing drainages will allow for a longer residence time of surface water on the parcel to support wetland and riparian establishment and rehabilitation efforts.
- **Land use**—the offsite mitigation parcels have historically supported agriculture (e.g., livestock grazing, haying). Grazing and haying will be discontinued on the USACE-designated mitigation parcels with the exception of the established wetlands on the Watson East (APN 037-221-30), Ford (APN 108-010-06), and Goss/MGC Plasma Middle/MGC Plasma North parcels. Once mitigation plantings have achieved success criteria for these wetland establishment sites, grazing levels would be adaptively managed to determine if the established wetlands could be incorporated into the managed grazing prescription.

#### 7.1.1.1 Wetland Establishment Design Approach

Specifically, with respect to wetland establishment, the above information was used to develop the following design criteria:

- Establish a minimum of 53.48 acres of wet meadow wetlands on offsite mitigation parcels with appropriate soils and hydrology, as indicated by existing jurisdictional wet meadow wetlands located in the immediate vicinity of the proposed established wetlands.
- Establish wet meadow wetlands that support similar native wetland plants and have a species richness and native species cover on par with existing jurisdictional wet meadow wetlands located in the immediate vicinity of the proposed established wetlands.

- Establish wet meadow wetlands with a hydroperiod similar to that of existing jurisdictional wet meadow wetlands located in the immediate vicinity of the proposed established wetlands.
- Minimize effects on existing sensitive biological resources (e.g., special-status plants, riparian habitat, jurisdictional wetlands, and oak woodland) from wetland establishment activities.

#### **7.1.1.2 Wetland Rehabilitation Design Approach**

Specifically, with respect to wetland rehabilitation, the above information was used to develop the following design criteria:

- Rehabilitate a minimum of 48.19 acres of existing wetlands on offsite mitigation parcels.
- Develop plant palettes appropriate for each wetland rehabilitation mitigation unit based on unit-specific soils and hydrology.
- Rehabilitate wetlands with native wetland plants that occur in each rehabilitation mitigation unit or with other site-appropriate species.
- Minimize effects on existing sensitive biological resources (e.g., special-status plants, riparian habitat, jurisdictional wetlands, and oak woodland) from wetland rehabilitation activities.

#### **7.1.1.3 Other Waters Rehabilitation Design Approach**

Specifically, with respect to wetland rehabilitation, the above information was used to develop the following design criteria:

- Rehabilitate a minimum of 18.0 acres of other waters on offsite mitigation parcels.
- Develop plant palettes for each other waters rehabilitation mitigation unit based on unit-specific soils and hydrology.
- Rehabilitate other waters with native wetland plants that occur in adjacent mitigation units or with other site-appropriate species.
- Minimize effects on existing sensitive biological resources (e.g., special-status plants, riparian habitat, jurisdictional wetlands, and oak woodland) from wetland rehabilitation activities.

### **7.1.2 Mitigation Implementation Schedule**

Because of funding constraints, the project will be constructed in two phases. Phase 1 will construct a functional interim facility consisting of a two-lane highway and the interchanges at the south and north ends of the bypass. These two lanes will run the entire length of the project limits and will serve as the southbound lanes in the ultimate configuration under Phase 2. Phase 1 is expected to begin in fall 2012 and end in fall 2017.

Phase 2 will construct the remaining two lanes—creating a full four-lane facility—when sufficient funding becomes available. Since only the two southbound lanes and interchanges will be constructed in Phase 1, per this MMP Caltrans will implement mitigation for the temporary and permanent impacts of Phase 1; mitigation for impacts resulting from Phase 2 will be identified at the time Phase 2 is permitted. Mitigation for Phase 1 of the project will be implemented concurrently with the beginning of Phase 1 construction.

Figure 7-1 shows the mitigation implementation schedule. It should be noted that the schedule stems from commencement of construction; if construction is delayed, the remainder of the schedule will be adjusted accordingly.

Construction of onsite mitigation will begin following completion of Phase 1 project construction and will be completed well before the start of Phase 2 project construction. Construction of onsite mitigation will occur in the footprint of the temporary disturbances and will not result in additional impacts to wetland habitat and sensitive biological resources.

Construction of offsite mitigation (i.e., mobilization and site preparation) will begin simultaneously with Phase 1 project construction and will be completed well before the start of Phase 2. Construction of offsite mitigation will be planned to minimize impacts on wetland habitat and sensitive biological resources (e.g., vegetation clearing associated with mitigation construction will be scheduled to reduce disruption of breeding and nesting birds). For the Ford and Niesen offsite mitigation parcels, excess material will be removed and used for fill in the bypass alignment. As a result, mitigation implementation at these two offsite parcels will occur near the end of Phase 1 construction.

## 7.2 Onsite Mitigation Implementation

Onsite mitigation implementation will focus on re-establishing temporarily affected wetland and riparian habitat within the project footprint (Appendix C). In addition, onsite minimization efforts related to state-listed plant species and other sensitive resources will be required. Onsite mitigation actions will entail the following activities, discussed in detail below.

- Site preparation.
- Grading.
- Seeding.
- Planting stock collection and installation.
- Construction inspections.
- Documentation of as-built conditions.

### 7.2.1 Site Preparation

Preparation of onsite mitigation sites will consist of the following activities, discussed in detail below.

- Installing protective fencing around the perimeter of environmentally sensitive areas (ESAs).
- Clearing vegetation.
- Salvaging topsoil and associated native plant seeds and rhizomes, including state-listed plant populations.

### **7.2.1.1 Environmentally Sensitive Area Fencing**

Prior to construction, Caltrans will install protective fencing and, where necessary, silt fencing around ESAs to be avoided. Protective fencing will consist of orange plastic-mesh fencing that is secured to metal T-posts, and will be installed in accordance with the project construction documents. Silt fencing may be installed around avoided wetlands, both jurisdictional and nonjurisdictional drainages, and riparian habitat to prevent soil or sediment from entering the habitat. Silt fencing may be used in combination with protective fencing, and will be installed in accordance with the project SWPPP to be prepared by the contractor and with BMPs specified in the project construction documents (see Section 7.3.2.1, Wetland Establishment, for more information on typical erosion control measures and BMPs).

### **7.2.1.2 Vegetation Clearing**

The onsite mitigation areas occur in the footprint of the project construction temporary impact areas. Vegetation will be cleared by the construction contractor according to the clearing and grubbing specification in the project construction plans. Wetland and riparian habitat will be re-established within the footprint of temporarily affected areas.

### **7.2.1.3 Preparing Wetland Topsoil Stockpile Areas**

Wetland topsoil at locations where Baker's meadowfoam occurs within the project footprint will be harvested and stockpiled for later use in topdressing the wetland establishment areas on the Watson East parcel (APN 037-221-30). The specific location of topsoil stockpile areas will be identified in the mitigation construction plans and specifications for contractor use. To prepare stockpile areas, existing ruderal vegetation will be removed and legally disposed of offsite at a landfill or other facility that accepts green waste.

### **7.2.1.4 Salvage of State-Listed Plant Populations**

#### ***Baker's Meadowfoam***

Prior to the beginning of ground-disturbing project construction activities, observed populations of Baker's meadowfoam to be affected by construction will be salvaged as plant duff and topsoil for relocation to the Watson East parcel (APN 037-221-30), where the harvested material will be used to topdress established wetlands at the parcel that are also potential Baker's meadowfoam habitat. The timing of salvage operations will be determined by a biological monitor.

Boundaries of observed populations will be identified and marked in the field using previously collected GPS data. The uppermost 1–2 inches of topsoil and plant duff will be harvested together and stockpiled at an appropriate site. The amount of salvaged topsoil/duff will not exceed the amount that is needed at the Watson East parcel (approximately 4,483 cubic yards).

TASK	2013												2014												2015												2016												2017											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
<b>Bypass Project Construction (Phase 1)</b>																																																												
<b>Offsite Mitigation<sup>a</sup></b>																																																												
<b>Benbow Offsite Mitigation Parcels</b>																																																												
Site preparation																																																												
Wetland establishment																																																												
Wetland rehabilitation																																																												
Other waters rehabilitation/ Wetland rehabilitation type 5																																																												
<b>Brooke Offsite Mitigation Parcel</b>																																																												
Site preparation																																																												
Wetland rehabilitation type 5																																																												
<b>Ford Offsite Mitigation Parcels<sup>b</sup></b>																																																												
Site preparation																																																												
Other waters rehabilitation/ Wetland rehabilitation type 5																																																												
Wetland establishment																																																												
<b>Frost Offsite Mitigation Parcel</b>																																																												
Site preparation																																																												
Other waters rehabilitation (erosion site rehabilitation)																																																												
<b>Goss/MGC Plasma North and Middle Offsite Mitigation Parcels</b>																																																												
Site preparation																																																												

Figure 7-1. Mitigation Implementation Schedule<sup>a</sup>

TASK	2013												2014												2015												2016												2017											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Wetland establishment																																																												
<b>Lusher Offsite Mitigation Parcel</b>																																																												
Site preparation																																																												
Wetland establishment																																																												
Wetland rehabilitation																																																												
Other waters rehabilitation/Wetland rehabilitation type 5																																																												
<b>Niesen Offsite Mitigation Parcel<sup>b</sup></b>																																																												
Site Preparation																																																												
Wetland establishment																																																												
Wetland rehabilitation (includes managing grazing)																																																												
<b>Watson Offsite Mitigation Parcel</b>																																																												
Site Preparation																																																												
Wetland establishment																																																												
Wetland rehabilitation																																																												
<b>Wildlands Offsite Mitigation Parcels</b>																																																												
Site preparation																																																												
Wetland establishment																																																												
Wetland rehabilitation																																																												
Other waters rehabilitation/Wetland rehabilitation type 5																																																												

Figure 7-1. Mitigation Implementation Schedule<sup>a</sup>  
(continued)

TASK	2013												2014												2015												2016												2017											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
<b>Bypass Project Construction (Phase 1)</b>																																																												
<b>Offsite Mitigation<sup>a</sup></b>																																																												
<b>Benbow Offsite Mitigation Parcels</b>																																																												
Site preparation																																																												
Wetland establishment																																																												
Wetland rehabilitation																																																												
Other waters rehabilitation/ Wetland rehabilitation type 5																																																												
<b>Brooke Offsite Mitigation Parcel</b>																																																												
Site preparation																																																												
Wetland rehabilitation type 5																																																												
<b>Ford Offsite Mitigation Parcels<sup>b</sup></b>																																																												
Site preparation																																																												
Other waters rehabilitation/ Wetland rehabilitation type 5																																																												
Wetland establishment																																																												
<b>Frost Offsite Mitigation Parcel</b>																																																												
Site preparation																																																												
Other waters rehabilitation (erosion site rehabilitation)																																																												
<b>Goss/MGC Plasma North and Middle Offsite Mitigation Parcels</b>																																																												
Site preparation																																																												

Figure 7-1. Mitigation Implementation Schedule<sup>a</sup>



Topsoil/duff stockpiles will be stored separately from other grading spoils. The topsoil/duff will be stored at ambient temperatures and protected from rainfall. It is expected that salvaged topsoil/duff stockpiles will be reapplied within a season; if the timeframe is longer, additional management of the stockpiles may be necessary to maintain seed viability.

### **7.2.2 Grading**

Temporarily affected locations will be graded as necessary to re-establish appropriate topography and site drainage. The disturbed locations will be configured to replicate pre-project conditions as closely as possible, based on topography as described in project construction documents or from other sources if such information is not available in the bypass project construction documents (Figure 7-2).

Erosion control seed mixes will be applied after grading is complete but prior to the onset of wet season rains to prevent loosened material/sediment from entering wetlands or waters near the project footprint.

### **7.2.3 Seeding**

Temporarily affected wetland and riparian locations will be seeded with an erosion control seed mix or a wet meadow seed mix, depending on their location in the project footprint. Based on availability, seed will be collected using the following hierarchy: (1) Little Lake Valley, (2) Outlet Creek Basin, and (3) Eel River watershed. All temporarily affected riparian locations and wetland locations outside the viaduct construction area will be seeded with an erosion control seed mix (Appendix D). Temporarily affected wetlands in the viaduct construction area will be seeded with a wet meadow seed mix (Appendix D). The seed mixes may be revised based on seed availability at the time of mitigation construction and seed application.

The erosion control seed mix and wet meadow seed mix will be applied using standard drill seeding or hydroseeding techniques. Drill seeding works best when applying seed to large areas that have a simple shape (e.g., square or rectangle). Hydroseeding can be used in a variety of areas. After hydroseeding, mulch (e.g., sterile rice straw or an approved weed-free equivalent) will need to be applied to protect the seed until it germinates. The mulch material will be of high quality (i.e., not musty, moldy, caked, or of otherwise low quality). The use of mulch that contains invasive plants will not be permitted.

Straw mulch material will be stabilized using a mulch crimper or equivalent straw anchoring tool. The crimper will be straight and capable of firmly punching the mulch into the soil. Hand methods will be used to anchor the straw where crimping equipment cannot be safely operated. Straw mulch material may also be stabilized using a suitable tackifier. If a tackifier is used, it will be applied uniformly over the mulch material at the specified rate.

## **7.2.4 Planting Stock Collection and Installation**

Temporarily affected wetland and riparian locations in the onsite mitigation area will be planted using container stock, cuttings, and/or seeds (i.e., acorns). Container plants will be planted at the re-established wetland mitigation sites. Container plants, cuttings, and acorns will be planted at the re-established riparian mitigation sites.

Planting density for wetland re-establishment sites will be at approximately 5 feet on center. Planting density for riparian re-establishment sites will be at approximately 10 feet on center. The plant palettes for the wetland and riparian re-establishment areas are provided in Appendix D.

### **7.2.4.1 Container Plant Propagation and Installation**

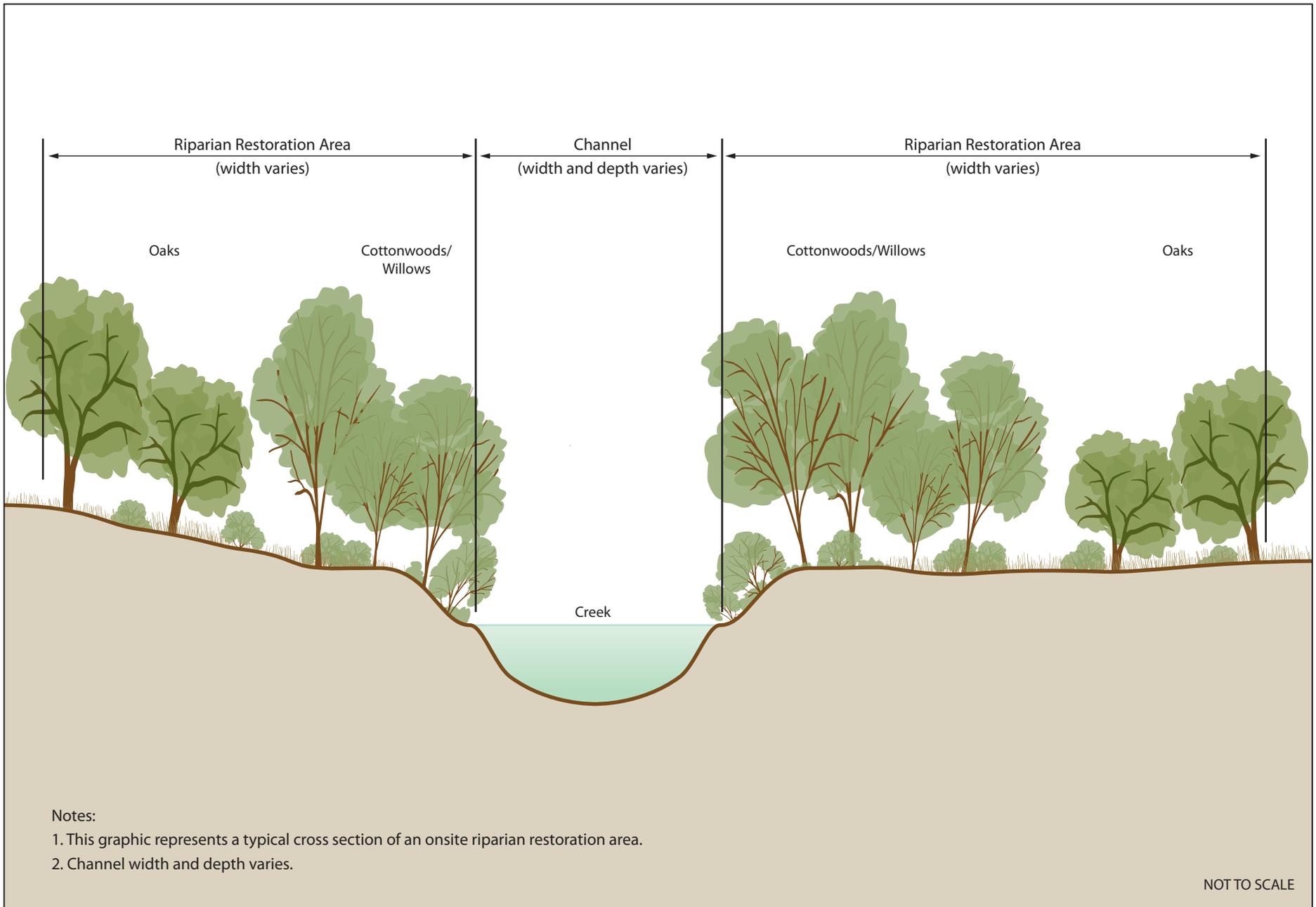
Caltrans will contract with a plant nursery experienced with the propagation of native herbaceous and woody plants to propagate container plants for mitigation efforts. The type of propagation material collected will depend on the species, and may be seeds (e.g., acorns) and/or root stock. Based on availability, seeds and/or root stock will be collected using the following hierarchy: (1) Little Lake Valley, (2) Outlet Creek Basin, and (3) Eel River watershed. Standard horticultural collection procedures will be used.

Container plants will be planted at the re-established wetland mitigation sites and at the re-established riparian mitigation sites. Container plants will be planted in fall/winter after rainfall has saturated the soil to a depth of approximately 10 inches. Container plants will be placed in a planting hole that is twice the width of, and no deeper than, the container. Planting holes will be hand excavated or augured. If planting holes are augured, the sides will be scarified to allow roots to more easily penetrate the surrounding soil. Soil removed when the planting hole is created will be used as backfill and in constructing a watering basin. (Appendix D).

Before planting, the container plant's root mass will be inspected, and any matted, dead, diseased, or twisted roots will be pruned. Inspection and pruning will take place quickly, because exposure to the air results in loss of root hairs. Care will be taken during pruning to avoid excessive loss of root mass.

Container plants will be placed in the planting hole so that the root collar is slightly above the desired final grade with the top of the first major root barely visible at the surface. Fertilizer will not be applied during container plant installation. As soil is backfilled, it will be worked around the roots so that they are not compressed into a tight mass, but are spread out and are supported by the new soil beneath them. After each 3 to 4 inches of soil has been placed in the hole, the soil will be tamped around the roots with foot or hand pressure, with care taken to not damage the roots.

Watering basins will be constructed around all container plants except those planted in the viaduct construction area, and plant protection cages may be installed to minimize herbivory. A 3-inch layer of bark mulch (this mulch could come from chipped woody vegetation removed as part of vegetation clearing activities [Section 7.2.1.2, Vegetation Clearing]) will be placed in each watering basin to reduce soil evaporation rates and help suppress weed growth.



**Figure 7-2**  
**Typical Onsite Riparian Restoration Area**



Container plants will be watered immediately after planting. Container plants will be inspected after initial watering to ensure that they have not settled. Any container plants that have settled will be adjusted so the appropriate length is exposed above ground.

#### **7.2.4.2 Riparian Cutting Collection and Installation**

Caltrans will collect willow and cottonwood cuttings to be planted at the re-established riparian mitigation sites. Cuttings will be collected from source material using the following hierarchy: (1) Little Lake Valley, (2) Outlet Creek Basin, and (3) Eel River watershed. Standard horticultural collection procedures will be used in a manner that minimizes impacts on both the source material and the cuttings. Cuttings will be collected from various source materials to ensure the genetic diversity and viability of the cuttings. Diseased or unhealthy source material will be avoided.

Cutting collection and installation will occur in December and/or January. All cuttings will be hardened-off green wood. Cuttings will be a minimum of 3 feet long and will be tapered from a minimum of 0.5 inch to a maximum of 2.5 inches in diameter. Cuttings will be cut at a right angle at the wide end of the cutting (Appendix D).

Immediately after harvesting, the leaves, branches, and twigs will be carefully removed from each cutting to avoid damage to buds on the cutting. The cuttings will then be wrapped in burlap or other approved material that protects them from sunlight and allows for air circulation within the bundle. The bundled cuttings will be maintained in cool wet storage until just before planting, and will be planted within 24 hours of collection.

Planting holes will be excavated for all cuttings. Cuttings will be installed vertically, with the narrow end exposed and two thirds of the cutting buried below ground to ensure the development of adequate root mass. Fertilizer will not be applied during cutting installation. Watering basins will be constructed around cuttings, and plant protection cages will be installed to minimize herbivory. A 3-inch layer of bark mulch (this mulch could come from chipped woody vegetation removed as part of vegetation clearing activities [Section 7.2.1.2, Vegetation Clearing]) will be placed in each watering basin to reduce soil evaporation rates and help suppress weed growth.

Cuttings will be watered immediately after planting and will be inspected after watering to ensure that they have not settled. Any cuttings that have settled will be adjusted so the appropriate length is exposed above ground.

#### **7.2.4.3 Acorn Collection and Installation**

Caltrans will collect acorns to be planted at the re-established riparian mitigation sites. Acorns will be collected from source material using the following hierarchy: (1) Little Lake Valley, (2) Outlet Creek Basin, and (3) Eel River watershed. Acorns will be collected from various source materials to ensure the genetic diversity and viability of the acorns. Diseased or unhealthy source material will be avoided.

Acorns will be planted in the fall/winter after rainfall has saturated the soil to a depth of approximately 10 inches. A planting hole that is 1 foot deep by 1 foot wide will be hand

excavated or augured. If planting holes are augured, the sides will be scarified to allow roots to more easily penetrate the surrounding soil. Soil removed when the planting hole is created will be used as backfill and in constructing a watering basin.

Acorn planting will consist of planting three acorns at each planting hole. Acorns will be placed horizontally in the center of the basin, 0.5 inch to a maximum of 1 inch below finish grade, in a 9-inch equilateral triangle (Appendix D). Fertilizer will not be applied during acorn installation.

Watering basins may be constructed around all acorn plantings, and plant protection cages may be installed to minimize herbivory. A 3-inch layer of bark mulch (this mulch could come from chipped woody vegetation removed as part of vegetation clearing activities [Section 7.2.1.2, Vegetation Clearing]) will be placed in each watering basin to reduce soil evaporation rates and help suppress weed growth. The bark mulch should not be placed directly on top of the acorns (i.e., to prevent the acorns from developing mildew and losing their viability).

Acorn plantings will be watered immediately after planting.

#### **7.2.4.4 Plant Watering**

The goal of watering will be to provide sufficient water to successfully establish deep-rooted plants that are able to survive without supplemental irrigation. Caltrans will water woody and non-woody plants in the re-established wetland and riparian mitigation sites after planting and during the 3 year post-construction plant establishment maintenance period using an irrigation system, a water truck, or other appropriate method as necessary to ensure survival and meet performance standards and success criteria. Those areas that received the erosion control seed mix only (i.e., no container plants, cuttings, or acorns were planted) will not be watered. Watering frequency and application rates are discussed in Chapter 8.

Small isolated re-establishment sites may be truck-watered because the installation of an irrigation system might not be practical; larger re-establishment sites may be watered using a temporary drip irrigation system. Potential water sources are existing agricultural wells and City water lines (many of the creeks in Little Lake Valley are intermittent and, as such, cannot be used as a reliable water source). Water may be pulled directly from a well or water line or stored in large plastic tanks and pumped through a delivery system.

#### **7.2.5 Construction Inspections**

Caltrans will conduct progress inspections of the habitat re-establishment efforts to ensure that onsite mitigation is fully and properly completed. Areas not meeting the implementation standards outlined above will be reevaluated and replanted as necessary. At a minimum, Caltrans will perform inspections at the following critical stages of mitigation implementation.

- Placement and installation of ESA protective fencing.
- Installation of erosion control measures and use of BMPs.
- Site preparation/vegetation clearing operations.

- Salvage of wetland topsoil and seed material.
- Grading operations, including placement of stockpiled wetland topsoil.
- Seeding and planting operations.
- Irrigation system installation (if applicable) and initial plant watering.

### **7.2.6 Documentation of As-Built Conditions**

Within 45 days from the completion of onsite habitat re-establishment efforts, Caltrans will submit a complete set of as-built drawings to the resource agencies. The as-built drawings will be prepared using MicroStation (version 7 or later) software and will be at the same scale as the construction drawings. The as-built drawings will be prepared following standard landscape architecture protocols and practices. The as-built drawings will depict the features listed below.

- Re-established habitat, including planted and seeded areas.
- Updated plant palettes, including species, plant material type (e.g., tree band, 1 gallon, cutting, acorn), and number of plants planted by species.
- Updated seed mix, including application rates.
- Plant watering method, including water source identification, delivery system design, and application rates.
- Fences, gates, and access roads.
- Other pertinent mitigation features.

## **7.3 Offsite Mitigation Implementation**

Compensatory mitigation for permanent impacts to wetlands and other waters will be accomplished through a combination of establishment and rehabilitation on the offsite mitigation parcels. These mitigation actions are defined in Chapter 2 and presented again in this section. Offsite mitigation parcels and associated mitigation actions are shown in Appendices C, E and F. Mitigation actions, by offsite mitigation parcel, are listed in Table 7-2. A narrative summary of the information provided in these Appendices and Table 7-2 is presented below.

As described in Chapter 6, a mitigation credit scale was developed in coordination with the USACE. The credit values vary depending on the mitigation action and the level of intensity used to rehabilitate existing wetlands. This section defines establishment and rehabilitation as well as identifies the location and mitigation implementation measures associated with each category.

### **7.3.1 Mitigation Actions by Offsite Mitigation Parcel**

This section identifies mitigation actions proposed for each offsite mitigation parcel and the mitigation units associated with each parcel. Additional detail is provided for those offsite mitigation parcels where Group 1 wetland establishment is proposed. Additional information regarding mitigation techniques that will be used to implement the mitigation actions is provided in subsequent sections.

The following tables, figures, and appendices provide information on the location of existing resources, mitigation actions, and mitigation acreage.

- Tables 6-1, 6-2, and 6-3 identify the establishment and rehabilitation mitigation acreage for each offsite mitigation parcel.
- Appendix B identifies sensitive biological resources in the bypass alignment and associated impacts.
- Appendix C identifies the location of jurisdictional wetlands and the mitigation actions for the offsite mitigation parcels.
- Appendix E identifies the design plans for offsite establishment and rehabilitation. The mitigation construction plans and special provisions will include further details.
- Appendix F identifies the design plans for stream repair at Haehl and Upp Creeks in the project footprint and erosion control and headcut repair sites on the offsite mitigation parcels.
- Appendix J provides the hydrology and soil memoranda, dated July 29, 2010, and August 10, 2010, respectively, and a follow-up response memo for the Group 1 wetland establishment sites, and the results of a soil survey performed in August 2011 at the Group 2 wetland establishment sites.

#### **7.3.1.1 Benbow (APN 007-020-03)**

The mitigation goals for this Benbow parcel are wetland rehabilitation and other waters rehabilitation (Figures 2-1a and 2-1b, Appendices C and E). Wetland rehabilitation will be accomplished by removing grazing from the entire parcel and implementing Type 2 and Type 3 rehabilitation actions (Appendix C, Table 6-4). Type 2 rehabilitation actions will be implemented over the majority of the wet meadow. Type 3 rehabilitation actions will be implemented in wet meadow adjacent to the riparian corridor on the east side of the parcel.

Other waters rehabilitation will be accomplished by widening a portion of the riparian corridor adjacent to an unnamed drainage on the east side of the parcel. Native riparian vegetation will be planted in the riparian corridor.

#### **7.3.1.2 Benbow (APN 007-010-04)**

The mitigation goals for this Benbow parcel are wetland rehabilitation and other waters rehabilitation (Figures 2-1a and 2-1b, Appendices C and E). Wetland rehabilitation will be accomplished by removing grazing from the entire parcel and implementing Type 2, Type 3, and Type 5 rehabilitation actions (Appendix C, Table 6-4). Type 2 rehabilitation actions will be

implemented over the majority of the wet meadow. Type 3 rehabilitation actions will be implemented in wet meadow adjacent to riparian corridor on the east side of the parcel.

Other waters rehabilitation will be accomplished by widening riparian corridor adjacent to an unnamed drainage on the east side of the parcel. Native riparian vegetation will be planted in the riparian corridor.

### **7.3.1.3 Benbow (APN 108-040-13)**

The mitigation goals for this Benbow parcel are wetland establishment, wetland rehabilitation, and other waters rehabilitation (Figures 2-1a and 2-1b, Appendices C and E).

Wetland establishment at this parcel will consist of the establishment of three wet meadow units totaling 0.62 acre (Appendix C, Table 6-4). The design plans for offsite wetland establishment are in Appendix E. The wetland establishment areas are small inclusions of existing uplands within the wet meadow complex that will be lowered to match, or be slightly lower than, the elevation of adjacent wetland habitat and will be seasonally saturated or inundated by rainfall and/or groundwater. The Natural Resources Conservation Service (NRCS) soil survey indicates that the soil type in the wetland establishment area is the same as the adjacent wet meadow.

The newly graded wetlands will be tied into existing topographic contours. The excess soil from grading will be disposed of offsite. The established wetlands will be seeded and planted with native species. An unstable headcut in a seasonal swale will also be re-established and planted to reduce sedimentation to downstream sources.

Wetland rehabilitation will be accomplished by removing grazing from the entire parcel and implementing Types 2, 3, 4, and 5 rehabilitation actions (Appendix C, Table 6-4). Type 2 rehabilitation actions will be implemented over the majority of the wet meadow. Type 3 rehabilitation actions will be implemented in wet meadow adjacent to riparian corridor on the east side of the parcel. Type 4 rehabilitation will occur on the wetter northern end of the parcel, and Type 5 actions will consist of plantings within the riparian wetland on the east side of the parcel. Other waters rehabilitation will be accomplished by widening the riparian corridor adjacent to an unnamed drainage on the east side of the parcel.

### **7.3.1.4 Benbow (APN 108-030-07)**

The mitigation goal for this Benbow parcel is wetland rehabilitation (Figures 2-1a and 2-1b, Appendices C and E). Wetland rehabilitation will be accomplished by removing grazing from the southern portion of the parcel and implementing the Type 2 rehabilitation actions (Appendix C, Table 6-4). Isolated stands of Himalayan blackberry will be targeted for control and removal and replaced with native wetland species.

### **7.3.1.5 Benbow (APN 108-020-06)**

The mitigation goal for this Benbow parcel is wetland establishment (Figures 2-1a and 2-1b, Appendices C and E).

Wetland establishment at this parcel will consist of the establishment of four wet meadow units totaling 0.60 acre (Appendix C, Table 6-4). Wetland establishment at this parcel will consist of the establishment of wet meadow. The design plans for offsite wetland establishment are in Appendix D.

The wetland establishment areas are small inclusions of existing uplands within the wet meadow complex that will be lowered to match, or be slightly lower than, the elevation of adjacent wetland habitat and will be seasonally saturated or inundated by rainfall and/or groundwater. The NRCS soil survey indicates that the soil type in the wetland establishment area is the same as the adjacent wet meadow. The newly graded wetlands will be tied into existing topographic contours. The excess soil from grading will be disposed of offsite. The established wetlands will be seeded and planted with native species.

#### **7.3.1.6 Brooke (APN 108-020-03)**

The mitigation goal for this Brooke parcel is Type 5 wetland rehabilitation (Appendix C, Table 6-4). Grazing was removed several years ago and no other management actions were implemented. As a result, riparian and wetland vegetation has become established passively on the remainder of the parcel and is expected to continue to expand. Wetland rehabilitation actions will entail planting riparian species within the riparian wetland on the east side of the parcel adjacent to Mill Creek.

#### **7.3.1.7 Brooke (APN 108-030-01)**

Wetland mitigation credits are not proposed for this parcel. The mitigation goal for this Brooke parcel is passive wetland rehabilitation. Grazing was removed several years ago and no other management actions were implemented. As a result, riparian and wetland vegetation has become established passively on the remainder of the parcel and is expected to continue to expand. There are no performance standards or success criteria for this parcel because wetland mitigation credit is not proposed.

#### **7.3.1.8 Brooke (APN 038-020-11)**

Wetland mitigation credits are not proposed for this parcel. The mitigation goal for this Brooke parcel is passive wetland rehabilitation. Grazing was removed several years ago and no other management actions were implemented. As a result, riparian and wetland vegetation has become established passively on the remainder of the parcel and is expected to continue to expand. There are no performance standards or success criteria for this parcel because wetland mitigation credit is not proposed.

#### **7.3.1.9 Brooke (APN 038-040-09)**

Wetland mitigation credits are not proposed for this parcel. The mitigation goal for this Brooke parcel is passive wetland rehabilitation. Grazing was removed several years ago and no other management actions were implemented. As a result, riparian and wetland vegetation has become established passively on the remainder of the parcel and is expected to continue to expand. There

are no performance standards or success criteria for this parcel because wetland mitigation credit is not proposed.

#### **7.3.1.10 Ford (APN 108-010-05)**

The mitigation goals for this Ford parcel is are wetland rehabilitation. Wetland rehabilitation will be accomplished by planting a portion of the riparian corridor adjacent to Davis Creek with riparian vegetation. This planting area will provide Type 5 wetland rehabilitation credit (Appendix C, Table 6-4).

#### **7.3.1.11 Ford (APN 108-010-06)**

The mitigation goals for this Ford parcel are wetland establishment, wetland rehabilitation, and other waters rehabilitation. Wetland establishment at this parcel will consist of the establishment of wet meadow. The design plans for offsite wetland establishment are provided in Appendix E. Type 5 wetland rehabilitation and other waters rehabilitation will be accomplished by widening the riparian corridors adjacent to Outlet Creek, Old Outlet Creek, and Wild Oat Canyon Creek to enhance the existing creek channels, as well as repairing the eroding bank sections along Outlet Creek (Appendix C, Table 6-4)

Wetland establishment at this Ford parcel will consist of the establishment of 2.85 acres of wet meadow adjacent to US 101 (1:1 mitigation credit will be applied to this established wetland). Figure 7-3 provides a graphic representation of wetland establishment efforts at the Ford parcel and Appendix E provides the same information in a technical format.

As described in Section 5.3.4.5 in Chapter 5, Baseline Information, existing soil at this parcel and in the area to be graded is composed of mostly Haplaquets (0–1% slopes) and a small area of Pinole gravelly loam (2–8% slopes) alongside US 101. Haplaquets is a poorly drained soil with surface soils consisting of clay loam (no profile is provided in the NRCS soil survey). Pinole gravelly loam is a well drained soil made up of gravelly loam from 0 to 10 inches, gravelly clay loam from 10 to 37 inches, and sandy clay loam and gravelly sandy clay loam from 37 to 61 inches deep. Based on a review of the NRCS soil survey and the wetland delineation results for this Ford parcel, existing wet meadow and mixed marsh occur on both the Haplaquet and Pinole soil map units (Wildlands 2008). The Pinole map unit also supports upland habitat. The wetland delineation did not include site-specific soil sample data points at the wetland establishment site. This parcel remains ponded into the late spring and provides saturated soil conditions that provide wetland hydrology. This is evidenced by the existing jurisdictional wetlands that surround the wetland establishment site.

As described in Section 5.1.3 in Chapter 5, Baseline Information, groundwater hydrology in Little Lake Valley is related to the aquifer underlying the valley. The upper portion of the aquifer occurs in alluvium that is composed of silt, clay, gravel, and sand (Farrar 1986). The presence of sheets of fine-grained sediments causes much of the aquifer to be confined or semiconfined. Based on well elevations and the presence of the large marsh at the northern end of Little Lake Valley, it is very likely that the upper portion of the water table is close to the ground surface. Overall, in Little Lake Valley, including this parcel, it is difficult to determine with certainty that the water is not perched on impermeable layers located above the main aquifer. If the water is

perched, the primary source of water to support the wetlands on this Ford parcel is rainfall (average annual precipitation of 50 inches per year) and surface runoff. If the water represents the upper portion of the main aquifer, the wetlands on the Ford parcel are supported by the aquifer as a whole. In either case, the presence of seasonally ponded wetlands adjacent to the wetland establishment site indicates that water is available for wetland establishment.

Test pits were dug and groundwater monitoring wells have been installed at the Frost, Goss, Huffman, Lusher, and MGC Plasma North parcels as part of studies related to North Coast semaphore grass (Caltrans 2010). These test pits are on wetland establishment parcels or are in close proximity to wetland establishment parcels. The test pits, which were dug during March 2010, generally found water within 10 inches of the ground surface. The monitoring wells at the wetland establishment sites found water within 12 inches of the soil surface during April 2010 and 29 inches of the soil surface during May 2010, indicating that water levels remain close to the soil surface through a large portion of the spring. The results from the test pits and groundwater monitoring wells indicate that water would likely be present in the wetlands into May during wet years. Results from the wetland delineation surveys indicate that during drier years, the wetlands may be dry as early as May. This timeframe is appropriate for hydrology to support wet meadow.

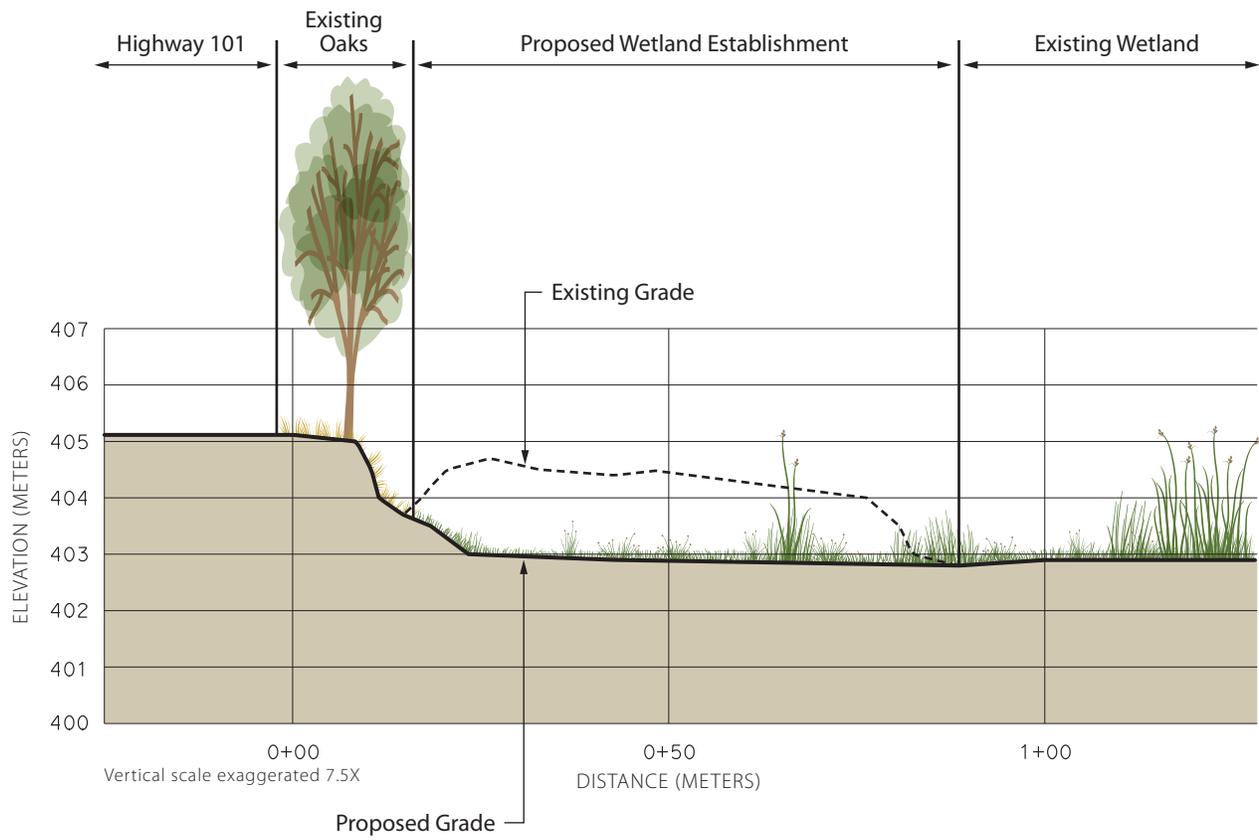
Surface hydrology at this Ford parcel appears to be influenced by rainfall, overflow from adjacent drainages, and seasonal high groundwater. Old Outlet Creek and Wild Oat Canyon Creek form the eastern and southern boundaries, respectively, of the existing wetland complex. High flows in the creeks seasonally inundate the wetlands. This wetland complex also occurs in the northern portion of Little Lake Valley where a lake historically formed during the rainy season, even during very low rainfall years (Dean 1920). As part of wetland establishment actions at the Ford parcel, current hydrology will be altered to allow for greater overland flow from an artificial drainage adjacent to the wetland establishment site.

Wetland establishment will be accomplished by grading an upland overburden area adjacent to existing wet meadow and mixed marsh habitat in the northeast corner of the parcel to establish additional wet meadow habitat. The established wetland will be tied into existing topographic contours and will be excavated (average range of 0 to 6.17 feet) to a depth comparable to adjacent wetlands to provide for seasonal inundation to a depth of 6–12 inches. Approximately 20,493 cubic yards will be removed (cut) to establish the wetland. No topsoil importation is planned for the wetland as existing topsoil from the graded area will be harvested (approximately the top 4 inches) and stockpiled for later use in topdressing the established wetland. Topsoil will be stockpiled in upland areas outside ESA boundaries. Caltrans has determined that the excess soil from grading (20,493 cubic yards) will be suitable for fill material within the project footprint.

#### **7.3.1.12 Ford (APN 108-020-04)**

The mitigation goals for this Ford parcel are wetland establishment, wetland rehabilitation, and other waters rehabilitation (Figures 2-1a and 2-1b, Appendices C and E).

Wetland establishment at this parcel will consist of Group 2 wetland establishment totaling 2.85 acres (Appendix C, Table 6-4). The design plans for offsite wetland establishment are in



**Notes:**

1. Existing grade will be lowered to proposed grade to establish wetland.
2. This graphic is based on Section A from Appendix D, "Design Plans for Onsite Riparian and Wetland Restoration and Offsite Wetland Establishment," (pages D-34 and D-35).

**Figure 7-3**  
**Wetland Establishment at Ford Parcel (APN 108-010-06)**  
 Willits Bypass Project



Appendix E. The wetland establishment area is an area of existing upland between an existing wet meadow complex and the riparian corridor. The wetland establishment area is an area of existing upland between an existing wet meadow complex and the riparian corridor. The upland appears to be composed of both a low, natural levee and the placement of soil to widen the natural levee. The established wetland footprint will extend from north end of this parcel south onto the adjacent Ford parcel (APN 108-030-02).

Wetland grading will consist of lowering a portion of this upland to match, or be slightly lower than, the elevation of the adjacent wet meadow located to the west. The wetland establishment site is expected to support wet meadow because the established wetland will share similar surface and groundwater characteristics as the existing wet meadow (i.e., it will be seasonally saturated or inundated by rainfall and/or is subject to a seasonal shallow groundwater table). The newly graded wetlands will be tied into existing topographic contours. The excess soil from grading will be disposed of offsite. The established wetlands will be seeded and planted with native wetland species.

Preliminary soil evaluations were performed by a soil scientist on the adjoining Ford parcels in August 2011. A geomorphologist also participated in the survey to evaluate the condition of the existing land surface and its feasibility to establish wetlands. Twelve soil pits were described; nine of which were placed in existing upland and the remaining three soil pits were located in the adjacent wet meadow to serve as reference areas. The soil profile and site description forms are provided in Appendix J. The survey results indicate that the soil type and range of soil characteristics in the proposed wetland establishment area are similar to the range of soils in the adjacent wet meadow.

As identified on the soil profile and site description forms in Appendix J, as mapped by the NRCS, the existing soil map unit in seven of the nine upland soil pits was Fluvaquents. The soil map units for the other two upland pits were Gielow and Gielow/Fluvaquents. Two of the wetland reference site soil units were Gielow, the other was Fluvaquents. The slope gradient in the upland sample locations was variable, ranging from 0 – 2% depending on location. The slope gradient in the wetland sample locations was variable, ranging from 0 – 3% depending on location. The survey results, as expected, were variable between the uplands and wetland reference sites; however, the upland and wetland reference sites shared similar soil texture, soil structure, redoximorphic features, and permeability (inferred).

The depth to soil saturation was greater than 20 inches in all of the soil pits; however, moist soil conditions were observed in one of the upland soil pits at a depth of 24 inches. The absence of soil moisture in the upland and wetland reference soil pits is not unexpected based on the date on which the surveys were performed.

Wetland inundation surveys were performed for the offsite mitigation parcels beginning in December 2010. The surveys were performed through May of 2011. Based on preliminary wetland survey results, which were reported in a baseline report prepared by Caltrans (California Department of Transportation 2011), the majority of the adjacent wetland was inundated for at least one month with some areas ponded for two months. Approximately one-half of the uplands proposed for wetland establishment were also inundated for at least one month. The wetland

inundation surveys did not assess soil saturation but it is presumed that some of the upland soils may also have been saturated for an extended period of time during the winter of 2010-2011.

The proposed establishment site was also surveyed by a geomorphologist to evaluate the condition of the existing land surface and its feasibility to establish wetlands. It was determined that the proposed grading area would not encroach on or impair the existing natural levee. The eastward limit of the wetland boundary was identified by the geomorphologist based on site characteristics. The geomorphologist also evaluated the area for the potential for overbank flow and sediment deposition. Based on this assessment, the extreme north end of the proposed wetland area was dropped from consideration. The proposed wetland boundary reflects this assessment.

#### **7.3.1.13 Ford (APN 108-030-02)**

The mitigation goals for this Ford parcel are wetland establishment, wetland rehabilitation, and other waters rehabilitation (Figures 2-1a and 2-1b, Appendices C and E).

Wetland establishment at this parcel will consist of Group 2 wetland establishment totaling 1.18 acres (Appendix C, Table 6-4). The established wetland footprint will extend from this parcel to the north end of the adjacent Ford parcel (APN 108-020-04). Soil survey information for this wetland establishment site is described in Section 7.3.1.12. The design plans for offsite wetland establishment are in Appendix E. The wetland establishment area is an area of existing upland between an existing wet meadow complex and the riparian corridor.

Wetland rehabilitation will be accomplished by removing grazing from portions of the parcel and implementing Type 2 and Type 5 rehabilitation actions (Appendix C, Table 6-4). Type 2 rehabilitation actions will occur where grazing will be removed from existing wet meadow on the parcel. Type 5 rehabilitation actions will occur on a portion of Old Outlet Creek. Other waters rehabilitation will be accomplished by widening the riparian corridors adjacent to Outlet Creek and Old Outlet Creek. Native riparian vegetation will be planted in the riparian corridor.

#### **7.3.1.14 Ford (APN 108-030-05)**

The mitigation goal for this Ford parcel is wetland rehabilitation (Figures 2-1a and 2-1b, Appendices C and E). Wetland rehabilitation will be accomplished by removing grazing from the entire parcel and implementing Type 2 and Type 3 and Type 5 rehabilitation actions (Appendix C, Table 6-4). Type 2 rehabilitation actions will be implemented over the majority of the wet meadow. Type 3 rehabilitation actions will be implemented in wet meadow in the southern portion of the parcel. Type 5 rehabilitation actions will occur on a portion of Outlet Creek. Other waters rehabilitation will be accomplished by widening the riparian corridors adjacent to Outlet Creek. Native riparian vegetation will be planted in the riparian corridor.

#### **7.3.1.15 Frost (APN 108-070-04)**

The mitigation goal for the Frost parcel is other waters rehabilitation. Other waters rehabilitation will be accomplished by repairing a complex of headcuts to reduce sedimentation to Berry Creek. The headcut repair area will be permanently fenced to exclude cattle. A total of 0.27

acre of Type 4 wetland rehabilitation will be available within the cattle exclusion area (Appendix C, Table 6-4). Appendix E presents the conceptual wetland design. Rehabilitation actions include grading channel banks to lessen the slope and installing in-channel grade control structures. The rehabilitation areas will be seeded and planted with native species.

#### **7.3.1.16 Goss (APN 103-230-02)**

The mitigation goal for the Goss parcel is wetland establishment. Wetland establishment is discussed in detail in Section 7.3.1.18, MGC Plasma Middle.

#### **7.3.1.17 Lusher (APN 108-030-04)**

The mitigation goals for this parcel are wetland establishment, wetland rehabilitation, and other waters rehabilitation (Figures 2-1a and 2-1b and Appendices C and E).

Wetland establishment at this parcel will consist of Group 2 wetland establishment totaling 1.65 acres (Appendix C, Table 6-4). The design plans for offsite wetland establishment are in Appendix E. The wetland establishment area is an area of existing upland between an existing wet meadow complex and the riparian corridor.

Wetland grading will consist of lowering a portion of this upland to match, or be slightly lower than, the elevation of the adjacent wet meadow located to the west. The wetland establishment site is expected to support wet meadow because the established wetland will share similar surface and groundwater characteristics as the existing wet meadow (i.e., it will be seasonally saturated or inundated by rainfall and/or is subject to a seasonal shallow groundwater table). The newly graded wetlands will be tied into existing topographic contours. The excess soil from grading will be disposed of offsite. The established wetlands will be seeded and planted with native wetland species.

Preliminary soil evaluations were performed by a soil scientist on the adjoining Ford parcels in August 2011. A geomorphologist also participated in the survey to evaluate the condition of the existing land surface and its feasibility to establish wetlands. Four soil pits were described; three of which were placed in existing upland and the remaining pit was located in the adjacent wet meadow to serve as reference area. The soil profile and site description forms are provided in Appendix J. The survey results indicate that the soil type and range of soil characteristics in the proposed wetland establishment area are similar to the range of soils in the adjacent wet meadow.

As identified on the soil profile and site description forms in Appendix J, as mapped by the NRCS, the existing soil map unit in two upland soil pits was Gielow, the other was Fluvaquents. The soil map unit for the wetland reference site was Gielow. The slope gradient in the upland sample locations was variable, ranging from 1 – 2% depending on location. The slope gradient in the wetland sample location was from 0 – 1%. The survey results, as expected, were variable between the uplands and wetland reference sites; however, the upland and wetland reference sites shared similar soil texture, soil structure, redoximorphic features, and permeability (inferred). The depth to soil saturation was greater than 20 inches in all of the soil pits. The

absence of soil moisture in the upland and wetland reference soil pits is not unexpected based on the date on which the surveys were performed.

Wetland inundation surveys were performed for the offsite mitigation parcels beginning in December 2010. The surveys were performed through May of 2011. Based on preliminary wetland survey results, which were reported in a baseline report prepared by Caltrans (California Department of Transportation 2011), the portions of the adjacent wetland were inundated for two to four months. Portions of the uplands proposed for wetland establishment were inundated for at least one to two months. The wetland inundation surveys did not assess soil saturation but it is presumed that some of the upland soils may also have been saturated for an extended period of time during the winter of 2010-2011.

The proposed establishment site was also surveyed by a geomorphologist to evaluate the condition of the existing land surface and its feasibility to establish wetlands. It was determined that the proposed grading area would not encroach on or impair the existing levee. The eastward limit of the wetland boundary was identified by the geomorphologist based on site characteristics. The geomorphologist also evaluated the area for the potential for overbank flow and sediment deposition, no concerns were identified.

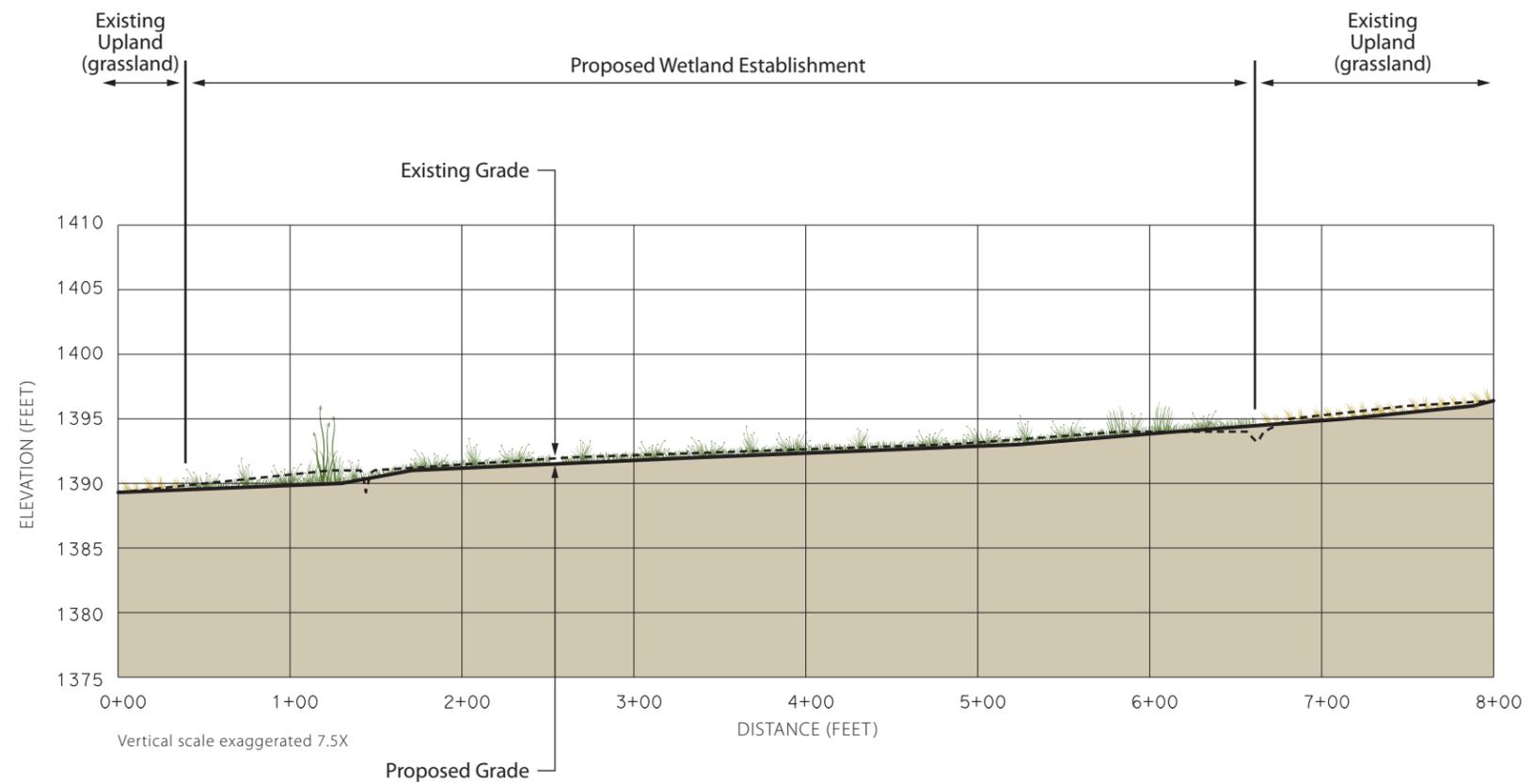
The newly graded wetlands will be tied into existing topographic contours. The excess soil from grading will be disposed of offsite. The established wetlands will be seeded and planted with native species. Wetland rehabilitation will be accomplished by removing grazing from portions of the parcel and implementing Type 2 rehabilitation actions.

Type 5 wetland rehabilitation and other waters rehabilitation will be accomplished by planting riparian species adjacent to Outlet Creek, Old Outlet Creek, and Mill Creek to establish Category I riparian corridors (Appendix C, Table 6-4). Native riparian vegetation will be planted in the riparian corridor. Two unstable headcuts in a seasonal swale will also be re-established and planted to reduce sedimentation to downstream sources. Appendix F presents the grading and planting plan for the headcut repair areas.

### **7.3.1.18 MGC Plasma Middle (APN 103-250-14)**

The mitigation goal for the MGC Plasma Middle parcel is wetland establishment. Wetland establishment at MGC Plasma (includes both Middle and North parcels) and Goss offsite mitigation parcels will consist of the establishment of a 7.47-acre wetland that spans portions of all three parcels (1:1 mitigation credit will be applied to this established wetland). Figure 7-4 provides a graphic representation of wetland establishment efforts at the MCG Plasma/Goss parcels. Appendix E presents the grading and planting plan for the established wetland.

As described in Section 5.3.9.3 in Chapter 5, Baseline Information, existing soil at these parcels and in the area to be graded is composed of Gielow sandy loam (0–5% slopes), Cole clay loam (0–2% slopes) and Clear Lake clay (0–2% slopes). Gielow sandy loam is a somewhat poorly drained soil with sandy loam from 0 to 4 inches, loam from 4 to 11 inches, and stratified sandy to clay loam from 11 to 60 inches deep. Cole clay loam is a somewhat poorly drained soil with clay loam from 0 to 8 inches, silty clay from 41 to 60 inches, and silty clay loam from 41 to 60 inches deep. Clear Lake clay is a poorly drained soil with clay from 0 to 49 inches and clay loam from



**Notes:**

1. Existing grade will be lowered to proposed grade to establish wetland.
2. This graphic is based on Section A from Appendix D, "Design Plans for Onsite Riparian and Wetland Restoration and Offsite Wetland Establishment," (pages D-45, D-46, and D-47).

**Figure 7-4**  
**Wetland Establishment at MGC Plasma Middle and North Parcels (APN 103-230-06)**  
**and Goss Parcel (APN 103-230-02)**  
 Willits Bypass Project



49 to 65 inches deep. These soils are all somewhat poorly drained and their reduced water infiltration rates allow for seasonal inundation and saturated soil conditions during the rainy season, thereby providing conditions for wetland hydrology. This is evidenced by the existing jurisdictional wetlands that surround the wetland establishment site.

As described in Section 5.1.3 in Chapter 5, Baseline Information, groundwater hydrology in Little Lake Valley is related to the aquifer underlying the valley. The upper portion of the aquifer occurs in alluvium that is composed of silt, clay, gravel, and sand (Farrar 1986). The presence of sheets of fine-grained sediments causes much of the aquifer to be confined or semiconfined. Overall within Little Lake Valley, including these parcels, it is difficult to determine with certainty that the water is not perched on impermeable layers located above the main aquifer. If the water is perched, the primary source of water to support the wetlands on these parcels is rainfall (average annual precipitation of 50 inches per year) and surface runoff. If the water represents the top of the main aquifer, the wetlands on these parcels are supported by the aquifer as a whole. In either case, the presence of seasonally saturated wetlands adjacent to the established wetland site indicates that water is available for wetland establishment.

Test pits were dug and groundwater monitoring wells have been installed at the MCG Plasma North/Goss parcels as part of studies related to North Coast semaphore grass (Caltrans 2010). The test pits, which were dug during March 2010, generally found water within 10 inches of the ground surface. The monitoring wells at the wetland establishment sites found water within 12 inches of the soil surface during April 2010 and within 29 inches of the soil surface during May 2010, indicating that water levels remain close to the soil surface through a large portion of the spring. The results from the test pits and groundwater monitoring wells indicate that water would likely be present in the wetlands through May during wet years. Results from the wetland delineation surveys indicate that during drier years, the wetlands may be dry as early as May. This timeframe is appropriate for hydrology to support wet meadow.

Surface hydrology at these parcels and in the area to be graded includes artificial drainages that drain water from the parcels into adjacent streams and other drainages. On the Goss parcel, hydrology is currently influenced by a series of artificial drainages apparently intended to drain sufficient surface water away from the center of the parcel to enable hay production and livestock grazing. These drainages form the western, southern, and eastern boundaries of the parcel, generally direct surface water flows from south to northwest. An additional artificial drainage bisects the parcel, draining surface water from southeast to northwest, and includes a corrugated metal culvert that allows equipment to access the south end of the parcel for mowing. It appears that excavation of this feature has allowed the northeast corner of the Goss parcel to develop into or to remain as upland.

As part of wetland establishment actions at the Goss parcel, the surface water hydrology will be altered. Artificial drainages, ranging from approximately 6 inches to 1 foot deep, will be regraded into wider, shallower swales. The swales will continue to drain water in the same direction, but will reduce runoff times and increase the residence time of water on the parcel. Additionally, some of the surface flow in the swales will be redirected into established depressional wetlands that will be located adjacent to the swales and to the existing wet meadow complex. Areas of slightly higher elevations will be lowered to tie together the existing swales and established swales. One large swale wetland complex will be established.

On the MGC Plasma parcels, a remnant stream channel is apparent that likely flowed through the two MGC Plasma parcels from southeast to northwest. As part of wetland establishment actions at the MGC Plasma parcels, the current hydrology will be altered. Artificial drainages, ranging from approximately 6 inches to 1 foot deep, occur at several locations on these parcels and will be regraded into wider, shallower swales or converted to wet meadow. The swales will continue to drain water in the same direction, but will reduce runoff times and increase the residence time of water on the parcel.

Wetland establishment will be accomplished by grading uplands adjacent to existing wet meadow to establish additional wet meadow habitat. The newly graded wetland will be tied into existing topographic contours. The established wetland will be excavated to a depth comparable to adjacent wetlands (average range of 0 to 1.16 feet). Approximately 3,428 cubic yards will be removed (cut) to establish the wetland. No topsoil importation is planned for the wetland because existing topsoil from the graded area will be harvested (approximately the top 4 inches) and stockpiled for later use in topdressing the established wetland. Topsoil will be stockpiled in upland areas outside ESA boundaries. The excess soil from grading (3,428 cubic yards) will be disposed of offsite.

#### **7.3.1.19 MGC Plasma North (APN 103-230-06)**

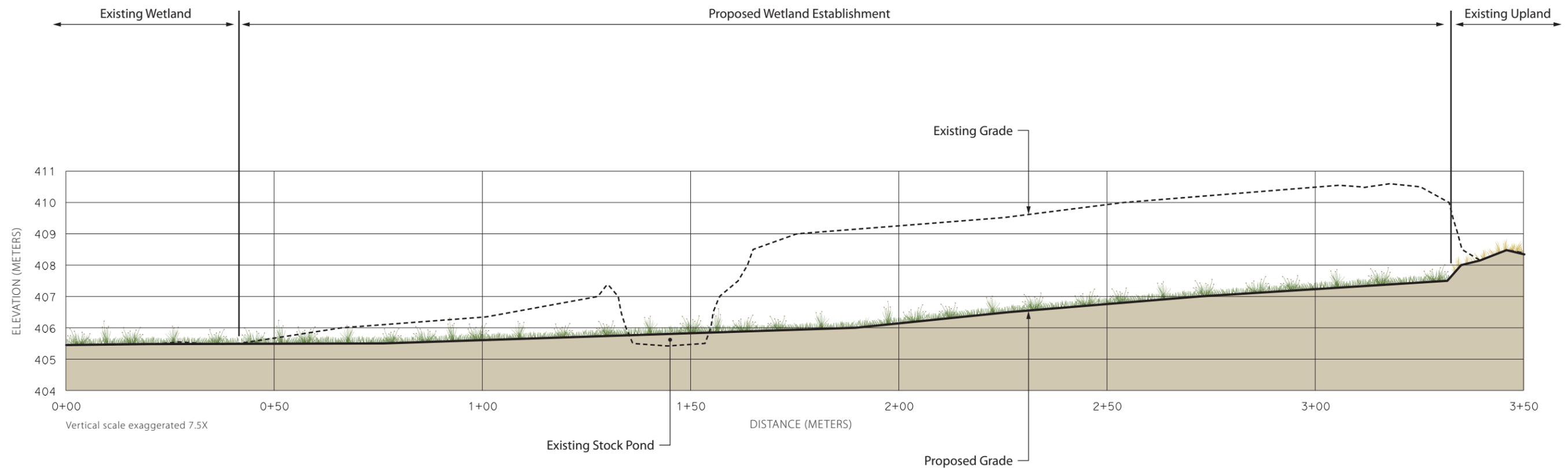
The mitigation goal for the MGC Plasma North parcel is wetland establishment. Wetland establishment is discussed in detail in Section 7.3.1.18, MGC Plasma Middle.

#### **7.3.1.20 Niesen (APN 108-040-02)**

The mitigation goal for the Niesen parcel is wetland establishment and wetland rehabilitation. Wetland establishment at the Niesen parcel will include the establishment of a 5.87-acre wetland adjacent to US 101 (1:1 mitigation credit will be applied to this established wetland). Figure 7-5 provides a graphic representation of wetland establishment efforts at the Niesen parcel and Appendix E, provides the same information in a technical format. Wetland rehabilitation will be accomplished by removing grazing from portions of the parcel and implementing Type 4 rehabilitation actions (Appendix C, Table 6-4).

As described in Section 5.3.11.3 in Chapter 5, Baseline Information, existing soil at this parcel and in the area to be graded is composed of Gielow sandy loam (0%–5% slopes) and Cole Clay loam. Gielow sandy loam is a somewhat poorly drained soil with sandy loam from 0 to 4 inches, loam from 4 to 11 inches, and stratified sandy to clay loam from 11 to 60 inches deep. In general, because Gielow sandy loam is somewhat poorly drained, it has reduced water infiltration rates that allow for seasonal inundation and saturated soil conditions during the rainy season, thereby providing conditions for wetland hydrology. This is evidenced by the existing jurisdictional wetlands that surround the wetland establishment site.

As described in Section 5.1.3 in Chapter 5, Baseline Information, groundwater hydrology in Little Lake Valley is related to the aquifer underlying the valley. The upper portion of the aquifer occurs in alluvium that is composed of silt, clay, gravel, and sand (Farrar 1986). The presence of sheets of fine-grained sediments causes much of the aquifer to be confined or semiconfined. Overall within Little Lake Valley, including this parcel, it is difficult to determine with certainty



**Notes:**

1. Existing grade will be lowered to proposed grade to establish wetland.
2. This graphic is based on Section B from Appendix D, "Design Plans for Onsite Riparian and Wetland Restoration and Offsite Wetland Establishment," (pages D-39 and D-40).

**Figure 7-5**  
**Wetland Establishment at Niesen Parcel (APN 108-040-02)**  
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that the water is not perched on impermeable layers located above the main aquifer. If the water is perched, then the primary source of water to support the wetlands on this parcel is rainfall (average annual precipitation of 50 inches per year) and surface runoff. If the water represents the top of the main aquifer, then the wetlands on this parcel are supported by the aquifer as a whole. In either case, the presence of seasonally saturated wetlands adjacent to the established wetland site indicates that water is available for wetland establishment.

Test pits were dug and groundwater monitoring wells have been installed at the Frost, Goss, Huffman, Lusher, and MCG Plasma North parcels as part of studies related to North Coast semaphore grass (Caltrans 2010). These test pits are on wetland establishment parcels or are in close proximity to wetland establishment parcels. The test pits, which were dug during March 2010, generally found water within 10 inches of the ground surface. The monitoring wells at the wetland establishment sites found water within 12 inches of the soil surface during April 2010 and within 29 inches of the soil surface during May 2010 indicating that water levels remain close to the soil surface through a large portion of the spring. The results from the test pits and groundwater monitoring wells indicate that water would likely be present in the wetlands through May during wet years. Results from the wetland delineation surveys indicate that during drier years, the wetlands may be dry as early as May. This timeframe is appropriate for hydrology to support wet meadow.

Surface hydrology at the Niesen parcel and in the area to be graded is variable. In general rainfall either percolates into the soil or occurs as surface runoff that flows downslope to an existing adjacent wet meadow. The current hydrology will be altered as part of wetland establishment actions. As described below the land surface 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 property boundary. An existing swale will be modified so that some of the drainage flows overland to support the established wet meadow. Additional surface hydrology will be provided by rainfall and surface runoff from the slope area east of existing US 101.

Wetland establishment will be accomplished by grading an upland overburden area to match the elevation of adjacent wet meadow habitat and establish additional wet meadow habitat. The newly graded wetland will be tied into existing topographic contours. The established wetland will be excavated to a depth comparable to adjacent wetlands (average range of 0 to 11.84 feet) to provide for seasonal soil saturation. Approximately 43,459 cubic yards will be removed (cut) to establish the wetland. No topsoil importation is planned for the wetland because existing topsoil from the graded area will be harvested (approximately the top 4 inches) and stockpiled for later use in topdressing the established wetland. Topsoil will be stockpiled in upland areas outside ESA boundaries. Caltrans has determined that the excess soil from grading (43,459 cubic yards) will be suitable for fill material within the project footprint.

#### **7.3.1.21 Watson East (APN 037-221-30)**

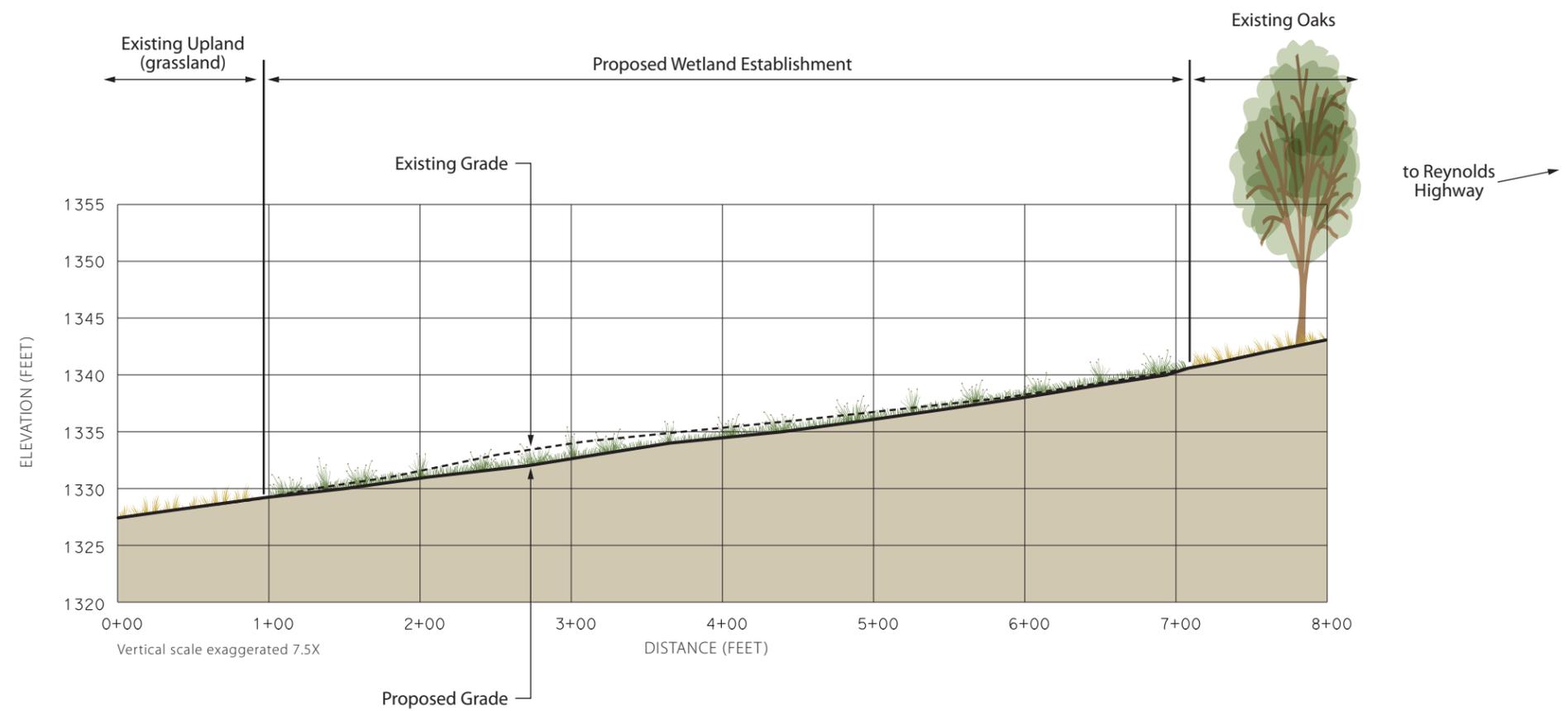
The mitigation goal for the Watson East parcel is wetland establishment and Type 1 and Type 3 wetland rehabilitation. Wetland establishment at the Watson East parcel will include the establishment of Group 1 and Group 2 wet meadow. Group 1 wetland establishment at the Watson East parcel will include the establishment of 8.34 acres of wet meadow (1:1 mitigation credit will be applied to this established wetland). Group 2 wetland establishment at the Watson

East parcel will consist of the establishment of 0.51 acre of wet meadow for which mitigation credits will be applied. The Group 2 wetlands are in existing upland in an existing wet meadow complex and the wetland design will be similar to the design for the Group 1 wetlands. These areas will be lowered to match, or be slightly lower than, the elevation of adjacent wetland habitat and will be seasonally saturated or inundated by rainfall and/or groundwater. Figure 7-6 provides a graphic representation of the Group 1 wetland establishment efforts at the Watson East parcel and Appendix E presents the construction design for Group 1 and 2 wetlands.

The Group 1 wetlands were presented in the 2010 MMP. As described in Section 5.3.13.3 in Chapter 5, Baseline Information, existing soil at this parcel and in the area to be graded is composed of Feliz clay loam (gravelly substratum, 2%–8% slopes) and Cole clay loam (0%–2% slopes). Feliz clay loam gravelly substratum is a well drained soil comprised of clay loam from 0 to 46 inches and very gravelly clay loam from 46 to 63 inches deep. Cole clay loam is a somewhat poorly drained soil with clay loam from 0 to 8 inches, silty clay from 41 to 60 inches, and silty clay loam from 41 to 60 inches deep. Although the Feliz clay loam is well drained, soil survey information from 1920 (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. This area of Little Lake Valley remains wet into the late spring and provides saturated soil conditions that provide wetland hydrology. This is evidenced by the existing jurisdictional wetlands that surround the two wetland establishment sites.

As described in Section 5.1.3 in Chapter 5, Baseline Information, groundwater hydrology in Little Lake Valley is related to the aquifer underlying the valley. The upper portion of the aquifer occurs in alluvium that is composed of silt, clay, gravel, and sand (Farrar 1986). The presence of sheets of fine-grained sediments causes much of the aquifer to be confined or semiconfined. Overall within Little Lake Valley, including these parcels, it is difficult to determine with certainty that the water is not perched on impermeable layers located above the main aquifer. If the water is perched, the primary source of water to support the wetlands on these parcels is rainfall (average annual precipitation of 50 inches per year) and surface runoff. If the water represents the top of the main aquifer, the wetlands on these parcels are supported by the aquifer as a whole. In either case, the presence of seasonally saturated wetlands adjacent to the established wetland sites indicates that water is available for wetland establishment.

Test pits were dug and groundwater monitoring wells have been installed at the Frost, Goss, Huffman, Lusher, and MCG Plasma North parcels as part of studies related to North Coast semaphore grass (Caltrans 2010). These test pits are on wetland establishment parcels or are in close proximity to wetland establishment parcels. The test pits, which were dug during March 2010, generally found water within 10 inches of the ground surface. The monitoring wells at the wetland establishment sites found water within 12 inches of the soil surface during April 2010 and within 29 inches of the soil surface during May 2010, indicating that water levels remain close to the soil surface through a large portion of the spring. The results from the test pits and groundwater monitoring wells indicate that water would likely be present in the wetlands through May during wet years. Results from the wetland delineation surveys indicate that during drier years, the wetlands may be dry as early as May. This timeframe is appropriate for hydrology to support wet meadow.



**Notes:**

- Existing grade will be lowered to proposed grade to establish wetland.
- This graphic is based on Section B from Appendix D, "Design Plans for Onsite Riparian and Wetland Restoration and Offsite Wetland Establishment," (pages D-53, D-54, and D-55).

**Figure 7-6**  
**Wetland Establishment at Watson (Eastern) Parcel (APN 037-221-30)**  
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Surface hydrology at the Watson East parcel and in the area to be graded is influenced by Berry Creek, which dissipates into an alluvial fan at the southwest boundary of the parcel. Two intermittent streams occur on the eastern half of the parcel. The southernmost of these streams drains onto the parcel from the east and eventually dissipates into a wet meadow area. This drainage is channelized from the point where it enters the Watson East parcel to its terminus in the wet meadow. The other intermittent stream is located in the northeast corner of the parcel and flows from an area east of Reynolds Highway onto the parcel before dissipating into a wet meadow. The western portion of the parcel is subject to frequent and long-duration ponding, flooding, and/or a seasonally high water table during the winter months. As part of wetland establishment actions at the Watson East parcel, the current hydrology will be altered by grading the northern drainage so that the flow is spread out into the center of the parcel.

Wetland establishment will be accomplished for the north wetland by grading uplands adjacent to existing wet meadow to establish additional wet meadow habitat. The newly graded wetlands will be tied into existing topographic contours. The north established wetland will be excavated to a depth comparable to adjacent wetlands (average range of 0 to 1.59 feet). Wetland establishment will be accomplished for the south wetland by grading to pull back the existing slope and creating a larger wet meadow at the base of the new slope. The south established wetland will be excavated to a depth comparable to adjacent wetlands (average range of 0 to 1.45 feet). Approximately 6,899 cubic yards will be removed (cut) to establish the two wetlands (4,482 cubic yards from the northern wetland and 2,417 cubic yards from the southern wetland). The wetlands will be over-excavated to accommodate topsoil/plant duff containing Baker's meadowfoam seed and plant material. This topsoil/plant duff will be placed as an approximately 4-inch topdressing in both established wetlands (4,483 cubic yards for both wetlands). The excess soil from grading (6,899 cubic yards) will be disposed of offsite.

#### **7.3.1.22 Watson (APN 037-250-05)**

The mitigation goal for this Watson parcel is wetland rehabilitation (Figures 2-1a and 2-1b, Appendices C and E). Wetland rehabilitation will be accomplished by removing grazing and haying from the entire parcel and implementing Type 1 rehabilitation actions (Appendix C, Table 6-4).

#### **7.3.1.23 Wildlands (APN 108-070-08)**

The mitigation goals for this Wildlands parcel are wetland rehabilitation and other waters rehabilitation (Figures 2-1a and 2-1b, Appendices C and E). Wetland rehabilitation will be accomplished by removing grazing from portions of the parcel and implementing Type 3, Type 4, and Type 5 rehabilitation actions (Appendix C, Table 6-4). Type 3 rehabilitation actions will be implemented in wet meadow subject to seasonal soil saturation that is less frequently or not inundated. Type 4 rehabilitation actions will be implemented in wet meadow that is subject to seasonal soil saturation. Type 5 rehabilitation will be wetland riparian plantings within the Davis Creek corridor. Other waters rehabilitation will be accomplished by widening the riparian corridor adjacent to Davis Creek with native riparian vegetation will be planted in the riparian corridor.

### 7.3.1.24 Wildlands (APN 108-070-09)

The mitigation goals for this Wildlands parcel are wetland establishment, wetland rehabilitation, and other waters rehabilitation (Figures 2-1a and 2-1b, Appendices C and E). Wetland establishment at this parcel will consist of Group 2 wetland establishment totaling 1.30 acres (Appendix C, Table 6-4). The design plans for offsite wetland establishment are in Appendix E.

The wetland establishment area is an area of existing upland between an existing wet meadow complex and the riparian corridor. The upland appears to be composed of both a low, natural levee and the placement of soil to widen the natural levee. The established wetland footprint will extend from this parcel north onto the adjacent Wildlands parcel (APN 108-060-01).

Wetland grading will consist of lowering a portion of this upland to match, or be slightly lower than, the elevation of the adjacent wet meadow located to the east. The wetland establishment site is expected to support wet meadow because the established wetland will share similar surface and groundwater characteristics as the existing wet meadow (i.e., it will be seasonally saturated or inundated by rainfall and/or is subject to a seasonal shallow groundwater table). The newly graded wetlands will be tied into existing topographic contours. The excess soil from grading will be disposed of offsite. The established wetlands will be seeded and planted with native wetland species.

Preliminary soil evaluations were performed by a soil scientist on the adjoining Wildlands parcels in August 2011. A geomorphologist also participated in the survey to evaluate the condition of the existing land surface and its feasibility to establish wetlands. Five soil pits were described; three of which were placed in existing upland and the remaining two soil pits were located in the adjacent wet meadow to serve as reference areas. The soil profile and site description forms are provided in Appendix J. The survey results indicate that the soil type and range of soil characteristics in the proposed wetland establishment area are similar to the range of soils in the adjacent wet meadow.

As identified on the soil profile and site description forms in Appendix J, as mapped by the NRCS, the existing soil map unit in all of the upland and wetland soil pits was Fluvaquents. The slope gradient in the upland sample locations was variable, ranging from 0 – 2% depending on location. The slope gradient in the wetland sample locations also ranged from 0 – 2% depending on location. The survey results, as expected, were variable between the uplands and wetland reference sites; however, the upland and wetland reference sites shared similar soil texture, soil structure, redoximorphic features, and permeability (inferred).

The depth to soil saturation was greater than 20 inches in all of the soil pits. The absence of soil moisture in the upland and wetland reference soil pits is not unexpected based on the date on which the surveys were performed.

Wetland inundation surveys were performed for the offsite mitigation parcels beginning in December 2010. The surveys were performed through May of 2011. Based on preliminary wetland survey results, which were reported in a baseline report prepared by Caltrans (California Department of Transportation 2011), the majority of the adjacent wetland was inundated for up to two months. Approximately one-half of the uplands proposed for wetland establishment were

also inundated for a period of one to two months. The wetland inundation surveys did not assess soil saturation but it is presumed that some of the upland soils may also have been saturated for an extended period of time during the winter of 2010-2011.

The proposed establishment site was also surveyed by a geomorphologist to evaluate the condition of the existing land surface and its feasibility to establish wetlands. It was determined that the proposed grading area would not encroach on or impair the existing natural levee. The westward limit of the wetland boundary was identified by the geomorphologist based on site characteristics. The geomorphologist also evaluated the area for the potential for overbank flow and sediment deposition. Based on this assessment, the south end of the proposed wetland area was dropped from consideration. The proposed wetland boundary reflects this assessment.

Wetland rehabilitation will be accomplished by removing grazing from portions of the parcel and implementing Type 3, Type 4, and Type 5 rehabilitation actions (Appendix C, Table 6-4). Type 3 rehabilitation actions will be implemented in wet meadow on the west side of Davis Creek. Type 4 rehabilitation actions will be implemented on the east side of Davis Creek adjacent the established wet meadow. Type 5 rehabilitation will be wetland riparian plantings within the Davis Creek corridor. Other waters rehabilitation will be accomplished by widening the riparian corridor adjacent to Davis Creek with Native riparian vegetation.

#### **7.3.1.25 Wildlands (APN 108-060-01)**

The mitigation goals for this Wildlands parcel are wetland establishment, wetland rehabilitation, and other waters rehabilitation (Figures 2-1a and 2-1b, Appendices C and E). Wetland establishment at this parcel will consist of Group 2 wetland establishment totaling 1.29 acres of wet meadow (Appendix C, Table 6-4). The design plans for offsite wetland establishment are in Appendix E. The wetland establishment area is an area of existing upland between an existing wet meadow complex and the riparian corridor. A portion of this upland will be lowered to match, or be slightly lower than, the elevation of adjacent wetland habitat and will be seasonally saturated or inundated by rainfall and/or groundwater. Preliminary soil surveys indicate that the soil type in the wetland establishment area is similar to the soils in the adjacent wet meadow.

A small area of wetland establishment will also occur on the west side of Davis Creek. This area is adjacent to and is part of the wetland establishment area on an adjacent Wildlands parcel (APN 108-020-07). The newly graded wetlands will be tied into existing topographic contours. The excess soil from grading will be disposed of offsite. The established wetlands will be seeded and planted with native species.

Wetland rehabilitation will be accomplished by removing grazing from portions of the parcel and implementing Type 4 rehabilitation actions (Appendix C, Table 6-4). Type 4 rehabilitation actions will be implemented on the east side of Davis Creek adjacent to the established wet meadow. Other waters rehabilitation will be accomplished by widening the riparian corridor adjacent to Davis Creek. Native riparian vegetation will be planted in the riparian corridor.

### **7.3.1.26 Wildlands (APN 108-020-07)**

The mitigation goals for this Wildlands parcel are wetland establishment, wetland rehabilitation, and other waters rehabilitation (Figures 2-1a and 2-1b, Appendices C and E). Wetland establishment at this parcel will consist of the establishment of two wet meadow units totaling 0.74 acre (Appendix C, Table 6-4). The design plans for offsite wetland establishment are in Appendix E. The wetland establishment areas are small inclusions of existing uplands within and adjacent to the wet meadow complex that will be lowered to match, or be slightly lower than, the elevation of adjacent wetland habitat and will be seasonally saturated or inundated by rainfall and/or groundwater. The NRCS soil survey indicates that the soil type in the wetland establishment area is the same as the adjacent wet meadow. The newly graded wetlands will be tied into existing topographic contours. The excess soil from grading will be disposed of offsite. The established wetlands will be seeded and planted with native species.

This area is adjacent to and is part of the wetland establishment area on an adjacent Wildlands parcel (APN 108-060-01) and an adjacent Benbow parcel (APN 108-020-06). The newly graded wetlands will be tied into existing topographic contours. The excess soil from grading will be disposed of offsite. The established wetlands will be seeded and planted with native species. Wetland rehabilitation will be accomplished by removing grazing from a small portion of the parcel and implementing Type 2 rehabilitation actions. Type 2 rehabilitation actions will be implemented on the west side of Davis Creek adjacent to the established wet meadow. Other waters rehabilitation will be accomplished by widening the riparian corridor adjacent to Davis Creek. Native riparian vegetation will be planted in the riparian corridor.

### **7.3.1.27 Wildlands (APN 108-030-08)**

The mitigation goals for this Wildlands parcel are wetland rehabilitation and other waters rehabilitation (Figures 2-1a and 2-1b, Appendices C and E). Wetland rehabilitation will be accomplished by removing grazing from portions of the parcel and implementing Type 3 rehabilitation actions (Table 6-4). Type 3 rehabilitation actions will be implemented on the west side of Davis Creek adjacent to an existing wet meadow. A small area of other waters rehabilitation will also occur on the west side of Davis Creek. Native riparian vegetation will be planted in the riparian corridor.

## **7.3.2 Offsite Mitigation Techniques**

For ease of discussion, information in this section is presented as shown below.

- Establishment techniques for wetland habitat.
- Rehabilitation techniques for wetlands and other waters habitat.

### **7.3.2.1 Wetland Establishment**

As defined in Chapter 2, *establishment* means the manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area and functions. Wetland

habitat will be established on some of the offsite mitigation parcels. The type and location of habitat establishment is shown in Appendices C and E and listed in Table 7-2. Wetland establishment will include grading upland habitats to establish depressions or swales that will be seasonally inundated or saturated. Wetland establishment sites occur in one of two groups. Group 1 wetland establishment sites consist of those establishment sites identified in the 2010 MMP. Group 2 wetland establishment sites consist of those sites identified in summer 2011. Construction-level plans have been developed for Group 1 sites and preliminary grading plans have been developed for Group 2 sites.

Offsite wetland establishment will consist of the following activities, discussed in detail below.

- Site preparation.
- Grading.
- Seeding.
- Planting.
- Construction inspections.
- Documentation of as-built conditions.

### ***Site Preparation***

Preparation of offsite wetland establishment areas will entail the following activities, discussed in detail below.

- Surveying and staking mitigation establishment areas.
- Installing ESA protective fencing.
- Installing erosion control measures and using BMPs.
- Preparing wetland topsoil stockpile areas.
- Vegetation and site clearing.

### ***Surveying and Staking Wetland Establishment Areas***

Prior to mitigation construction, the limits of the mitigation establishment areas, including staging areas, topsoil stockpiling areas, and access roads, will be surveyed and staked. These exact locations will be based on the mitigation construction plans and specifications for contractor use.

### ***Installing Environmentally Sensitive Area Fencing***

Prior to construction, Caltrans will install protective fencing and, where necessary, silt fencing around ESAs to be avoided. Protective fencing will consist of orange plastic-mesh fencing that is secured to metal T-posts, and will be installed in accordance with the project construction documents. Silt fencing may be installed around avoided wetlands, both jurisdictional and nonjurisdictional drainages, and riparian habitat to prevent soil or sediment from entering the habitat. Silt fencing may be used in combination with protective fencing, and will be installed in accordance with the project's SWPPP to be prepared by the contractor and with BMPs specified

in the project construction documents (see Wetland Establishment, for more information on possible erosion control measures and BMPs).

*Installing Erosion Control Measures and Using Best Management Practices*

Implementation of the mitigation will require a SWPPP. Specific erosion control measures and BMPs will be provided in the document. Caltrans will review the contractor-prepared SWPPP for compliance with the mitigation construction plans and special provisions. The SWPPP will then be submitted to the RWB for approval. The following typical erosion control measures and BMPs have been identified in the mitigation construction plans and special provisions. These measures will be employed during site preparation and construction efforts and remain in place until ground disturbing activities have ended (please note that this is not an exhaustive list of erosion control measures and BMPs):

- Prior to the start of construction activities, all personnel will receive water pollution control training.
- A temporary construction entrance will be installed and maintained to provide temporary access to the mitigation construction areas.
- Temporary fiber rolls will be installed and maintained around areas in which grading activities will occur to reduce sedimentation.
- Hydroseed will be applied to exposed slopes upon completion of construction activities to reduce erosion and sedimentation.
- Materials will be delivered, used, and stored in a way that minimizes or eliminates discharge of material into watercourses.
- Stockpiled materials will be stored at least 100 feet from concentrated flows of stormwater and drainage courses, if within the floodplain, and at least 50 feet from these waters if outside the floodplain.
- Material stockpiles will be covered with plastic sheeting or geosynthetic fabric when not in use and surrounded with a linear sediment barrier, and/or placed on pallets.
- Liquid wastes will be held in leak-proof containers such as roll-off bins and portable tanks, which will be stored at least 50 feet from moving vehicles and equipment and at least 100 feet from stormwater and drainage courses.
- Vehicle and equipment cleaning will be limited to cleaning that is necessary to control vehicle tracking or hazardous waste.
- When practicable, vehicle and equipment maintenance will be conducted offsite. If fueling or maintenance must be done at the construction site, a site or sites will be designated for use. Containment berms or dikes shall be used around these sites.
- Spill and leak prevention procedures will be implemented for chemicals and hazardous substances stored at the mitigation construction site.
- Drip pans and absorbent pads will be used under vehicles or equipment used over water.
- Trash and debris will be removed from the job site at least once per week and will not be allowed to accumulate.

- Non-stormwater visual inspections will be performed on a quarterly basis.

#### Preparing Wetland Topsoil Stockpile Areas

Wetland establishment will take place on 12 of the offsite mitigation parcels (Figures 2-1a and 2-1b). The parcels on which wetland establishment occur consist of the following:

- Two Benbow parcels (APN 108-040-13, APN 108-020-06).
- Three Ford parcels (APN 108-010-06, APN 108-020-04, APN 108-030-02).
- The Goss/MGC Plasma Middle/MGC Plasma North complex.
- One Lusher parcel (APN 108-030-04).
- The Niesen parcel (APN 108-040-02).
- The Watson East (APN 037-221-30).
- Three Wildlands parcels (APN 108-020-07, APN 108-060-01, APN 108-070-09).

At the Goss/MGC Plasma Middle/MGC Plasma North parcels, topsoil harvesting (approximately the top 4 inches of topsoil will be stripped) and stockpiled for later use in topdressing the established wetland will occur. Topsoil will be stockpiled in upland areas outside ESA boundaries. The specific location of topsoil stockpile areas will be identified in the mitigation construction plans and specifications for contractor use.

At the Watson East parcel, topsoil/plant duff salvaged from observed populations of Baker's meadowfoam from the project footprint will be used to topdress the Group 1 and 2 established wetlands. At the Ford (APN 108-010-06) and Niesen parcels, topsoil importation might need to be considered based on resource agency concerns regarding the appropriateness of the existing topsoil for topdressing the established wetlands at these parcels. Similar to topsoil that will be used at the Watson East parcel, topsoil for the Ford and Niesen parcels could be imported from within the project footprint prior to construction disturbance.

Topsoil for the remaining Group 2 wetlands will consist of harvesting (approximately the top 4 inches of topsoil will be stripped) and stockpiling topsoil for later use in topdressing the established wetlands. Topsoil will be stockpiled in upland areas outside ESA boundaries. The specific location of topsoil stockpile areas will be identified in the mitigation construction plans and specifications for contractor use.

To prepare stockpile areas, existing ruderal vegetation will be removed and legally disposed of offsite at a landfill or other facility that accepts green waste. Topsoil stockpiles will be stored separately from other grading spoils. The topsoil will be stored at ambient temperatures and protected from rainfall.

#### Vegetation and Site Clearing

The extent of vegetation and site clearing at the offsite mitigation parcels will depend on the amount of grading required or the amount of debris or structures to be removed. Where extensive grading is necessary (e.g., Niesen parcel), vegetation and site clearing might not be necessary because existing vegetation and/or debris will be removed as part of these grading activities.

Where extensive grading is not necessary and existing topsoil remains largely in place, some vegetation and debris removal may be necessary.

Vegetation clearing at the offsite mitigation parcels will include mowing herbaceous vegetation to a height of 1 to 3 inches in the habitat establishment areas, topsoil stockpiling areas, staging areas, and for temporary access roads. Some clearing or pruning of woody vegetation may be necessary to allow equipment access and could consist of removing the entire above-ground portion of the plant or pruning low-hanging branches. Cut vegetation will be legally disposed of offsite at a landfill or other facility that accepts green waste (because the woody vegetation may include oaks, it will be necessary to confirm with the disposal facility that oak wood is accepted in light of possible disposal quarantines related to sudden oak death disease).

Vegetation clearing associated with invasive plants has been identified at some of the offsite mitigation parcels (i.e., Benbow and Brooke). Targeted treatment of invasive plants will be performed to reduce the extent of the infestation and to improve the ability to control the species in the future. Invasive plants will be removed to the extent feasible from the mitigation areas. Repeated treatments may be necessary as determined by a qualified biologist. Nonchemical methods (i.e., manual and mechanical) for invasive plant control are preferred over chemical methods. If chemical methods are used, chemicals (i.e., herbicides) will be applied under the direction of a licensed herbicide applicator and in strict accordance with all applicable regulations for their use. If vegetation clearing is necessary during the migratory bird nesting season, a qualified biologist will conduct preconstruction surveys to identify active nests, and the appropriate species-specific avoidance and minimization measures will be implemented where practical.

### **Grading**

Grading will be necessary to establish wetland depressions and swales and to improve parcel hydrology. Grading will be performed by a licensed contractor who will use appropriately sized construction equipment.

The location of wetland establishment areas is shown in Figures 2-1a and 2-1b and in Appendix E. Wetland establishment will result in the conversion of uplands to wetlands. At all locations wetland establishment will occur adjacent to existing wetland complexes and will result in an increase in wetland habitat patch size. Grading will also be used to provide more natural drainage patterns by capturing flow that is currently channelized in drainage ditches and using it to provide wetland hydrology as part of the grading for established wetlands.

Grading will be limited to the dry season (late spring through early fall), with erosion control seed mixes being applied after grading has been completed to prevent loosened material/sediment from entering wetlands or other waters on and adjacent to the offsite mitigation parcels.

For those locations requiring topsoil application, the subgrade will be excavated to a depth sufficient to accommodate the stockpiled topsoil while providing appropriate finish-grade topography to support wetland hydrology and vegetation. The reapplied topsoil layer will be a minimum of approximately 4 inches deep. The topsoil will not be compacted, except for wheel compaction that occurs as a result of reapplication. It is desirable to keep the topsoil in a

noncompacted, friable condition while relying on an erosion control seed mix to hold the soil in place during heavy rains (Section 7.2.3, Seeding).

*Parcel-Specific Wetland Establishment Grading*

*Benbow (APN 108-020-06) and (APN 108-040-13)*

The grade of the small inclusions of existing uplands within the wet meadow complex will be lowered to match, or be slightly lower than, the elevation of adjacent wetland habitat and will be seasonally saturated or inundated by rainfall and/or groundwater. Stockpiled upland topsoil from this location will be used to topdress the established wetland.

*Ford (APN 108-010-06)*

The established wetland on this parcel will be seasonally inundated to a depth of 6 to 12 inches, which is equivalent to the water depths in the adjacent mixed marsh. Caltrans has determined that excess soil from grading activities on this parcel will be suitable for fill material within the project footprint therefore offsite wetland topsoil will be required to topdress the wetland. Topsoil for this wetland establishment site could be imported from within the project footprint prior to construction disturbance.

*Ford (APN 108-020-04) and (APN 108-030-02)*

The grade of existing uplands will be lowered to match, or be slightly lower than, the elevation of adjacent wetland habitat and will be seasonally saturated or inundated by rainfall and/or groundwater. Stockpiled upland topsoil from this location will be used to topdress the established wetland.

*Goss/MGC Plasma Middle/MGC Plasma North Complex*

The grade of existing uplands will be lowered to match, or be slightly lower than, the elevation of adjacent wetland habitat and existing drainages that drain water from the parcels into adjacent streams and other drainages will be graded as part of the grading for established wetlands to retain water and increase the residence time that water stays on the parcel. This wetland will be seasonally saturated by rainfall and/or groundwater.

*Lusher (APN 108-030-04)*

The grade of existing uplands will be lowered to match, or be slightly lower than, the elevation of adjacent wetland habitat and will be seasonally saturated or inundated by rainfall and/or groundwater. Stockpiled upland topsoil from this location will be used to topdress the established wetland.

*Niesen (APN 108-040-02)*

The grade of existing uplands will be lowered to equal to or slightly lower than adjacent wetland habitat and will be seasonally saturated by rainfall and runoff from an adjacent swale that will be graded between the established and existing wet meadow to maintain project drainage requirements. The swale itself will be slightly wetter than the surrounding wet meadow but is expected to provide similar habitat conditions. Caltrans has determined that excess soil from grading activities on the Niesen parcel will be suitable for fill material within the project footprint. Topsoil for the Niesen parcel could be imported from within the project footprint prior to construction disturbance.

Watson (APN 037-221-30)

The grade of existing uplands will be lowered to match, or be slightly lower than, the elevation of adjacent wetland habitat and will be seasonally saturated by rainfall and/or groundwater. Topsoil/plant duff salvaged from observed populations of Baker's meadowfoam from the project footprint will be used to topdress the established wetlands.

Wildlands (APN 108-060-01) and (APN 108-070-09)

The grade of existing uplands will be lowered to match, or be slightly lower than, the elevation of adjacent wetland habitat and will be seasonally saturated or inundated by rainfall and/or groundwater. Stockpiled upland topsoil from this location will be used to topdress the established wetland.

Wildlands (APN 108-020-07)

The grade of the small inclusions of existing uplands within the wet meadow complex will be lowered to match, or be slightly lower than, the elevation of adjacent wetland habitat and will be seasonally saturated or inundated by rainfall and/or groundwater. Stockpiled upland topsoil from this location will be used to topdress the established wetland.

**Seeding**

Wetland Seeding

Wetland seed mixes consisting of native grasses and forbs will be used to seed established wetlands. The seed mixes have been developed for each Group 1 wetland establishment area based on wetland delineation vegetation data, August 2010 vegetation surveys at the wetland establishment parcels, and other field observations. Similar parcel-specific seed mixes will be developed for each Group 2 established wetland based on wetland delineation vegetation data and other field observations. The wetland seed mixes are presented in Appendix E.

The seed mixes may be revised based on seed availability at the time of mitigation construction and seed application. For the wetland establishment site at the Ford parcel, a seed mix has not been identified for mixed marsh (only for wet meadow) because this section of the establishment site is not expected to be subjected to erosive flows and will be inundated for prolonged periods during the rainy season.

The wet meadow seed mix will be applied to all created wetland habitat, including created wetland habitat at the Watson East offsite mitigation parcel that will be topdressed with topsoil/plant duff salvaged from the project footprint for Baker's meadowfoam. The seed mixes will be applied during early fall following completion of mitigation grading to reduce erosion. Wetland seeding will occur before installing wetland container plants.

Riparian Seeding

A riparian seed mix consisting of native grasses and forbs will be used to seed areas disturbed by establishment of riparian. The seed mix may be revised based on seed availability at the time of mitigation construction and seed application.

The riparian seed mix will be applied during early fall following completion of mitigation grading to reduce erosion. Riparian seeding will occur before installing riparian cuttings and riparian and oak container plants.

### **Upland Seeding**

An upland seed mix will be used to seed disturbed upland areas within the offsite mitigation parcels. The seed mix may be revised based on seed availability at the time of mitigation construction and seed application. The upland seed mix will consist of native grasses and wildflowers. The seed mix will be applied during early fall following completion of mitigation grading to reduce erosion.

### **Application Methods**

The soil surface in the established wetlands and disturbed upland areas will be scarified before seeding to ensure adequate root penetration for seeds. The seed mixes will be applied using standard hydroseeding methods at the rates specified in. All seeded areas will then be mulched with sterile rice straw or an approved weed-free equivalent to protect the seed until it germinates. The mulch material will be of high quality (i.e., not musty, moldy, caked, or otherwise of low quality). The use of mulch that contains invasive weeds will not be permitted. Straw mulch material will be stabilized using a mulch crimper or equivalent straw anchoring tool. The crimper will be straight and capable of firmly punching the mulch into the soil. Hand methods will be used to anchor the straw where crimping equipment cannot be safely operated. Straw mulch material may also be stabilized using a suitable tackifier. If a tackifier is used, it will be applied uniformly over the mulch material at the specified rate.

### **Planting**

Plant palettes have been developed for each wetland establishment site based on wetland delineation vegetation data, CRAM data collected in spring 2011, August 2010 vegetation surveys at the wetland establishment parcels, and other field observations (Appendix E).

Caltrans will contract with a plant nursery experienced with the propagation of native herbaceous wetland plants to propagate container plants for mitigation efforts. The locations for individual plantings will be identified using pin flags. Each species will be assigned a specific flag color to ensure that plant material is planted at the proper location. Plant spacing for herbaceous wetland establishment planting areas will be at approximately 5 feet on center.

### **Wetland Container Plant Installation**

Wetland container plants will be planted in the winter after the offsite mitigation parcels have been graded and rainfall has saturated the soil to a depth of approximately 10 inches. Container plants will be propagated and installed as described in Section 7.2.4, Plant Stock Selection and Propagation, and in this section.

Container plants will consist of tree band or equivalent sized container stock. Container plants will be installed in clusters in the established wetland depressions and swales. Container plants will be installed in a planting hole that is twice the width of and no deeper than the container. Soil removed when the planting hole is created will be used as backfill. Watering basins or bark mulch will not be required for wetland container plants.

Container plants will be placed in the planting hole so that the root collar is slightly above the desired final grade, with the top of the first major root barely visible at the surface. The plant will be watered immediately after planting and will be inspected after initial watering to ensure that settling has not occurred. Any container plants that have settled will be adjusted so the appropriate length is exposed above ground.

### **Plant Watering**

The goal of watering will be to provide sufficient water to successfully establish herbaceous wetland plants that are able to survive without supplemental irrigation. Caltrans will water-in wetland establishment plantings after planting. Irrigation will not be applied during the 3-year post-construction plant establishment period because herbaceous wetland species will be supported by seasonal inundation and soil saturation.

### ***Construction Inspections***

Caltrans will conduct progress inspections of the mitigation efforts to ensure that offsite wetland establishment mitigation is fully and properly completed. Areas not meeting the implementation standards identified above will be re-evaluated and re-planted as necessary. At a minimum, Caltrans will perform inspections at the following critical stages of mitigation implementation:

- Layout of proposed mitigation establishment boundaries prior to construction.
- Placement and installation of ESA protective fencing.
- Installation of erosion control measures and use of BMPs.
- Site preparation/vegetation clearing operations.
- Harvesting of wetland topsoil and seed material.
- Grading operations, including placement of stockpiled wetland topsoil.
- Irrigation system installation (if applicable) and initial plant watering.
- Placement of stockpiled wetland topsoil.
- Seeding and planting operations.

### ***Documentation of As-Built Conditions***

Within 45 days from the completion of offsite wetland establishment Caltrans will submit a complete set of as-built drawings to the resource agencies. The as-built drawings will be prepared using MicroStation (version 7 or later) software and will be at the same scale as the construction drawings. The as-built drawings will be prepared following standard landscape architecture protocols and practices. The as-built drawings will depict the features listed below.

- Mitigation planting and seeding area boundaries and elevations.
- Updated plant palettes, including species, plant material type (e.g., container, cutting), and number of plants planted by species.
- Updated seed mix, including application rates.
- Fences, gates, and access roads.

- Other pertinent mitigation or parcel features.

### 7.3.2.2 Wetland Rehabilitation

Wetlands will be rehabilitated at some of the offsite mitigation parcels using a variety of rehabilitation types or techniques. Table 7-2 lists rehabilitation strategies and corresponding actions to implement these strategies. In this section, a general description of each rehabilitation type is provided and details are provided for each rehabilitation action.

As defined in Chapter 2, Objectives, *rehabilitation* is the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic area.

Wetland habitat will be rehabilitated on several of the offsite mitigation parcels. The type of wetland rehabilitation and location is shown in Appendices C and E and listed in Table 7-2. As described in Chapter 6, Determination of Credits, five types of wetland rehabilitation have been developed. With the more aggressive strategies, wetland rehabilitation will include clearing existing patches of nonnative wetland vegetation and re-planting and seeding with native species. In addition to planting and seeding, each rehabilitation type includes some level of successional development in untreated areas. For all types of wetland rehabilitation, management activities that would inhibit successional vegetative development will be excluded from the rehabilitation sites. Each rehabilitation type also has specific performance standards and success criteria (Chapter 9).

- Type 1 wetland rehabilitation only occurs on the Watson West parcel (APN 037-250-05). Because this parcel already has high-quality wetland habitat over most of the parcel, no mitigation actions will be implemented. The parcel will be monitored to ensure that there is no decrease in native plant cover or an influx of noxious plant species.
- Type 2 wetland rehabilitation requires an increase of at least 10% in relative cover by native species over baseline conditions. The increase in cover is anticipated to be provided by successional development. Therefore, the Type 1 mitigation units will not be planted initially or seeded. If during the monitoring period Type 2 mitigation units are not trending toward achieving the Year 10 performance standard, supplemental planting and seeding may be implemented. Any Type 2 rehabilitation areas that will be seeded and planted will use native herbaceous wetland species.
- Type 3 wetland rehabilitation requires an increase of at least 40% in relative cover by native species over baseline conditions. The increase in cover may be provided by the planted and seeded areas and/or the untreated areas. Type 3 rehabilitation areas will be seeded and planted with native herbaceous wetland species. Native woody vegetation will also be planted at these locations.
- Type 4 wetland rehabilitation requires an increase of at least 70% in relative cover by native species over baseline conditions. The increase in cover may be provided by the planted and seeded areas and/or the untreated areas. Type 4 rehabilitation areas will be seeded and planted with native herbaceous wetland species.

- Type 5 wetland rehabilitation requires an increase of the establishment of at least 50% absolute cover by native riparian tree and shrub species over baseline conditions. The increase in cover may be provided by the planted and volunteer vegetation. Type 5 rehabilitation areas will be seeded and planted with native riparian species.

Offsite wetland rehabilitation will entail the following activities, discussed in detail below.

- Site preparation.
- Seeding.
- Planting.
- Plant watering.
- Construction inspections.
- Documentation of as-built conditions.

### ***Site Preparation***

Preparation of offsite wetland rehabilitation areas will entail the following activities, discussed in detail below.

- Surveying and staking mitigation establishment areas.
- Installing ESA protective fencing.
- Installing erosion control measures and using BMPs.
- Vegetation and site clearing.

### ***Surveying and Staking Mitigation Rehabilitation Areas***

Prior to mitigation construction, the limits of the mitigation rehabilitation areas, including staging areas and access roads, will be surveyed and staked. These locations will be based on the mitigation construction plans and specifications for contractor use.

### ***Installing Environmentally Sensitive Area Fencing***

Prior to mitigation construction, protective fencing or silt fencing will be installed around ESAs to be avoided. ESA protective fencing will be installed as described in Section 7.2, Onsite Mitigation Implementation.

### ***Installing Erosion Control Measures and Using Best Management Practices***

Erosion control measures and BMPs will be implemented as described in Section 7.2, Onsite Mitigation Implementation.

### ***Vegetation Clearing***

The extent of vegetation and site clearing at a given rehabilitation area will vary depending on whether it is designated as a Type 2, Type 3, Type 4, or Type 5 rehabilitation area. The total area of vegetation clearing provided for a given mitigation unit will be dependent on the total acreage of the mitigation unit and the required percent increase in absolute percent cover by native wetland species over baseline conditions for each mitigation unit. For example, if Type 4

rehabilitation is proposed on a 10-acre mitigation unit the unit must demonstrate a 70% increase in absolute percent cover by native wetland species over baseline conditions (which in this example is assumed to be 0% cover). Therefore vegetation clearing will need to occur on 70% (7 acres) of the mitigation unit.

The total acreage of vegetation clearing on a parcel will be subdivided into smaller vegetation clearing areas that are distributed across the parcel in small planting units. The planting units may be of varying size and dimension depending on the size, location, and existing conditions in each mitigation unit. For example, the 7 acres of vegetation clearing in the preceding example would be distributed across the parcel and the vegetation clearing unit could be laid out in a patch pattern with areas not cleared interspersed with the cleared areas. Patches of existing native vegetation would be avoided and retained.

Type 2 rehabilitation areas will not initially be cleared because successional development is expected to provide the increase in native cover by Year 10. If, during the monitoring period, Type 2 mitigation units are not trending toward achieving the Year 10 success criteria, vegetation clearing may occur in Type 2 mitigation units to allow for supplemental planting and seeding may be implemented.

Intensive vegetation and control methods will be implemented to eradicate or reduce the population of nonnative grasses and forbs in each treatment area. Repeated treatments are expected to be necessary and will be provided on an as-needed basis. Treatment methods may include one or more of the following: mowing, string trimming, manual removal, burning, and herbicide treatments (if permitted). Mulching using a synthetic fabric may also be considered if other techniques are not effective in controlling undesirable species. Disking or other soil disturbing methods will not be used.

Nonchemical methods for invasive plant control are preferred over chemical methods. If chemical methods are used, chemicals (i.e., herbicides) will be applied under the direction of a licensed herbicide applicator and in strict accordance with all applicable regulations for their use.

## **Seeding**

### **Wetland Seeding**

Wetland seed mixes consisting of native grasses and forbs will be used, on a site-by-site basis, to seed rehabilitated wetlands. Seed mixes may be applied to all Type 3, Type 4, and Type 5 rehabilitation areas. Type 2 rehabilitation areas will not initially be seeded because successional development is expected to provide the increase in native cover by Year 10. If, during the monitoring period, Type 2 mitigation units are not trending toward achieving the Year 10 success criteria, a seeding program may be implemented in Type 2 mitigation units.

Vegetation surveys will be performed at each rehabilitation area prior to implementing mitigation actions to confirm existing species composition and relative cover values. Based on this information, parcel-specific seed mixes may be refined for each rehabilitation area. The seed mixes will be applied using a drill seeder during early fall following completion of vegetation clearing.

## **Planting**

Plant palettes have been developed for each wetland rehabilitation unit based on wetland delineation vegetation data, CRAM data collected in spring 2011, August 2010 vegetation surveys at the wetland establishment parcels, and other field observations (Appendix E). Planting of native herbaceous species will occur in Type 3, Type 4, and Type 5 rehabilitation areas. Planting of native woody species will occur in Type 3 (in addition to herbaceous species plantings) and Type 5 rehabilitation areas.

Type 2 rehabilitation areas will not initially be planted because successional development is expected to provide the increase in native cover by Year 10. If, during the monitoring period, Type 2 mitigation units are not trending toward achieving the Year 10 success criteria, a planting program may be implemented in Type 2 mitigation units.

All Type 3 and 4 rehabilitation areas will be seeded and planted with native herbaceous wetland species. Type 3 rehabilitation areas will also be planted with clusters of native trees (e.g., valley oak). Type 5 rehabilitation areas will be planted with native woody species and seeded with native species. Vegetation surveys will be performed at each rehabilitation area prior to implementing mitigation actions to determine existing species composition and absolute and relative percent cover values of herbaceous species and to refine, if necessary, the plant and seed palettes present in Appendix E.

### Wetland Container Plant Installation

Wetland container plants will be planted in the winter after the offsite mitigation parcels have been graded and rainfall has saturated the soil to a depth of approximately 10 inches. Container plants will be propagated and installed as described in Section 7.2.4, Plant Stock Selection and Propagation, and in this section.

Container plants will consist of tree band or equivalent sized container stock. Container plants will be installed in clusters. Container plants will be installed in a planting hole that is twice the width of and no deeper than the container. Soil removed when the planting hole is created will be used as backfill. Watering basins or bark mulch will not be required for wetland container plants.

Container plants will be placed in the planting hole so that the root collar is slightly above the desired final grade, with the top of the first major root barely visible at the surface. The plant will be watered immediately after planting and will be inspected after initial watering to ensure that settling has not occurred. Any container plants that have settled will be adjusted so the appropriate length is exposed above ground.

### Woody Plant Species Container Plant Installation

Container plants will be installed in the Type 3 and Type 5 wetland rehabilitation areas that are currently vegetated by herbaceous vegetation. Container plants will be installed as described in Section 7.2.4, Plant Stock Selection and Propagation, and in this section. The Type 3 and 5 plant palettes are provided in the design plans for offsite mitigation (Appendix E).

Container plants will consist of trees, shrubs, and vines. The plants will be installed in a random, naturalistic pattern. Container plants will be installed in a planting hole that is twice the width of and no deeper than the container. Soil removed when the planting hole is created will be set aside

for use as backfill. Container plants will be placed in the planting hole so that the root collar is slightly above the desired final grade with the top of the first major root barely visible at the surface. The plants will be watered immediately after planting, and will be inspected after watering to ensure that settling has not occurred. Plants that have settled will be adjusted so that the appropriate length is exposed above ground.

Watering basins will be constructed around all container plants and plant protection cages will be installed to minimize herbivory. A 3-inch layer of bark mulch (this mulch could come from chipped woody vegetation removed as part of vegetation clearing activities [Section 7.2.1.2, Vegetation Clearing]) will be placed in each watering basin to reduce soil evaporation rates and help suppress weed growth.

#### Riparian Cutting Collection and Installation

Willow and cottonwood cuttings will be installed in the Type 5 wetland rehabilitation areas that occur on streambanks or in wet meadows adjacent to streams and drainages. Cutting collection and installation will occur in December and/or January. Cuttings will be collected and installed as described in Section 7.2.4.2, Riparian Cutting Collection and Installation, and in this section.

All cuttings will be hardened-off green wood. Cuttings will be a minimum of 3 feet long and will be tapered from a minimum of 0.5 inch to a maximum of 2.5 inches in diameter. Cuttings will be cut at a right angle at the wide end of the cutting.

Immediately after harvesting, the leaves, branches, and twigs will be carefully removed from each cutting to avoid damage to buds on the cutting. The cuttings will then be wrapped in burlap or other approved material that protects them from sunlight and allows for air circulation within the bundle. The bundled cuttings will be maintained in cool wet storage until just before planting, and will be planted within 24 hours of collection.

Planting holes will be excavated for all cuttings. Cuttings will be installed vertically, with the narrow end exposed and two thirds of the cutting buried below ground to ensure the development of adequate root mass. Fertilizer will not be applied during cutting installation. Watering basins will be constructed around cuttings, and plant protection cages will be installed to minimize herbivory. A 3-inch layer of bark mulch (this mulch could come from chipped woody vegetation removed as part of vegetation clearing activities [Section 7.2.1.2, Vegetation Clearing]) will be placed in each watering basin to reduce soil evaporation rates and help suppress weed growth.

Cuttings will be watered immediately after planting and will be inspected after watering to ensure that they have not settled. Any cuttings that have settled will be adjusted so the appropriate length is exposed above ground.

#### Acorn Collection and Installation

Caltrans will collect acorns to be planted at the Type 5 wetland rehabilitation areas. Acorns will be installed as described in Section 7.2.4.3, Acorn Collection and Installation, and in this section.

Acorns will be planted in the fall/winter after rainfall has saturated the soil to a depth of approximately 10 inches. A planting hole that is 1 foot deep by 1 foot wide will be hand excavated or augured. If planting holes are augured, the sides will be scarified to allow roots to

more easily penetrate the surrounding soil. Soil removed when the planting hole is created will be used as backfill and in constructing a watering basin.

Acorn planting will consist of planting three acorns at each planting hole. Acorns will be placed horizontally in the center of the basin, 0.5 inch to a maximum of 1 inch below finish grade, in a 9-inch equilateral triangle (Appendix E). Fertilizer will not be applied during acorn installation.

Watering basins may be constructed around all acorn plantings, and plant protection cages may be installed to minimize herbivory. A 3-inch layer of bark mulch (this mulch could come from chipped woody vegetation removed as part of vegetation clearing activities [Section 7.2.1.2, Vegetation Clearing]) will be placed in each watering basin to reduce soil evaporation rates and help suppress weed growth. The bark mulch should not be placed directly on top of the acorns (i.e., to prevent the acorns from developing mildew and losing their viability). Acorn plantings will be watered immediately after planting

### ***Plant Watering***

Plant watering will be provided for woody plantings in the Type 3 and Type 5 wetland rehabilitation areas on an as-needed basis, as determined based on plant vigor during the summer months. Herbaceous wetland plantings will not be watered because these species are adapted to, and will be supported by, seasonal water availability. The goal of watering will be to provide sufficient water to successfully establish deep-rooted plants that are able to survive without supplemental irrigation. Caltrans will water woody plantings as needed during the 3-year plant establishment maintenance period. Possible irrigation methods are described in Section 7.2, Onsite Mitigation Implementation, and watering frequency and application rates are described in Chapter 8, Mitigation Maintenance Plan.

### ***Construction Inspections***

Caltrans will conduct progress inspections of the wetland rehabilitation efforts as described in Section 7.3.2 Wetland Establishment.

### ***Documentation of As-Built Conditions***

Caltrans will prepare and submit as-built drawings to the resource agencies as described in Section 7.3.2, Wetland Establishment.

### ***Physical and Management Actions of Wetland Rehabilitation Areas***

Wetland rehabilitation consists of physical and management actions that will increase habitat complexity, install native plants, and control invasive and noxious plants (Table 7-2).

#### ***Increase Habitat Complexity***

Wetland rehabilitation is focused on wet meadow. Wetland rehabilitation actions will provide connectivity with existing wetland habitat; provide increased edge effect with wet meadow and other habitats, and increase habitat complexity and structure. Habitat complexity will be increased by planting native species and controlling nonnative during the plant establishment period.

### Install Native Plants

Existing wetlands will be rehabilitated by planting and seeding native herbaceous wetland species and native woody species. Planting of woody vegetation in existing wet meadow habitat adjacent to streams will result in a type change to riparian wetland.

### Control Invasive and Noxious Plants

Targeted treatment of invasive and noxious plant species will occur if such species are present in the wetland rehabilitation areas. Invasive species are those nonnative species, not listed as noxious, that could compete with the survival and establishment of planted and seeded species. Following initial control of these species through manual, mechanical, or chemical control methods, the wetland rehabilitation areas will be planted with wetland and riparian plants.

### **7.3.2.3 Other Waters Rehabilitation**

Other waters habitat will be rehabilitated on several of the offsite mitigation parcels. Table 7-2 lists rehabilitation strategies and corresponding actions to implement these strategies.

The location of other waters habitat rehabilitation is shown in Appendices C, D, E, and F and listed in Table 7-2. Other waters rehabilitation will include planting riparian vegetation within a band on each side of designated stream corridors. In some locations existing patches of nonnative vegetation will be cleared and the areas replanted and seeded with native species.

Offsite other waters rehabilitation will entail the following activities, discussed in detail below.

- Site preparation.
- Seeding.
- Planting.
- Plant watering.
- Construction inspections.
- Documentation of as-built conditions.

### **Site Preparation**

Preparation of offsite other waters rehabilitation areas will entail the following activities, discussed in detail below.

- Surveying and staking mitigation establishment areas.
- Installing ESA protective fencing.
- Installing erosion control measures and using BMPs.
- Vegetation and site clearing.

### Surveying and Staking Mitigation Rehabilitation Areas

Prior to mitigation construction, the limits of the rehabilitation areas, including staging areas and access roads, will be surveyed and staked. These locations will be based on the mitigation construction plans and specifications for contractor use.

### **Installing Environmentally Sensitive Area Protective Fencing**

Prior to mitigation construction, protective fencing or silt fencing will be installed around ESAs to be avoided. ESA protective fencing will be installed as described in Section 7.2, Onsite Mitigation Implementation.

### **Installing Erosion Control Measures and Using Best Management Practices**

Erosion control measures and BMPs will be implemented as described in Section 7.2, Onsite Mitigation Implementation.

### **Vegetation Clearing**

The extent of vegetation and site clearing at a given rehabilitation area will vary depending on the presence and density of nonnative species. Intensive vegetation and control methods will be implemented to eradicate or reduce the populations of some nonnative species such as Himalayan blackberry. Repeated treatments are expected to be necessary and will be provided on an as-needed basis. Treatment methods may include one or more of the following: mechanical removal, manual removal, and herbicide treatments (if permitted). Disking or other soil disturbing methods will not be used.

Nonchemical methods for invasive plant control are preferred over chemical methods. If chemical methods are used, chemicals (i.e., herbicides) will be applied under the direction of a licensed herbicide applicator and in strict accordance with all applicable regulations for their use.

### **Seeding**

A riparian seed mix consisting of native grasses and forbs will be used to seed areas disturbed by rehabilitation activities. The seed mix for the other waters rehabilitation areas are provided in Appendix E. The seed mix may be revised based on seed availability at the time of mitigation construction and seed application. The riparian seed mix will be applied during early fall following completion of mitigation grading to reduce erosion. Riparian seeding will occur before installing riparian cuttings and riparian container plants. The seed mix will be applied using a drill seeder or by hydroseeding during early fall following completion of vegetation clearing.

### **Planting**

All other waters rehabilitation areas will be planted with native trees, shrubs, and vines. The plant palettes for the other waters rehabilitation areas are provided in Appendix E. Plantings will be installed as container stock, cuttings, or acorns and will be installed as described in Section 7.2, Onsite Mitigation Implementation. The planting density for riparian rehabilitation planting areas will vary based on soil texture and soil moisture conditions as well as proximity to the nearest creek. Riparian planting areas on relatively high terraces may be composed primarily of oaks that will be planted at approximately 20 feet on center. Riparian plantings on more mesic planting surfaces will be planted at approximately 10 feet on center.

### **Plant Watering**

Plant watering will be provided for woody plantings in the other waters rehabilitation areas on an as-needed basis, as determined based on plant vigor during the summer months. The goal of watering will be to provide sufficient water to successfully establish deep-rooted plants that are able to survive without supplemental irrigation. Caltrans will water woody plantings as needed during the 3-year plant establishment maintenance period. Possible irrigation methods are

described in Section 7.2, Onsite Mitigation Implementation, and watering frequency and application rates are described in Chapter 8, Mitigation Maintenance Plan.

### **Construction Inspections**

Caltrans will conduct progress inspections of the habitat repair efforts as described in Section 7.2, Onsite Mitigation Implementation.

### **Documentation of As-Built Conditions**

Caltrans will prepare and submit as-built drawings to the resource agencies as described in Section 7.2, Onsite Mitigation Implementation.

### **Physical and Management Actions of Other Waters Rehabilitation Areas**

Other waters habitat rehabilitation consists of the physical and management actions that will improve hydrology, minimize sedimentation, expand habitat, increase habitat complexity, install native plants, and control invasive and noxious plants (Table 7-2).

#### **Improve Hydrology**

Parcel hydrology will be improved to enhance other waters (riparian) habitat by stabilizing eroding banks that lead to the direct loss of riparian habitat and contribute excessive sediment to the stream channel. At the Ford offsite mitigation parcel (APN 108-010-06); three instream eroding bank sections on Outlet Creek in the center of the parcel will be repaired (Appendices C and E). All three sites have unstable, mostly vegetated cut banks created by convergence flow on the riffle/gravel bar complex on the opposite side of the cut bank. The banks are approximately 6 feet tall and actively slumping. These areas will be repaired by grading back the vertical bank (which will in turn decrease shear stress on the bank), planting of native riparian vegetation (which will stabilize the banks through increased ground cover and root density), and the incorporation of instream structures at toe slope (which may establish instream aquatic habitat in the form of lateral scour pools that can support listed fish species and other aquatic organisms). See the erosion site assessment in Appendix H for repair concepts for these eroding banks.

Parcel hydrology will be improved by modifying several drainages. As previously described in this MMP, numerous drainages throughout Little Lake Valley drain wet meadows to allow for more efficient and extensive grazing of pastureland. These drainages are often interconnected and flow to the lowest point on the parcel, where they exit the parcel onto another parcel or into an adjacent stream. Parcel hydrology will be improved by modifying some these drainages, usually as part of grading for the proposed wetland establishment sites. As a result, water that would have previously left the site as runoff will have a longer residence time and will be retained as surface flow or as shallow groundwater or saturated soil. This action may also result in an increase in groundwater recharge.

In addition, improvement of parcel hydrology through the repair of eroding banks and headcuts is proposed at the following offsite mitigation parcels: Benbow, Ford, Frost, and Lusher. Specific actions related to these drainages and headcuts for each of the parcels are described below.

At the Benbow offsite mitigation parcel (APN 108-040-13); a large headcut located in a swale that is tributary to an intermittent stream will be repaired by placing soil fill to establish a step-pool grade control structure (see mitigation construction plans and special provisions for grading

plans). Sediment derived from this headcut likely enters a discontinuous intermittent stream channel that runs along the eastern edge of the parcel. This channel appears to once have been connected to Davis Creek but no longer has an active hydrologic connection to that creek. As such, potential sedimentation from this headcut essentially enters an active sediment sink (the discontinuous intermittent stream). Hydrology will be improved by the placement of a step-pool grade control structure to stop the upward migration of the headcut and reduce sedimentation on the parcel.

At the Ford offsite mitigation parcels (APN 108-020-04 and APN 108-030-02), a linear ditch drains surface water and locally lowers the groundwater table to enhance livestock grazing conditions. Water from the ditch flows directly onto the Lusher parcel (APN 038-060-08). The ditch has a relatively uniform width and varies in depth from approximately 1 to 4 feet. If feasible, the entire ditch will be filled to match the existing grade of the adjacent wet meadow (see mitigation construction plans and special provisions for grading plans). Because the southern terminus of the ditch is deeply incised and is connected to another incised ditch, it may not be feasible to completely fill the ditch at this location. If possible, hydrology will be improved at this location by the placement of fill soil to improve drainage grade and by laying back the banks to a more natural slope condition.

At the Frost offsite mitigation parcel, five headcuts are located near the northeast corner of the parcel. Three of these are instream headcuts on a small unnamed tributary to Berry Creek and two are upland headcuts. The headcuts appear to be unstable and have a high potential to contribute sediment to Berry Creek via the unnamed tributary. These sites will be repaired by placing soil fill to establish a step-pool grade control structure (see mitigation construction plans and special provisions for grading plans). Hydrology will be improved by reducing sedimentation to Berry Creek.

At the Goss/MGC Plasma Middle/MGC Plasma North offsite mitigation parcels, existing incised drainages that drain surface water from these parcels into other adjacent drainages will be graded as part of grading for the proposed wetland establishment site to retain water and increase the residence time that water stays on the parcels (see mitigation construction plans and special provisions for grading plans).

At the Lusher offsite mitigation parcel (APN 108-030-04); two instream headcuts are located on a short unnamed tributary to Old Outlet Creek. The instream headcuts appear unstable with a high potential for sediment to enter Old Outlet Creek. These two headcuts will be repaired by placing soil fill to establish a step-pool grade control structure (Appendix F). Hydrology will be improved by reducing sedimentation to Old Outlet Creek.

### Expand Habitat

Other waters rehabilitation actions—installing riparian plants adjacent to existing riparian habitat along stream corridors and fence lines or in adjacent upland—will result in an increase in riparian habitat patch size. Riparian habitat in Little Lake Valley provides habitat for common and special-status wildlife species. Willow flycatcher, yellow warbler, and yellow-breasted chat are riparian-dependent special-status species that breed in Little Lake Valley and that would benefit from an expansion of riparian habitat.

### Increase Habitat Complexity

Most of the other waters rehabilitation actions described in this section will result in an increase in the overall acreage of riparian woodland habitat on the offsite mitigation parcels, provide connectivity with existing riparian and oak woodland habitat, provide increased edge effect with wet meadow and other habitats, and increase habitat complexity and structure. Habitat complexity will be increased by improving hydrology that will lead to prolonged ponding and soil saturation, which is anticipated to promote increased species richness through natural recruitment. Habitat complexity is also anticipated to be increased by discontinuing grazing management practices because discontinuing grazing will allow for the establishment of native riparian plant communities.

### Plant Riparian Plants

Existing riparian corridors will be enhanced by planting riparian species in adjacent uplands, within suitable areas of existing wet meadows and along existing riparian corridors. Riparian plantings along streams or adjacent to existing riparian habitat will supplement senescent vegetation, maintain or increase shade, and provide more overhead structure and diversity.

### Control Invasive And Noxious Plants

Targeted treatment of invasive and noxious plant species will occur if such species are present in the wetland rehabilitation areas. Invasive species are those nonnative species, not listed as noxious, that could compete with the survival and establishment of planted and seeded species. Following initial control of these species through manual, mechanical, or chemical control methods, the wetland rehabilitation areas will be planted with wetland and riparian plants.



# Chapter 8 Mitigation Maintenance Plan

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Maintenance of mitigation sites will consist of three distinct periods: plant establishment maintenance, short-term maintenance, and long-term maintenance. The first two periods, discussed in this chapter, will occur during the performance-monitoring period. Long-term maintenance, discussed in Chapter 11, will begin after the mitigation parcels achieve their designated success criteria.

Both the onsite mitigation area and offsite mitigation properties will receive maintenance during these periods. The level of maintenance generally decreases with each period, in keeping with the goal to establish self-sustaining natural habitats. On the onsite mitigation area, Caltrans will conduct maintenance in all three periods. At the offsite mitigation properties, Caltrans will implement the offsite mitigation and perform the plant establishment maintenance for the offsite mitigation parcels, but MCRCD will conduct short- and long-term maintenance. MCRCD is also responsible for collecting all biological monitoring during all three maintenance periods at the offsite mitigation properties.

## 8.1 Plant Establishment Maintenance Period

Plant establishment is the initial and most intensive maintenance period, beginning immediately after mitigation implementation activities are completed (Chapter 7). The plant establishment period is anticipated to last 3 years and will be performed by the Caltrans mitigation contractor for both onsite mitigation area and the offsite mitigation parcels. Plant establishment maintenance generally includes the following tasks, which are described in detail in Section 8.3:

- Water mitigation plantings.
- Control weeds around mitigation plantings and in overall planting areas.
- Control invasive plants, as needed.
- Assess plant protection and health.
- Install replacement plants (as needed, based on monitoring results).
- Conduct general assessment.

## 8.2 Short-Term Maintenance Period

The short-term maintenance period starts once the 3-year plant establishment period is complete and continues for the rest of the performance-monitoring period. Onsite mitigation areas will be treated as a management unit, and each offsite wetland and other waters mitigation unit will be treated as a maintenance/management unit.

The performance-monitoring period will be 5 years for wetland establishment mitigation units, and 10 years for all wetland rehabilitation habitat and other-waters rehabilitation units. The

performance-monitoring period will determine the length of the short-term maintenance period for that parcel. For example, established wetlands (which have a 5-year performance monitoring period) would have a 2-year short-term maintenance period, whereas the wetland rehabilitation areas (which have a 10-year performance-monitoring period) would have a 7-year short-term maintenance period.

Short-term maintenance is a less labor-intensive version of plant establishment maintenance. Most of the activities conducted in the plant establishment phase will continue, but they are performed less frequently than during plant establishment. Short-term maintenance generally includes the following tasks, which are described in Section 8.3:

- Control invasive plants, as needed.
- Assess plant protection and health.
- Conduct general assessment.

## **8.3 Maintenance Activities**

### **8.3.1 Water Mitigation Plantings**

Woody riparian and nonwoody plantings (excluding seeded areas) in the onsite mitigation area and offsite mitigation properties (low through upper banks) will be watered immediately after planting and during the first 3 years following the initial planting (i.e., the plant establishment period) to ensure survival and achieve performance standards and success criteria.

Depending on the location, plants will be watered using a hose attachment on a water truck or a temporary drip irrigation system. The maintenance contractor will inspect the plantings to determine watering requirements; the approximate anticipated watering schedule is outlined below.

Woody plants will be watered weekly during Year 1 of the plant establishment period and twice monthly during Years 2 and 3. Plants will receive approximately 5 gallons of water per application. Annual watering will begin in mid-spring and continue through mid-fall. Maintenance inspections will be undertaken weekly during Year 1 and twice monthly during Years 2 and 3 to determine whether the annual watering schedule and water application rate require adjustment based on site-specific soil moisture conditions or landscape-level conditions.

It is anticipated that herbaceous wetland plantings in the re-established, established, and rehabilitated wetlands will not be watered because they will be supported by seasonal inundation or soil saturation. Supplemental watering may be provided if the land manager determines that herbaceous wetland plantings are stressed and could be subject to extensive plant loss. Supplemental watering, if needed, would likely only be needed during the first year of the establishment period.

### 8.3.2 Control Weeds

Periodic removal of nonnative vegetation, including invasive and noxious species, will be required during the maintenance periods for the re-establishment, establishment, and rehabilitation areas. Weed control will be provided for three primary reasons: 1) weeds are in direct competition with individual desired plants for nutrients, water, and other resources; 2) weeds can affect the ability of a mitigation unit to meet the performance standards (e.g., absolute percent cover by native species); and 3) weeds have the potential to take over a mitigation unit and spread into adjacent habitats.

Standard landscape weed control measures will be used to control weeds in the planting basins. Caltrans prepared an invasive plant management plan (IPMP; Appendix G) to address the control of species considered invasive or noxious. Invasive plants can be defined as plants that invade agricultural crops or infrastructure such as canals, or plants that invade natural communities, displace native species, and alter ecosystem functions (e.g., 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”; by the California Department of Food and Agriculture (CDFA) as A, B, or Q; and by the California Invasive Plant Council (Cal-IPC) as “high” (USDA National Invasive Species Information Center 2008; California Department of Food and Agriculture 2009; California Invasive Plant Council 2006, 2007).

The IPMP provides additional information on the definition and designation of nonnative plants. In brief, the IPMP identifies the following definitions for weeds, which will be used to define the maintenance and management actions for the control of 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*).
- The term *nonnative* is used for species that were directly or indirectly introduced by humans, were not present in the region before this introduction, and would not have spread into the area without human interference.
- *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.
- *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.

#### 8.3.2.1 Weed Control in Mitigation Planting Areas

Periodic removal of competing weedy vegetation will be required during the maintenance periods. Weeds that are in direct competition with planted or seeded native vegetation, and have the potential to displace or the vigor of desired species will be removed from the planting basins

or in the immediate vicinity of mitigation plantings. Removal techniques may include manual, mechanical, or chemical methods.

Weeds will be removed inside plant protection screens (for woody plantings), within the planting basins, and around stands of herbaceous plug plants. Weeds occurring at these locations will be removed manually on an as-needed basis to reduce weed competition throughout the maintenance period, or until such time that the land manager determines that planted and seeded species have become sufficiently established and that no further maintenance is required to ensure that the plantings meet the performance standards and success criteria (Chapter 9).

Native herbaceous vegetation that is planted, seeded, or naturally colonizes the mitigation/restoration site will be retained, although this herbaceous vegetation will be cleared from the woody plant species planting basins during the maintenance period to ensure establishment of the planted material.

### **8.3.2.2 Nonnative Plant Control**

Nonnative plants will be controlled in the onsite mitigation area and offsite mitigation units. The nonnative species to be controlled will vary depending on site-specific mitigation actions and associated performance standards and success criteria. Invasive and noxious plants in or adjacent to mitigation locations will be controlled using manual, mechanical, or chemical control methods.

Re-established, established, and rehabilitated wetlands have performance standards and success criteria for absolute percent cover by native wetland species. All nonnative species, regardless of whether they are defined as invasive or noxious, in these mitigation units may need to be controlled to ensure that the Year 10 success criteria for absolute percent cover by native wetland cover are achieved.

Re-established wetlands and riparian wetlands, established wetlands, and rehabilitated wetlands and other waters habitats also have performance standards and success criteria for absolute percent cover by invasive species. The performance standards and success criteria for invasive species cover for each mitigation type are described in Chapter 9. Invasive species will be controlled on an as-needed basis to ensure that the success criteria are met.

### **8.3.2.3 Weed Control Methods**

Nonchemical weed control methods (manual and mechanical) are preferred over chemical methods. If nonchemical methods are used, weeds will be removed before they reach their flowering stage or spread (whichever occurs first). Weeds that are cut and cleared will be legally disposed of offsite at a landfill or other facility that accepts green waste. Manual control methods may include hand removal or use of small hand-powered or handheld equipment (e.g., a Weed Wrench or a chainsaw). Mechanical removal may include string-trimming or mowing.

If chemical methods are used, herbicides will be applied in late winter, when leaf rosettes are beginning to appear. This is an effective time to conduct chemical control because the frequency of application is reduced, so less herbicide is needed. Before herbicides are applied, weeds will

be string-trimmed to a height of 6–12 inches to further reduce the amount of herbicide needed. Cut materials will be legally disposed of offsite at a landfill or other facility that accepts green waste. Once the cut materials have been cleared, herbicide will be applied to the remaining leaves and stems. Repeated treatments may be necessary, as determined by a qualified biologist/botanist. All herbicide treatments will be conducted by licensed personnel in accordance with the manufacturer's specifications. Herbicide application will comply with federal, state, and local health and water quality regulations.

Invasive plants will be controlled in a manner that minimizes disturbance to desirable native animal and plant species to the extent feasible. Any mitigation plantings or existing woody plants damaged during invasive plant control activities will be replaced in-kind at a 1:1 ratio, consistent with the planting procedures described for initial mitigation plantings. Replacement plants will be propagated from locally native stock if possible and will be as similar in size to the damaged plant as possible. Replacement plants will be planted in fall and winter. Replacement plant locations will be documented on the as-maintained drawings.

### **8.3.3 Assess Plant Protection and Health**

During maintenance inspections, each woody plant will be checked for deer or rodent browse damage; insect damage; signs of disease; wind, water, or drought stress; or other damage. Plants substantially affected (i.e., beyond their ability to recover unaided) will be replaced following the same procedures specified for initial plantings. Locations will be marked, and replanting will occur in fall or winter, as appropriate (Section 8.3.4).

Browse protection will be assessed to ensure that it is in good condition, functioning effectively, and not constricting or becoming embedded in the plant. If plants outgrow their browse protection, the protection will be replaced with larger collars or other measures or will be removed entirely.

Plants that become dislodged, settle excessively, or are otherwise unseated from their natural growing condition will be adjusted. Associated planting items such as plant protection, water basins, and mulch will also be adjusted as necessary.

### **8.3.4 Replace Plants**

#### **8.3.4.1 Replace Woody Plants**

Woody plants will be inspected during annual vegetation monitoring surveys to determine whether replacement plants will be necessary to meet the performance standards and success criteria. The annual monitoring report (Chapter 10) will identify the causes of any plant mortality and any remedial measures that may be necessary. For example, if a particular species has a high mortality rate, a determination will be made about the cause of plant mortality and whether replacement by another species better suited to the microsite conditions is warranted.

During each annual maintenance period, necessary replacement plants will be provided, installed, and maintained by the land manager. Replacement will include planting a sufficient number of seedlings so that the number of living plants meets or exceeds the success criteria. Plants will be replaced following the same procedures specified for initial plantings. Replacement plants will be propagated from locally native stock if possible, and will be as similar in size to the original plant as possible. Replacement plants will be planted in the fall/winter. Replacement plant locations will be documented on the as-maintained drawings.

#### **8.3.4.2 Replace Herbaceous Wetland Plants**

Herbaceous plants will be densely planted; therefore, each individual plant will not be inspected during annual vegetation monitoring surveys. Instead, a general assessment of plant survival and vigor will be performed to determine whether replacement plants will be necessary to meet the success criteria. The assessment will focus on identifying relatively large areas that have experienced high plant mortality. The annual monitoring report (Chapter 10) will identify the causes of any plant mortality and any remedial measures that may be necessary. Based on the site assessments, a determination will be made about the cause of plant mortality and whether replacement by another species better suited to the microsite conditions is warranted.

During each annual maintenance period, necessary replacement plants will be provided, installed, and maintained by the land manager. Replacement will include planting a sufficient number of seedlings so that the number of living plants meets or exceeds the success criteria. Plants will be replaced following the same procedures specified for initial plantings. Replacement plants will be propagated from locally native stock if possible, and will be as similar in size to the original plant as possible. Replacement plants will be planted in the fall/winter. Replacement plant locations will be documented on the as-maintained drawings.

#### **8.3.5 Conduct Supplemental Seeding**

Seeded areas include the wetland and other waters mitigation planting areas, as well as areas disturbed during implementation of mitigation actions. During each performance monitoring survey, a general assessment of seeded area establishment will be performed to determine whether supplemental seeding will be necessary to meet the performance standards and success criteria. The assessment will focus on identifying relatively large areas that have experienced low seed germination and seedling establishment. The annual monitoring report (Chapter 10) will identify the causes of any plant mortality and any remedial measures that may be necessary. Based on the site assessments, a determination will be made about the cause of plant mortality and whether replacement by another species better suited to the microsite conditions is warranted.

All surfaces disturbed by mitigation implementation will also be seeded after completion of the implementation phase. These seeded areas will be maintained during the maintenance period. It is anticipated that the seeded areas will become vegetated by seeded species and colonized by other herbaceous species that occur in adjacent areas. Seeding area maintenance will include reseeding large bare areas or other areas of concern identified by the land manager. Bare areas will be reseeded with the original seed mix at the rate specified in the construction documents.

### **8.3.6 Conduct General Assessment**

The onsite mitigation area and offsite mitigation properties will be assessed to ensure that site features such as fences, gates, irrigation systems, and access roads are in good working condition and free of debris and trash.

Fences and gates will be maintained in good working condition. Damaged fencing material will be replaced or repaired. Gates will be maintained in an operable condition, including working locks. All excess fence wire, fabric, and other materials will be collected and removed after each repair is completed.

Access roads will be maintained to the following standards:

- Access roads will have a smooth crown to ensure expedient surface water runoff.
- Graveled access roads will be maintained so that gravel covers most of the road surface, with minimal soil showing.
- Unimproved access roads will be maintained with onsite materials only; no new soil or other surface materials will be imported to the offsite mitigation properties.
- Access road culverts and roadside ditches will be maintained free of debris or obstructions.

The onsite mitigation area and offsite mitigation properties will be kept free of all unnatural debris and trash. Debris and trash will be removed promptly. Depending on the materials involved, debris and trash may be raked or removed manually, with care taken not to disturb or damage native vegetation. Collected debris and trash will be legally disposed of offsite at a landfill or other waste facility.

## **8.4 Record Keeping**

The maintenance activities described above will be documented on the as-maintained drawings during the plant establishment and short-term maintenance periods. The as-maintained drawings will be based on the as-built drawings. The as-maintained drawings will be updated as necessary to reflect current conditions at mitigation parcels, including the annual watering schedule, water application rates, invasive plant control activities, plant replacement, and general maintenance activities.

A record of monthly maintenance performed at the mitigation parcels will be kept during the plant establishment and short-term maintenance periods (i.e., 5 or 10 years). The record will document maintenance activities performed (e.g., purpose, location, method employed, labor and direct costs, effectiveness). A maintenance summary report will be compiled at the conclusion of each monitoring year that summarizes the monthly maintenance information and includes the as-maintained drawings for that maintenance year. This information will be helpful in the preparation of the performance monitoring report (see Section 10.5) and will be useful for long-term management and adaptive management decisions.

## 8.5 Maintenance Inspections

Schedules of maintenance inspections for the plant establishment maintenance and short-term maintenance periods are presented in Tables 8-1 and 8-2.

**Table 8-1. Schedule for Plant Establishment Maintenance Period**

Activity	Schedule and Notes
Water woody mitigation plantings	Weekly inspection April 15 through October 31 for Year 1. Inspection twice monthly April 15 through October 31 for Years 2 and 3.
Control invasive plants	Monthly inspection. Small infestations of invasive and noxious species removed immediately. Herbicide use typically timed for late winter (appearance of leaf rosettes).
Control other nonnative plants	Monthly inspection. Nonnative species in competition with mitigation plantings and native species cover. Herbicide use typically timed for late winter (appearance of leaf rosettes).
Assess plant protection and health	Monthly inspection. Replacement planting in fall and winter.
Install replacement plants and supplemental seeding	Annual plant replacement (if needed) based on monitoring results. Supplemental seeding as needed.
Conduct general assessment of offsite mitigation parcels	Monthly inspection. Repairs as needed.

**Table 8-2. Schedule for Short-Term Maintenance Period**

Activity	Schedule
Control invasive and noxious plants	Quarterly inspection; small infestations removed immediately; herbicide use typically timed for late winter (appearance of leaf rosettes)
Assess plant protection and health	Quarterly inspection; replacement planting in the fall/winter
Conduct general assessment of offsite mitigation parcels	Quarterly inspection; repairs as needed

## Chapter 9 Performance Standards

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Performance standards and success criteria have been developed to determine if the project's compensatory mitigation has successfully mitigated project impacts. The performance standards and success criteria were developed on the basis of USACE requirements.

As defined in this MMP, a *performance standard* is a measure of a habitat characteristic that is used to assess the progress of the habitat toward meeting a success criterion; a *success criterion* is a measure that indicates whether the mitigation has successfully addressed project impacts. Performance standards are applied during the performance monitoring period to determine if the habitat is progressing toward the success criteria. Success criteria are applied at the end of the performance monitoring period to determine if the mitigation has been successful.

Compensatory mitigation for the project will include: 1) re-establishment of temporary project impacts to wetland and other waters; 2) offsite wetland establishment and rehabilitation; and 3) other waters rehabilitation.

Performance monitoring will be performed to ensure that the compensatory mitigation is successful and fulfills the project's mitigation requirements. The tables in this chapter summarize performance standards and success criteria for re-established, established, and rehabilitated habitats as well as monitoring schedules.

Progress of the re-established, established, or rehabilitated habitats will be considered satisfactory if all the performance standards in the tables are met or exceeded for the onsite mitigation area and for each offsite mitigation management unit. The monitoring results will be aggregated for the onsite mitigation area (i.e., the results of all the individual wetland re-establishment sites will be aggregated). The monitoring results offsite mitigation unit will be assessed separately.

For the purpose of this document, an offsite mitigation unit is defined as a geographic area in which a particular mitigation action will occur. For example, on Ford 108-020-04 areas of wetland establishment (1 each) and Type 2 (3 each) and Type 3 (1 each) wetland rehabilitation are proposed. Each of these areas will be assessed as an individual unit (mitigation unit).

Success of the re-established, established, or rehabilitated mitigation habitats will be considered achieved if all the success criteria in the tables are met or exceeded for the onsite mitigation area and for each offsite mitigation property. Written notification of completion of the performance monitoring period and compliance with the performance standards and success criteria for each onsite mitigation area by Caltrans and each offsite mitigation property by the Land Manager will be provided to the USACE. USACE will then confirm whether they are in agreement with the assessment. The corresponding performance monitoring methods for performance standards and success criteria discussed below are presented in Chapter 10.

## **9.1 Re-established or Established Wetland**

### **9.1.1 Wet Meadow Wetland**

Wet meadow re-establishment will occur only onsite, while establishment will occur only on the offsite mitigation property. Wet meadow wetland re-establishment and establishment share the same performance standards, success criteria, and length of monitoring period. The success of re-established or established wet meadow habitat will be measured by performance standards and success criteria for absolute percent cover by wetland species, absolute percent cover by native wetland species, species richness, hydroperiod, and absolute cover by invasive plants (Table 9-1). Re-established or established wet meadow wetlands will be monitored annually for 5 years.

#### **9.1.1.1 Absolute Percent Cover by Wetland Plant Species**

On average, at least 80% absolute vegetation cover by wetland plant species will be present in re-established or established wetland habitat at Year 5 (Table 9-1). Annual performance standards have been developed for Years 1–4 to serve as indicators of the trend in the establishment of absolute percent cover by wetland plant species. Wetland species are defined as facultative (FAC), facultative wetland (FACW), or obligate (OBL) after Reed (1988).

#### **9.1.1.2 Absolute Percent Cover by Native Wetland Plant Species**

Native wetland vegetation in re-established or established wetland habitat will provide 50% absolute cover at Year 5 (Table 9-1). Annual performance standards have been developed for Years 1–4 to serve as indicators of the trend in the establishment of absolute percent cover by native wetland plant species. Wetland species are defined as FAC, FACW, or OBL after Reed (1988).

#### **9.1.1.3 Species Richness**

All re-established or established wetland habitat will contain at least 75% of the number of species originally seeded and/or planted at Year 5 (Table 9-1). Annual performance standards have been developed for Years 1–4 to serve as indicators of the trend in the establishment of planted and seeded species.

#### **9.1.1.4 Hydroperiod**

The hydroperiod for all re-established and established wetland habitats will be within plus or minus 10% of the hydroperiod for monitoring reference sites at Year 5. Monitoring results will be aggregated for the onsite mitigation area and presented separately for each established wetland on the offsite mitigation property (Table 9-1).

#### **9.1.1.5 Absolute Cover by Invasive Plants**

Invasive plant cover, as defined in Chapter 8, will be monitored concurrently with monitoring absolute percent cover for wetland and native wetland species in the wet meadow re-

establishment and establishment sites. Cover by invasive plants will be less than 5% of the absolute cover of all plants, and less than 10% of the absolute cover of nonnative plants. Monitoring results will be aggregated for the onsite mitigation area and presented separately for each offsite mitigation property (Table 9-1).

Invasive plant cover will also be monitored in reference sites. In the event that invasive plants in the reference sites exceed the success criteria, the absolute cover of invasive plants in the reference sites will serve as the success criteria.

**Table 9-1. Re-established or Established Wet Meadow Habitat—Performance Standards and Success Criteria**

Habitat Characteristic	Performance Standards		Success Criteria	
	Monitoring Year	Standard	Monitoring Year	Criterion
Absolute percent cover by wetland plant species	1	35%	5	80%
	2	50%		
	3	60%		
	4	70%		
Absolute percent cover by native wetland plant species	1	25%	5	50%
	2	30%		
	3	35%		
	4	40%		
Species richness	1-4	Presence of at least 75% of the number of species seeded and/or planted	5	Presence of at least 75% of the number of species seeded and/or planted
Hydroperiod	1-4	The hydroperiod for all re-established and established wetland habitats will be within plus or minus 10% of the hydroperiod for monitoring reference sites	5	The hydroperiod for all re-established and established wetland habitats will be within plus or minus 10% of the hydroperiod for monitoring reference sites
Absolute cover by invasive plants	1-4	Cover by invasive plants will be less than 5% or 10% of the absolute cover of all plants in re-established and established wetlands	5	Cover by invasive plants will be less than 5% or 10% of the absolute cover of all plants in re-established and established wetlands

### 9.1.2 Re-established Riparian Wetland

Riparian wetland re-establishment will take place only onsite. No riparian wetland establishment is proposed. The success of riparian wetland re-establishment will be measured by performance standards and success criteria for plant survival, plant vigor, and percent vegetation cover. Re-established riparian wetlands will be monitored over a 10-year timeframe at Years 1–5, 6, 8, and 10 (Table 9-2).

**Table 9-2. Re-established Riparian Wetlands—  
Performance Standards and Success Criteria**

Habitat Characteristic	Performance Standards		Success Criteria	
	Monitoring Year	Standard	Monitoring Year	Criterion
Plant survival by percentage survival of original number planted (includes replacement plants), by species	1	90%	5	60%
	2	80%		
	3	70%		
	4	60%		
Plant vigor by species (both planted and replacement plants)	1–4	Greater than 1.0	5	Equal or greater than 2.0
Percent vegetation cover (i.e., absolute canopy cover) by native tree species	5	10%	10	50%
	6	20%		
	8	40%		
Percent vegetation cover (i.e., absolute canopy cover) by native shrub species	5	10%	10	50%
	6	20%		
	8	40%		

### 9.1.2.1 Plant Survival

All plants planted as part of mitigation efforts (including replacement plants) will be monitored to assess survival rates. Monitoring results will be aggregated for the onsite mitigation area. Naturally recruited plants will not be included as part of plant survival monitoring because inclusion would skew the monitoring results, which focus on survival of planted material. Planted material will have a minimum of 60% survival at Year 5. Annual performance standards have been developed for Years 1–4 to serve as indicators of the trend in plant survival.

The plant survival performance standard and success criteria will be replaced in Year 5 by percent vegetation cover performance standards and success criteria, which will be monitored in Years 5, 6, 8, and 10 and will include both planted and naturally recruited vegetation. This shift is appropriate because as riparian habitat develops and plants mature, a canopy begins developing and individual plant assessment becomes less relevant to overall ecological success.

### 9.1.2.2 Plant Vigor

All plants planted as part of mitigation efforts (including replacement plants) will be monitored during Years 1 through 5 to assess vigor. Monitoring results will be aggregated for the onsite mitigation area. Annual performance standards have been developed for Years 1–4 to serve as indicators of the trend in plant vigor. Naturally recruited plants will not be included as part of plant vigor monitoring because inclusion would skew the monitoring results, which focus on vigor of planted material.

The determination of vigor will include disease symptoms, low-density foliage, atypical leaf color, stem and foliar vigor (e.g., signs of desiccation, leaf curl), browsing or other wildlife-related damage, and vandalism. A vigor rating of *good*, *fair* or *poor* (values of 3.0, 2.0, and 1.0, respectively) will be assigned to each plant. Dead plants will not be assigned a vigor rating. These ratings are defined below.

- **Good (3.0):** A plant with less than 25% of its aboveground growth exhibiting one or more of the factors listed above.
- **Fair (2.0):** A plant with 25–75% of its aboveground growth exhibiting one or more of the factors listed above.
- **Poor (1.0):** A plant with more than 75% of its aboveground growth exhibiting one or more of the factors listed above.
- **Dead:** A plant that does not appear capable of growth.

For planted material to be considered alive, plant vigor must be greater than 1.0 for Years 1–4 and equal to or greater than 2.0 at Year 5.

### 9.1.2.3 Percent Vegetation Cover

The percent vegetation cover (i.e., absolute canopy cover) in the riparian corridor for planted and naturally recruited native tree and shrub species by vegetative strata must be 50%, at Year 10. Annual performance standards have been developed for Years 1–4 to serve as indicators of the trend in the percent vegetation cover of native tree and shrub species. Monitoring results will be aggregated for the onsite mitigation area.

## 9.2 Rehabilitated Wetlands

Wetland rehabilitation will occur in existing wetlands on offsite mitigation properties only. Some rehabilitation will take place in wetlands adjacent to creeks within riparian corridors currently vegetated with only grasses. As described in Chapters 6 and 7, five types of wetland rehabilitation will be implemented. Type 1 (successional development) rehabilitation has an exclusive set of performance standards and success criteria that require no decrease below Year 1 wetland and native species cover values. Types 2–4 share the same success criteria for total absolute percent cover by all wetland plant species; however each of these types has its own set of success criteria for total absolute percent cover by native wetland species. Type 5 also has its own set of performance standards and success criteria as well. The specific performance standards and success criteria for each wetland rehabilitation type are presented in the following sections.

### 9.2.1 Rehabilitated Wet Meadow Wetland (Type 1)

Type 1 wet meadow rehabilitation will occur on the Watson parcels. Type 1 rehabilitation will occur on the entirety of Watson APN 037-250-05 and in the southwest portion of Watson East (APN 037-221-30). Type 1 rehabilitation will be accomplished by removing grazing and haying from the entire mitigation unit. Because these parcels already have high-quality wetland habitat over most of the parcel no mitigation actions will be implemented. Year 1 surveys will be used to determine the existing total absolute percent cover by wetland species and absolute percent cover by native wetland species. The mitigation units will be monitored during Years 1–10 to ensure that there is no decrease in absolute percent cover by wetland and native wetland plant cover.

Year 1 surveys will also be used to determine the presence/absence and absolute percent cover by noxious plant species. The performance standards and success criteria for Type 1 wetland rehabilitation mitigation units are presented in Table 9-3.

**Table 9-3. Type 1 Rehabilitated Wetland Habitat—Performance Standards and Success Criteria**

Habitat Characteristic	Performance Standards		Success Criteria	
	Monitoring Years	Standard	Monitoring Year	Criterion
Absolute percent cover by wetland plant species	2	No decrease in absolute cover by wetland species below Year 1 conditions	-	-
	4			
	5			
	7			
	9			
	-	-	10	No decrease in absolute cover by wetland species below Year 1 conditions
Absolute percent cover by native wetland plant species	2	No decrease in absolute cover by wetland species below Year 1 conditions	-	-
	4			
	5			
	7			
	9			
	-	-	10	No decrease in absolute cover by wetland species below Year 1 conditions
Absolute percent cover by noxious plant species	2, 4, 5, 7, 9	Less than 2%	-	-
	-	-	10	Less than 2%

### 9.2.2 Rehabilitated Wet Meadow Wetland (Type 2)

Type 2 wet meadow rehabilitation will be accomplished by removing grazing and haying from the entire mitigation unit. No planting or seeding will occur because existing native vegetation is expected to expand and new native populations are expected to colonize the rehabilitation mitigation units. If Type 2 rehabilitation mitigation units are not meeting or trending toward meeting the performance standard by Year 4, Caltrans will assess the need to provide supplemental planting and seeding of Type 2 rehabilitation mitigation units on a unit-by-unit basis.

Type 2 rehabilitation mitigation units have performance standards and success criteria that are similar to Types 3 and 4 rehabilitation mitigation units. The success of rehabilitated wet meadow habitat will be measured by performance standards and success criteria for absolute percent cover by wetland species, absolute percent cover by native wetland species, and absolute cover by noxious plants (Table 9-4).

### **9.2.3 Rehabilitated Wet Meadow Wetland (Types 3–4)**

Types 3–4 wet meadow rehabilitation will consist of manipulating the biological (vegetation) characteristics of degraded wet meadows by removing nonnative species followed by planting and seeding native herbaceous wetland species (Chapter 7). The success of rehabilitated wet meadow habitat will be measured by performance standards and success criteria for absolute percent cover by wetland species, absolute percent cover by native wetland species, and absolute cover by noxious plants (Table 9-4).

Native woody plant species will be planted in clusters in Type 3 wetland rehabilitation mitigation units to provide increase functions and services for these rehabilitation units and adjacent habitats. The native tree species planting component of Type 3 wetland rehabilitation efforts is not expected to significantly contribute to the overall percent cover of native plant species. Therefore, Type 3 rehabilitation efforts will not be subject to the performance standards and success criteria for vegetation cover. Instead, woody plant species will be monitored to determine plant survival and plant vigor (Table 9-4).

**Table 9-4. Type 3–4 Rehabilitated Wetland Habitat—  
Performance Standards and Success Criteria**

Habitat Characteristic	Monitoring Year	Performance Standards and Success Criteria <sup>1</sup>						Comments
		Type 2—0.1 Credit Value		Type 3—0.2 Credit Value		Type 4—0.3 Credit Value		
		Performance Standard	Success Criteria	Performance Standard	Success Criteria	Performance Standard	Success Criteria (%)	
Absolute percent cover by wetland plant species over Year 1 surveys	1	-	-	-	-	-	-	Increase in absolute cover by wetland plant species over Year 1 surveys.
	2	15%	-	15%	-	15%	-	
	3	-	-	-	-	-	-	
	4	40%	-	40%	-	40%	-	
	5	50%	-	50%	-	50%	-	
	6	-	-	-	-	-	-	
	7	70%	-	70%	-	70%	-	
	8	-	-	-	-	-	-	
	9	80%	-	80%	-	80%	-	
	10	-	90%	-	90%	-	90%	
Absolute percent increase in native wetland plant species cover over Year 1 surveys	1	-	-	-	-	-	-	Increase in absolute cover by wetland plant species over Year 1 surveys.
	2	2%	-	8%	-	14%	-	
	3	-	-	-	-	-	-	
	4	4%	-	16%	-	28%	-	
	5	5%	-	20%	-	35%	-	
	6	-	-	-	-	-	-	
	7	7%	-	28%	-	49%	-	
	8	-	-	-	-	-	-	
	9	9%	-	36%	-	63%	-	
	10	-	10%	-	40%	-	70%	

Habitat Characteristic	Monitoring Year	Performance Standards and Success Criteria <sup>1</sup>						Comments
		Type 2—0.1 Credit Value		Type 3—0.2 Credit Value		Type 4—0.3 Credit Value		
		Performance Standard	Success Criteria	Performance Standard	Success Criteria	Performance Standard	Success Criteria (%)	
Absolute percent cover by noxious plant species	2, 4, 5, 7, 9, 10	Less than 2%	Less than 2%	Less than 2%	Less than 2%	Less than 2%	Less than 2%	—
Plant survival by percentage survival of original number planted (includes replacement plants), by species	1	—	—	90%	—	—	—	—
	2	—	—	80%	—	—	—	—
	3	—	—	70%	—	—	—	—
	4	—	—	60%	—	—	—	—
	5	—	—	60%	—	—	—	—
	6	—	—	55%	—	—	—	—
	8	—	—	50%	—	—	—	—
Plant vigor by species (both planted and replacement plants)	1–5, 6, 8	—	—	Greater than 1.0	—	—	—	—
	6, 8, 10	—	—	—	Equal or greater than 2.0	—	—	—

### **9.2.3.1 Absolute Percent Cover by Wetland Plant Species**

On average, at least 90% absolute vegetation cover by wetland plant species will be present in rehabilitated wetland habitat at Year 10. Annual performance standards have been developed for Years 1–9 to serve as indicators of the trend in the establishment of absolute percent cover by wetland plant species. Wetland species are defined as FAC, FACW, or OBL after Reed (1988).

### **9.2.3.2 Absolute Percent Cover by Native Wetland Plant Species**

For Types 2–4, the performance standards and success criteria applied to a particular type of wetland rehabilitation within a mitigation unit will vary depending on the existing total absolute percent cover of native species determined by the Year 1 surveys (Table 9-5). This is because a certain percentage of native plant species cover will be credited toward meeting the final success criteria depending on the existing absolute percent cover by native wetland species. Wetland species are defined as FAC, FACW, or OBL after Reed (1988).

For example, the success criteria for a Type 3 wetland rehabilitation mitigation unit is a minimum 40% absolute percent cover by native wetland species at Year 10. If a Type 3 wetland rehabilitation mitigation unit has 0% cover by native wetland species at the time of the Year 1 survey, a 40% increase in absolute percent cover of native wetland species is required at Year 10 (success criteria = 40% total absolute cover of native species in year 10). If at Year 1 the existing total absolute percent cover by native wetland species in a Type 3 wetland is already at 50%, the required increase by year 10 is 40% conversion to natives of the remaining 50% of the land, which is 20% of the total area being rehabilitated.

In this example, the success criteria would be the initial 50% of land that is already covered by native wetland species, plus the additional 20% of land that is targeted for conversion to native wetland species, or 70%. The 70% success criteria at Year 10 as opposed to 90% (50% existing plus 40% required increase over time) reflects a 20% credit (90% – 70% = 20%) given to the site for already having a certain level of native wetland species cover present. More simply, the higher the existing native cover, the lower the required increase. It should be noted that large areas that are already highly functioning wetlands with high concentrations of native species, (Type 1 rehabilitation areas) were excluded from the higher levels of rehabilitation credit.

Table 9-5 presents the results of an assessment of existing native wetland plant cover that was derived using wetland delineations, California Rapid Assessment Methodology (CRAM) results, and other available information (i.e., vegetative surveys for establishment sites, field staff notes, etc.) for each of the offsite mitigation properties on which rehabilitation will occur. Table 9-6 provides a complete breakdown of the sliding scale illustrating the credit given for existing native cover (see Table 9-4 for performance standards for Types 3–4).

**Table 9-5. Preliminary Assessment of Existing Native Wetland Species Cover on the Offsite Mitigation Properties**

Parcel Name	Assessor's Parcel Number (APN)	Data Sources			Comments
		Wetland Delineations	CRAM Wetland Data		
		Estimate of Absolute Percent Cover by Native Species	Number of AAs/Parcels Used to Determine % Cover	Estimate of Absolute Percent Cover by Native Species	
Benbow	108-020-06	19%	2	36%	–
	108-040-13	55%	2	40%	–
	108-030-07	35%	2	64%	–
	007-010-04	32%	3	31%	–
	007-020-03	33%	3	6%	–
Brooke	108-020-03	–	–	–	Only Type 5 wetland rehabilitation occurs on this parcel. Existing cover value does not apply.
Ford	108-010-05	–	–	–	Only Type 5 wetland rehabilitation occurs on this parcel. Existing cover value does not apply.
	108-010-06	–	9	36%	–
	108-020-04	–	4	35%	–
	108-030-02	–	2	37%	–
	108-030-05	–	2	30%	–
Frost	108-070-04	–	–	–	Only erosion control repair occurs on this parcel. Existing cover value does not apply.
Goss	103-230-02	35%	3	26%	Group 1 wetland establishment occurs on this parcel. See additional information in Appendix J.
Lusher	108-030-04	48%	2	31%	–
MGC Plasma North	103-230-06	35%	–	–	Group 1 wetland establishment occurs on this parcel. See additional information in Appendix J.
MGC Plasma Middle	103-250-14	31%	–	–	Group 1 wetland establishment occurs on this parcel. See additional information in Appendix J.

Parcel Name	Assessor's Parcel Number (APN)	Data Sources			Comments
		Wetland Delineations	CRAM Wetland Data		
		Estimate of Absolute Percent Cover by Native Species	Number of AAs/Parcels Used to Determine % Cover	Estimate of Absolute Percent Cover by Native Species	
Niesen	108-040-02	30%	3	26%	Group 1 wetland establishment occurs on this parcel. See additional information in Appendix J.
Watson East	037-221-30	–	2	33%	Group 1 wetland establishment occurs on this parcel. See additional information in Appendix J.
Watson West	037-250-05	–	2	74%	Type 1 rehabilitation area.
Wildlands	108-060-01	–	2	50%	–
	108-070-09	–	2	22%	–
	108-070-08	–	4	55%	–
	108-020-07 108-030-08	–	2	64%	–

**Table 9-6. Sliding Scale of Performance Standards  
and Success Criteria for Wetland Rehabilitation Areas**

Existing Absolute Percent Cover by Native Wetland Species (%)	Required Success Criteria for Total Absolute Percent Cover by Native Wetland Species, by Wetland Rehabilitation Type				
	Wet Meadow				Riparian
	Type 1 (0.05 Wetland Credit)	Type 2 (0.1 Wetland Credit)	Type 3 (0.2 Wetland Credit)	Type 4 (0.3 Wetland Credit)	Type 5 (0.3 Wetland Credit)
0	–	10%	40%	70%	–
10%	–	19%	46%	73%	–
20%	–	28%	52%	76%	–
30%	–	37%	58%	79%	–
40%	–	46%	64%	82%	–
50%	–	55%	70%	85%	–
60%	–	64%	76%	88%	–
70%	–	73%	82%	91%	–
80%	–	82%	88%	94%	–
90%	–	91%	94%	97%	–
100%	–	–	–	–	–

### 9.2.3.3 Absolute Cover by Noxious Plants

Noxious species, as defined in Chapter 8, will be monitored concurrently with monitoring absolute percent cover for wetland and native wetland species in the wet meadow re-establishment and establishment sites. Cover by noxious plants will be less than 2% of the absolute cover of all plants in rehabilitated wetlands at Year 10.

### 9.2.3.4 Plant Survival

Woody plants planted in the Type 3 wetland rehabilitation units will be monitored to assess survival rates. Naturally recruited plants will not be included as part of plant survival monitoring because inclusion would skew the monitoring results, which focus on survival of planted material. Planted material will have a minimum of 50% survival at Year 10. Annual performance standards have been developed for Years 1–5, 6, 8, and 9 to serve as indicators of the trend in plant survival.

### 9.2.3.5 Plant Vigor

All plants planted as part of mitigation efforts (including replacement plants) will be monitored during Years 1–5, 6, 8, and 10 to assess vigor. Annual performance standards have been developed for Years 1–5, 6, and 8 to serve as indicators of the trend in plant vigor. Naturally recruited plants will not be included as part of plant vigor monitoring because inclusion would skew the monitoring results, which focus on vigor of planted material. The determination of vigor will be determined in the same manner as that for reestablished riparian habitat (Section 9.1.2.2).

## **9.2.4 Rehabilitated Riparian Wetland (Type 5)**

The success of Type 5 rehabilitated riparian wetlands will be measured using the same performance standards and success criteria developed for re-established onsite riparian habitat (Table 9-2). The habitat characteristics to be monitored are plant survival, plant vigor, and absolute percent cover by native riparian tree and shrub species. In addition, performance standards and success criteria for absolute cover by noxious plant species will be applied to Type 5 wetlands. Rehabilitated riparian wetlands will be monitored annually for 10 years according to the schedule in Table 9-2.

### **9.2.4.1 Plant Survival**

All plants planted as part of mitigation efforts (including replacement plants) will be monitored to assess survival rates, with monitoring results presented separately for each offsite mitigation management unit. Naturally recruited plants will not be included as part of plant survival monitoring because inclusion would skew the monitoring results, which focus on survival of planted material. Planted material will have a minimum of 60% survival at Year 5. Annual performance standards have been developed for Years 1–4 to serve as indicators of the trend in plant survival.

The plant survival performance standard and success criteria will be replaced in Year 5 by percent vegetation cover and plant density performance standards and success criteria, which will be monitored in Years 5, 6, 8, and 10 and will include both planted and naturally recruited vegetation.

### **9.2.4.2 Plant Vigor**

All plants planted as part of mitigation efforts (including replacement plants) will be monitored during Years 1–5 to assess vigor. Monitoring results will be aggregated for each offsite mitigation unit. Annual performance standards have been developed for Years 1–4 to serve as indicators of the trend in plant vigor. Naturally recruited plants will not be included as part of plant vigor monitoring because inclusion would skew the monitoring results, which focus on vigor of planted material.

The determination of vigor will be determined in the same way as for reestablished riparian habitat (Section 9.1.2.2).

### **9.2.4.3 Percent Vegetation Cover**

The percent vegetation cover (i.e., absolute canopy cover) in the riparian corridor for planted and naturally recruited native tree and shrub species by vegetative strata must be 50% at Year 10. Annual performance standards have been developed for Years 1–4 to serve as indicators of the trend in the percent vegetation cover of native tree and shrub species. Monitoring results will be aggregated for each Type 5 mitigation unit.

#### **9.2.4.4 Absolute Cover by Noxious Plants**

Noxious species, as defined in Chapter 8, will be monitored concurrently with monitoring percent cover for native tree and shrub species. Cover by noxious plants will be less than 2% of the absolute cover of all plants in Type 5 rehabilitated wetlands at Year 10 (Table 9-3). The performance standards and success criteria for absolute percent cover by noxious plant species in Table 9-3 also applies to Type 5 rehabilitated wetlands in Years 5, 7, 9, and 10.

### **9.3 Re-established Other Waters**

#### **9.3.1 Riparian Habitat**

Other waters re-establishment consists of planting riparian vegetation at temporarily affected sites within the project. It shares the same performance standards, success criteria, and length of monitoring period with riparian wetland re-establishment. See Section 9.1.2 for details.

### **9.4 Rehabilitated Other Waters**

#### **9.4.1 Riparian Habitat**

Other waters rehabilitation of this type includes planting riparian vegetation at the offsite mitigation properties within corridors adjacent to degraded other waters currently covered by herbaceous vegetation and/or by removing woody nonnative species followed by planting native woody riparian species. It shares the same performance standards, success criteria, and length of monitoring period with riparian wetland re-establishment. See Section 9.1.2 for details.

#### **9.4.2 Erosion Repair and Fish Passage**

Fish passage improvements and in-stream erosion repairs are also attributed to other waters rehabilitation. No credits have been applied to these actions, and no performance standards or success criteria are proposed.

### **9.5 Summary of Monitoring Actions**

Table 9-7 summarizes the monitoring required for each mitigation unit to determine whether the mitigation is successful.

**Table 9-7. Monitoring Requirements for the Onsite and Offsite Mitigation Areas**

Parcel	APN	All Monitoring Locations	Re-established and Established Wetlands						Re-established Riparian Wetlands				Rehabilitated Wetlands (Type 1–4)				Rehabilitated Type 5 Wetlands and Other Waters				
		Qualitative Data on General Site Conditions	Photo Monitoring Stations	Absolute Percent Cover by Wetland Species	Absolute Percent Cover by Native Wetland Species	Species Richness	Hydroperiod	Absolute Cover by Invasive Plants	Plant Survival	Plant Vigor	Percent Vegetation Cover of Native Trees and Shrubs	Absolute Cover by Invasive Plants	Absolute Percent Cover by Wetland Species	Absolute Percent Cover by Native Wetland Species	Absolute Percent Cover by Noxious Species	Plant Survival (Type 3 Wetlands Only)	Plant Vigor (Type 3 Wetlands Only)	Plant Survival	Plant Vigor	Percent Vegetation Cover of Native Trees and Shrubs	Absolute Cover by Invasive Plants (Type 5 Wetlands Only)
<b>Onsite Wetland and Riparian Habitat Repair Area</b>	-	X	X	X	X	X	X	X	X	X	X										
<b>Offsite Mitigation Areas</b>																					
Benbow	007-010-04	X	X										X	X	X	X	X	X	X	X	X
	007-020-03	X	X										X	X	X	X	X	X	X	X	X
	108-020-06	X	X	X	X	X	X	X													
	108-030-07	X	X										X	X	X						
	108-040-13	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X
Brooke	108-020-03	X	X														X	X	X	X	X
Ford	108-010-05	X	X														X	X	X	X	X
	108-010-06	X	X	X	X	X	X	X									X	X	X	X	X
	108-020-04	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X
	108-030-02	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X
	108-030-05	X	X										X	X	X	X	X	X	X	X	X
Frost	108-070-04	X	X										X	X	X	X	X	X	X		X
Goss	103-230-02	X	X	X	X	X	X	X													
Lusher	108-030-04	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X
MGC Plasma North	103-230-06	X	X	X	X	X	X	X													

Parcel	APN	All Monitoring Locations	Re-established and Established Wetlands						Re-established Riparian Wetlands				Rehabilitated Wetlands (Type 1–4)				Rehabilitated Type 5 Wetlands and Other Waters					
		Qualitative Data on General Site Conditions	Photo Monitoring Stations	Absolute Percent Cover by Wetland Species	Absolute Percent Cover by Native Wetland Species	Species Richness	Hydroperiod	Absolute Cover by Invasive Plants	Plant Survival	Plant Vigor	Percent Vegetation Cover of Native Trees and Shrubs	Absolute Cover by Invasive Plants	Absolute Percent Cover by Wetland Species	Absolute Percent Cover by Native Wetland Species	Absolute Percent Cover by Noxious Species	Plant Survival (Type 3 Wetlands Only)	Plant Vigor (Type 3 Wetlands Only)	Plant Survival	Plant Vigor	Percent Vegetation Cover of Native Trees and Shrubs	Absolute Cover by Invasive Plants (Type 5 Wetlands Only)	Total Area of Riparian Habitat (Yr 10)
MGC Plasma Middle	103-250-14	X	X	X	X	X	X	X					X	X	X							
Niesen	108-040-02	X	X	X	X	X	X	X														
Watson	037-221-30	X	X	X	X	X	X	X					X	X	X	X	X					
	037-250-05	X	X										X	X	X	X	X					
Wildlands	108-020-07	X	X	X	X	X	X	X					X	X	X			X	X	X	X	X
	108-030-08	X	X										X	X	X	X	X	X	X	X	X	X
	108-060-01	X	X	X	X	X	X	X					X	X	X			X	X	X	X	X
	108-070-08	X											X	X	X	X	X	X	X	X	X	X
	108-070-09	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X	X



# Chapter 10 Monitoring Requirements

To ensure that re-established, established, and rehabilitated mitigation is progressing toward the success criteria established in this MMP (Chapter 9), qualified biologists will monitor the mitigation using standard, easily reproducible monitoring methods that are known and accepted by the scientific community and regulatory agencies. Two types of monitoring will be conducted: performance monitoring and reference site monitoring.

*Performance monitoring* will be used to assess the progress of the onsite mitigation area and offsite mitigation management units toward meeting performance standards and success criteria. *Reference site monitoring* will be used identify environmental trends at the onsite mitigation area and the offsite mitigation properties. These monitoring methods are described below.

## 10.1 Performance Monitoring

Performance monitoring will be conducted for re-established, established, and rehabilitated mitigation habitat to assess the progress of the habitat toward meeting the performance standards and success criteria presented in Chapter 9.

### 10.1.1 Monitoring Schedule

The performance monitoring schedule will vary according to habitat type (Table 10-1). Monitoring reference sites will be monitored concurrently with mitigation habitat.

**Table 10-1. Performance Monitoring Schedule**

Habitat Type and Habitat Characteristics	Monitoring Years	Monitoring Period
<b>Re-established or Established Wetland Habitat</b>		
Absolute percent cover by wetland plant species	1–5	April–May
Absolute percent cover by native wetland plant species	1–5	April–May
Species Richness	1–5	April–May
Hydroperiod	1-5	November–May
Absolute cover by invasive species	1-5	April-May
Other data	1–5	April–May
<b>Re-established Riparian Habitat</b>		
Plant survival	1–4	August–September
Plant vigor	1–4	August–September
Percent vegetation cover	5, 6, 8, 10	August–September
Other data	1–6, 8, 10	August–September
<b>Rehabilitated Wetland (Types 1–4)</b>		
Absolute percent cover by wetland plant species	2, 4, 5, 7, 9	April–May
Absolute percent cover by native wetland plant species	2, 4, 5, 7, 9	April–May
Absolute cover by noxious species	2, 4, 5, 7, 9	April-May
Other data	2, 4, 5, 7, 9	April–May

Habitat Type and Habitat Characteristics	Monitoring Years	Monitoring Period
<b>Rehabilitated Other Waters and Rehabilitated Riparian Wetland (Type 5)</b>		
Plant survival	1–4	August–September
Plant vigor	1–4	August–September
Percent vegetation cover	5, 6, 8, 10	August–September
Other data	1–6, 8, 10	August–September

## 10.1.2 Mitigation Monitoring Methods

Monitoring methods will vary according to habitat type and will include landscape photodocumentation at permanent stations. The monitoring methods that will be used during performance monitoring are described below by habitat type.

### 10.1.2.1 Re-established or Established Wetland

Re-established and established wetlands will be monitored in the onsite mitigation area and on the offsite mitigation units where this mitigation habitat occurs. Re-established riparian wetland habitat will be monitored in August or September of each monitoring year to quantify most of the growth expected to occur each growing season (Table 10-1). Performance monitoring of re-established or established wetland habitat will focus on absolute percent cover by wetland plant species, absolute percent cover by native wetland plant species, species richness, hydroperiod, and absolute cover of invasive species in Years 1–5. In addition, as part of other data to be collected, general site conditions will be assessed and photodocumentation will be conducted in Years 1–5.

Re-established or established wetland habitat will be monitored in the onsite mitigation area and the offsite mitigation areas where the habitat occurs. Re-established or established wetland habitat will be monitored in April–May of each monitoring year to coincide with the flowering periods of most wetland species.

#### **Absolute Percent Cover by Wetland Plant Species**

Absolute percent cover by wetland plant species will be monitored in re-established and established wetlands, with monitoring results aggregated for the onsite mitigation area and assessed individually for each established wetland on the offsite mitigation property.

Absolute percent cover provided by planted, seeded, and naturally recruited wetland plant species for each re-established or established wetland will be monitored using randomly selected 1-square-meter quadrats placed along permanent 100-meter-long transects. If wetland dimensions do not accommodate a 100-meter transect, the transect length will be shortened to the dimensions of the wetland. A maximum of five transects will be field located for each acre of re-established or established wetland.

The endpoints of each transect will be permanently marked in the field using metal t-posts or other method. Transect endpoints will be documented using global position system (GPS) units. The absolute percent cover of all species will be visually estimated in each quadrat. Only plants rooted within a quadrat will be used to estimate the cover value for that species. The absolute

percent cover value of all hydrophytic species of all quadrats will be summed and divided by the number of quadrats to determine the average absolute percent cover by wetland species for re-established or established wetlands.

### ***Absolute Percent Cover by Native Wetland Plant Species***

Absolute percent cover by native wetland plant species will be monitored in re-established and established wetlands, with monitoring results aggregated for the onsite mitigation area and assessed individually for each established wetland on the offsite mitigation property.

Absolute percent cover by native wetland plant species will be estimated using the same method as that used for estimating absolute percent cover by wetland plant species. Absolute percent cover data for native wetland plant species will be collected concurrently with absolute percent cover data for wetland plant species.

### ***Species Richness***

Species richness will be monitored concurrently with absolute percent cover monitoring. Species richness will be monitored in re-established and established wetlands, with monitoring results aggregated for the onsite mitigation area and assessed individually for each established wetland on the offsite mitigation property.

Species richness will be monitored using the same transects and quadrats used for determining absolute percent cover. Species richness will be determined by identifying, to the extent feasible, all plants in each quadrat to the species level and developing a cumulative list for each re-established or established wetland. The species richness value of planted native species will be determined for each transect as well as for each re-established or established wetland. The species richness value of all quadrats will be summed and divided by the number of quadrants to determine the average species richness value for re-established or established wetlands.

### ***Hydroperiod***

The hydroperiod of re-established and established wetlands will be monitored in re-established and established wetlands, with monitoring results aggregated for the onsite mitigation area and assessed individually for each established wetland on the offsite mitigation property.

Hydroperiod monitoring will include determining the extent of ponding and soil saturation in re-established and established wetlands once cumulative rainfall has reached approximately 5 inches (typically November). Monitoring will continue to determine if the re-established and established wetland hydroperiod is within plus or minus 10% of the hydroperiod in the monitored reference site wetlands.

For the onsite mitigation area, inundation depths will be measured at one fixed point for each acre of re-established wetlands using a staff gage and/or shallow groundwater monitoring wells. For the offsite mitigation property, inundation depths will be measured at one fixed point for each established wetland (this includes the minor portions of wetland that were repaired) using a staff gage and/or shallow groundwater monitoring well. To the extent possible, digging soil pits to determine shallow groundwater levels will be avoided to minimize disturbance to the re-established and established wetlands.

### **Absolute Percent Cover by Invasive Species**

The absolute cover by invasive plants will be measured in the sampling quadrats as well as by performing relevé surveys throughout each sampling unit. The location and size of invasive plant populations will be recorded using a GPS receiver.

### **Other Data**

In addition to the monitoring described above, general site conditions will be visually assessed during each monitoring visit. Site conditions will be documented using permanent photodocumentation stations.

#### **10.1.2.2 Re-established Riparian Habitat**

Re-established riparian habitat will be monitored in the onsite mitigation area where this mitigation habitat occurs. Re-established riparian habitat will be monitored according to the schedule presented in Table 10-1. Performance monitoring of re-established riparian habitat will initially focus on plant survival and plant vigor in Years 1–5 and then shift to percent vegetation cover in Years 5, 6, 8, and 10. This approach is appropriate because as riparian habitat develops and plants mature, a canopy begins developing and individual plant assessment becomes less relevant to overall ecological success.

### **Plant Survival**

Plant survival will be conducted at the re-established riparian wetland planting areas, with monitoring results aggregated by species for the onsite mitigation area. Each plant that was planted as part of mitigation efforts will be monitored for survival (replacement plants are included in this monitoring), with monitoring results aggregated by species for the onsite mitigation area. Naturally recruited plants will not be included as part of plant survival monitoring because inclusion would skew the monitoring results, which focus on survival of planted material.

Identifying individual species' survival rates will determine whether any single species is becoming dominant or does not appear to be well suited for a particular mitigation site. The determination of survival rates will be based on the total number of plants of that species originally planted at each mitigation site. Plants will be recorded as dead if no viable aboveground growth is visible. For example, if all the leaves on a tree are brown, but an examination of the stems and branches shows viable stem tissue, the plant will be considered alive, although it may be given a low vigor rating.

### **Plant Vigor**

Plant vigor will be monitored concurrently with plant survival. Plant vigor monitoring will be conducted at the re-established riparian wetland planting areas, with monitoring results aggregated by species for the onsite mitigation area. Each plant that was planted as part of mitigation efforts will be monitored to assess vigor (replacement plants are included in this monitoring). Naturally recruited plants will not be included as part of plant vigor monitoring because inclusion would skew the monitoring results, which focus on vigor of planted material.

The determination of vigor will entail consideration of disease symptoms, low-density foliage, atypical leaf color, stem and foliar vigor (e.g., signs of desiccation, leaf curl), browsing or other

wildlife-related damage, and vandalism. A vigor rating of *good*, *fair* or *poor* (values of 3.0, 2.0, and 1.0, respectively) will be assigned to each plant. Dead plants will not be assigned a vigor rating. These ratings are defined below.

- **Good (3.0):** A plant with less than 25% of its aboveground growth exhibiting one or more of the factors listed above.
- **Fair (2.0):** A plant with 25–75% of its aboveground growth exhibiting one or more of the factors listed above.
- **Poor (1.0):** A plant with more than 75% of its aboveground growth exhibiting one or more of the factors listed above.
- **Dead:** A plant that does not appear capable of growth.

### **Percent Vegetation Cover**

Percent vegetation cover by native trees and shrubs will be monitored at the re-established riparian wetland planting areas, with monitoring results aggregated for the onsite mitigation area. Naturally recruited plants will be considered under percent vegetation cover monitoring because they will contribute to native riparian habitat cover.

Percent vegetation cover will be assessed quantitatively using a line-intercept method. For linear planting areas adjacent to the bypass alignment, a permanent line transect will be established along the planting areas using a measuring tape. In larger, nonlinear planting areas one or more line transects will be established at randomly selected locations.

The line-intercept method will be used to record the absolute percent vegetation cover by native tree and shrub species, and absolute cover by noxious plants. The location and size of noxious plant populations will be recorded using a GPS receiver, whether observed through the transect sampling method or through visual inspection of the rehabilitation site. Wherever a native tree or shrub intersects the line transect, the distance the plant (or group of plants) spans on the measuring tape will be recorded. Tree and shrub cover will be recorded separately to determine the percent canopy cover provided by trees and by shrubs. Areas with nonnative tree and shrub cover, as well as areas with no tree or shrub cover, will also be recorded. This process will be repeated along the entire length of the transect.

Vegetation strata will be as defined in the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Region* (U.S. Army Corps of Engineers 2008).

### **Other Data**

In addition to the monitoring described above, total riparian habitat area will be determined in Year 10. Aerial photographs will be taken in the summer of monitoring Year 10 and used in the field to map the edge of riparian trees and shrubs in re-established riparian habitat. The resulting polygons will be measured to determine the total area of riparian habitat based on canopy extent.

Qualitative data will be collected during each monitoring visit on general site conditions. Site conditions will be documented using permanent photodocumentation stations.

### **10.1.2.3      Rehabilitated Wetland Habitat**

#### ***Rehabilitated Wet Meadow Wetland (Types 1–4)***

Performance monitoring of Type 1–4 rehabilitated wetlands will be monitored in the offsite mitigation property where they occur, with monitoring results aggregated for each wetland rehabilitation mitigation property. Rehabilitated wetland habitat will be monitored according to the schedule presented in Table 10-1.

Performance monitoring of Type 1–4 rehabilitated wet meadow wetland habitat will focus on absolute percent cover by wetland plant species, absolute percent cover by native wetland plant species, and absolute percent cover of noxious species. In addition, as part of other data to be collected, general site conditions will be assessed and photodocumentation will be conducted.

Performance monitoring will occur along permanent transects. Transects will traverse the width of the individual mitigation areas. The location and quantity of transects will be determined in the field prior to beginning the surveys. The transect locations and quantities will be selected to provide a representative sample for each mitigation unit. The selected transect locations will be used for the Year 1–10 performance monitoring surveys. The endpoints of each transect will be permanently marked in the field using metal t-posts or other method. Absolute percent vegetation cover by wetland species and absolute percent vegetation cover by native wetland species will be measured within 1-square-meter quadrats that are placed at random locations on each transect.

The absolute percent cover of all species will be visually estimated in each quadrat. Only plants rooted within a quadrat will be used to estimate the cover value for that species. The absolute percent cover value of all hydrophytic and native hydrophytic species of all quadrats will be summed and divided by the number of quadrats to determine the average absolute percent cover by wetland species for rehabilitated wetlands.

The transect sampling method will also be used to record the absolute cover of noxious plants throughout each sampling unit. The location and size of noxious plant populations will be recorded using a GPS receiver, whether observed through the transect sampling method or through visual inspection of the rehabilitation site.

### **10.1.2.4      Rehabilitated Riparian Wetland (Type 5)**

Performance monitoring of Type 5 rehabilitated riparian habitat will be monitored in the offsite mitigation property where this mitigation habitat occurs, with monitoring results aggregated for each wetland rehabilitation mitigation unit. Rehabilitated riparian wetland habitat will be monitored according to the schedule presented in Table 10-1.

Performance monitoring of rehabilitated riparian habitat will initially focus on plant survival and plant vigor in Years 1–5 and then shift to percent vegetation cover in Years 5, 6, 8, and 10. This approach is appropriate because as riparian habitat develops and plants mature, a canopy begins developing and individual plant assessment becomes less relevant to overall ecological success. In addition, the intent of riparian wetland rehabilitation efforts is to increase the overhead cover in riparian corridor streams; accordingly, a direct assessment of cover is desirable to determine if mitigation efforts are successful.

Vegetation cover data will be collected along permanent transects. The transect locations and lengths will be determined in the field prior to beginning the surveys. Transects will traverse portions of the length of the sampling units. The location and quantity of transects for each mitigation unit will be selected to provide a representative sample for each sampling area. The endpoints of each transect will be permanently marked in the field using metal t-posts or other method. The selected transect locations will be used during Years 5, 6, 8, and 10 performance monitoring surveys to record the absolute percent vegetation cover by native and shrub species.

The line-intercept method will be used on the transects to record the absolute percent vegetation cover by native tree and shrub species, and absolute cover by noxious plants. Wherever a native tree or shrub intersects the line transect, the distance the plant (or group of plants) spans on the measuring tape will be recorded. Tree and shrub cover will be recorded separately to determine the percent canopy cover provided by trees and by shrubs. Areas with nonnative tree and shrub cover, as well as areas with no tree or shrub cover, will also be recorded. This process will be repeated along the entire length of the transect.

The location and size of noxious plant populations will be recorded using a GPS receiver, whether observed through the transect sampling method or through visual inspection of the rehabilitation site.

Vegetation strata will be as defined in the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Region* (U.S. Army Corps of Engineers 2008).

In addition, as part of other data to be collected, total riparian canopy cover will be determined for riparian wetland mitigation units in Year 10; general site conditions will be assessed in Years 1–6, 8, and 10; and photodocumentation will be conducted in Years 1–6, 8, and 10.

#### **10.1.2.5 Rehabilitated Other Waters**

Performance monitoring of rehabilitated other waters will be monitored in the offsite mitigation units where this mitigation habitat occurs, with monitoring results aggregated for each mitigation unit. Rehabilitated other waters will be monitored according to the schedule presented in Table 10-1. The determination of sampling locations and the monitoring methods for rehabilitated other waters are the same as those identified in the Section 10.1.2.4.

Performance monitoring of rehabilitated other waters will initially focus on plant survival and plant vigor in Years 1–5 and then shift to percent vegetation cover in Years 5, 6, 8, and 10. This approach is appropriate because as riparian habitat develops and plants mature, a canopy begins developing and individual plant assessment becomes less relevant to overall ecological success.

In addition, the intent of other waters rehabilitation efforts is to increase the overhead cover in riparian corridor streams; accordingly, a direct assessment of cover is desirable to determine if mitigation efforts are successful. In addition, as part of other data to be collected, total riparian canopy cover will be determined for other waters rehabilitation mitigation units in Year 10; general site conditions will be assessed in Years 1–6, 8, and 10; and photodocumentation will be conducted in Years 1–6, 8, and 10.

## **10.2 Reference Site Monitoring**

Monitoring reference sites will be identified for the re-established wetland and riparian wetlands and established wetlands based on their ecological and physical similarity to the monitored habitat; these monitoring reference sites will be monitored in conjunction with re-established and established wetlands.

Reference sites will be selected during the Year 1 monitoring surveys.

### **10.2.1 Location of Monitoring Reference Sites**

#### **10.2.1.1 Onsite Monitoring Reference Sites**

For the onsite mitigation area, four monitoring reference sites will be selected for each of the following mitigation actions:

- Wetland re-establishment sites that will be returned to original grade only (no wetland seed mix and no wetland planting).
- Wetland re-establishment sites that will be returned to original grade, seeded with a wetland seed mix, and planted with wetland plants (Appendix D).
- Riparian re-establishment sites that will be planted with riparian trees and shrubs and seeded with an erosion control seed mix or seeded with a wetland seed mix (within the viaduct).

#### **10.2.1.2 Offsite Monitoring Reference Sites**

One monitoring reference site will be selected on each the offsite mitigation property on which wetland establishment will occur. The wetland establishment reference sites will be located in adjacent wetlands that will not be disturbed by mitigation construction.

### **10.2.2 Monitoring Schedule**

Monitoring reference sites will be monitored concurrently with mitigation habitat.

### **10.2.3 Monitoring Methods**

Monitoring methods for wetland establishment reference sites will be the same as described above for performance monitoring of mitigation habitat (Section 10.2).

### 10.3 Photodocumentation

The progress of re-established, established, or rehabilitated mitigation habitat will be documented photographically. Permanent photodocumentation stations will be established. The locations of photodocumentation stations will be determined during the first year of the monitoring period, and the locations will be identified in the field and mapped. Most photodocumentation stations will be permanently marked using a metal t-posts or other method. Photodocumentation stations in the vicinity of the roadway, however, will be identified on a map or by using a GPS receiver, but will not be permanently marked for safety reasons.

The number of photographs taken at a given photodocumentation station will vary, depending on the area and habitat. A sufficient number of stations will be established to ensure that the photographs provide a complete visual record of mitigation areas. Photographs will be taken during monitoring activities. Additional representative photographs may be taken at other times of the year at the Land Manager's discretion.

### 10.4 Monitoring Reports

Caltrans will prepare a monitoring report at the conclusion of each monitoring year and submit it to USACE by December 31. Each monitoring report will include the following information.

- The project CWA Section 404 permit number.
- A description of the project location.
- A summary of the monitoring methods.
- A list of the names, titles, and affiliations of the people who prepared the content of the report and/or participated in monitoring activities that year.
- A summary and analysis of the monitoring results, including an evaluation of site conditions in the context of performance standards and success criteria.
- A discussion of modifications made to the monitoring methods (if any).
- A discussion of the monitoring results.
- A discussion of maintenance efforts and remedial actions implemented since submittal of the previous monitoring report.
- Management recommendations for the following year, including discussion of areas with inadequate performance and recommendations for remedial action.
- An appendix containing photodocumentation of all re-established, established, and rehabilitated mitigation areas.



# Chapter 11 Long-Term Management Plan

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## 11.1 Purpose

The purpose of this long-term management plan is to ensure that the mitigation is maintained and managed in perpetuity in a manner that preserves the project's mitigation goals. It establishes guidance and a framework for management of day-to-day activities. This plan is a binding and enforceable instrument, implemented by CEs (or deed restrictions with agency approval) covering the mitigation parcels. This plan will take effect after completion of the short-term maintenance period, once the regulatory agencies have agreed that the mitigation has met the success criteria. The expected activities necessary to manage the offsite mitigation areas are listed below:

- General maintenance activities such as noxious plant species control.
- Cleanup and trash removal.
- Infrastructure management such as gate, fence, road, culvert, signage, and drainage feature repair.
- Other maintenance activities necessary to maintain the mitigated resource habitat quality and resource-specific long-term maintenance and monitoring activities as described in Chapters 8 and 10, respectively.

## 11.2 Responsible Parties

The responsible parties are listed below and described in more detail below. MCRCD is the property owner and land manager. CDFG is the endowment holder, CE holder, and compliance monitor.

### 11.2.1 Property Owner

Offsite mitigation properties have been purchased in the name of Caltrans. Caltrans will transfer fee title to MCRCD. Caltrans or its designee will place a CE over the parcels. CE documents will be submitted to Mendocino County for recordation.

### 11.2.2 Land Manager

The land manager will be MCRCD. The land manager, and subsequent land managers, upon transfer, will implement this long-term management plan. Long-term management tasks will be funded through a nonwasting endowment. The land manager's responsibilities include:

- Ensuring that signage and fencing are maintained.

- Coordinating trash removal.
- Conducting noxious plant management when necessary with qualified personnel.
- Reviewing monitoring data and recommending and coordinating remedial action with the regulatory agencies when necessary.
- Maintaining a log for the mitigation properties that will contain a record of all activities, correspondence, and determinations regarding the mitigation.
- Coordinating two general inspections per year of the mitigation properties, as required by this plan.
- Arranging for any corrective action necessary to ensure the performance of the habitat, as required by this plan.
- Submitting an annual general inspection report, in coordination with the monitoring biologists, regarding the compliance and maintenance status of the mitigation.
- Working with the regulatory agencies when necessary to carry out long-term management.

### **11.2.3 Qualified Personnel, Including Monitoring Biologist**

The land manager will retain professional biologists, botanists, or other specialists (i.e., the qualified personnel, including the monitoring biologist) to conduct specialized tasks. The monitoring biologist will be familiar with California flora and fauna and will have knowledge regarding the various special-status species and their ecology. The qualified personnel's responsibilities may include:

- Monitoring wetland function and erosion.
- Evaluating the accumulation of thatch and recommending removal, if needed.
- Evaluating the presence of newly introduced noxious plant species and recommending management, if needed.
- Evaluating site conditions and recommending remedial action to the land manager.
- Assisting in reviewing or planning restoration activities, use of the mitigation properties for education, or other tasks such as grant proposals.
- Working with the land manager and the regulatory agency staff.

If there are changes in the land manager or qualified personnel, the outgoing and incoming personnel will tour the mitigation properties together, and the former will advise the latter of trends, problems, and administrative difficulties.

### **11.2.4 Endowment Holder**

CDFG has agreed to act as the endowment holder. The endowment will be transferred to CDFG by June 30, 2013.

### **11.2.5 CE Holder and Compliance Monitor**

CDFG has agreed to act as the CE holder and compliance monitor for the offsite mitigation properties. Caltrans or its designee will provide CDFG with copies of the CE documents within 30 days after they have been recorded by Mendocino County.

## **11.3 Management Approach**

The general management approach to long-term maintenance of the mitigation properties will be to maintain quality habitat for each mitigated resource through ongoing monitoring and maintenance of key environmental characteristics. More specifically, an adaptive management approach will be used (if needed) to incorporate changes to management practices, including corrective actions, as determined to be appropriate by the land manager. Adaptive management includes those activities necessary to address the effects of climate change, fire, flood, or other natural events, force majeure, etc. Before considering any adaptive management changes to this long-term management plan, the land manager will consider whether such actions will help ensure the continued viability of mitigation sites' resources. See Chapter 12 for a detailed discussion of adaptive management.

## **11.4 Conditions That May Warrant Adaptive Management**

### **11.4.1 Changes in Hydrology**

Changes in hydrology could be short- or long-term, could be natural or artificial, and include reductions or increases in duration or volume. The land manager will evaluate each of the circumstances and, where it is reasonable and within the scope of the MMP and the control of the responsible parties, hydrologic changes would be addressed with appropriate actions. Some of those foreseeable situations, such as flooding and water supply issues, are discussed below.

Typically, winter and early spring flooding of varying extents occurs in the Little Lake Valley basin. After large storms, water in the relatively large upper Outlet Creek Basin backs up at the narrow and constricting mouth of Outlet Creek in the north end of Little Lake Valley (CH2M HILL 2006). Additional localized flooding in the valley is generally related to debris or erosion problems in the creeks. The Little Lake Valley basin, encompassing a 67.26-mi<sup>2</sup> area, is defined by the surrounding mountains. Flooding was recorded in the Outlet Creek Basin in 1907, 1938, 1950, 1955, 1964, 1983, and 1997. The largest recorded flood event in the valley occurred on December 20, 1964, lasting 84 hours, with total precipitation of 18.59 inches (CH2M HILL 2006).

In the case of prolonged flooding, specific actions may not be required, but instead may be recorded as a type change within a natural resource habitat. Where flood debris is interfering with the perpetual success of the mitigation, it will be removed; however, in cases where it adds to habitat complexity, it will be retained. Acute sedimentation from large flood events, such as those described in the previous paragraph, will be remediated if it interferes with perpetual

success of the mitigation. However, chronic long-term sedimentation, which is a normal condition of Little Lake Valley, will not be removed, and the mitigation will be allowed to adapt naturally in response to that condition.

The historical natural water supply of the valley has been reduced by the development of Willits, agricultural drainage projects, and a number of reservoirs in the surrounding hills. Furthermore, California is currently experiencing a statewide water crisis, and northern California's water supply is pressured by the demand to supply southern California's water needs. If a future widespread increase in private and public projects in and around the valley continues to decrease the natural water supply to the extent that it begins to effect the mitigation, then remediation would require the intervention of regulatory agencies or other governing bodies, because this would be a situation beyond the scope of this project and the authority of the land manager or Caltrans.

#### **11.4.2 Fire**

Despite wetter conditions and easy access, fire potential on the nongrazed mitigation areas could increase because of thatch accumulation over time. In the event that a fire destroys a wetland rehabilitation site, the site will be evaluated for damage and monitored for regrowth. Similarly, if an establishment site or wetland rehabilitation site that includes plantings is burned during the establishment period, it will be evaluated for damage and monitored for regrowth. Based on the time of year of the fire and extent of damage and plant regeneration, a revegetation or reseeded plan for the planted areas may be drafted and implemented.

#### **11.4.3 Extensive Adjacent Development**

Extensive development on adjacent properties may alter current hydrologic regimes supporting the mitigation sites, cause site disturbance that encourages growth and spread of invasive plant species, contribute to fragmentation of sensitive plant populations, involve site alterations that increase erosion or sedimentation on the mitigation site, or introduce grazing or other activities or features that pollute or create barriers in shared streams or creeks.

Because the mitigation lands will be held under a CE, future developers will be responsible for developing and implementing mitigation measures to avoid impacts on these protected lands. In the event that future development or significant land use changes are proposed on adjacent lands, the land manager will coordinate with the adjacent land owner, resource agency personnel assigned to that project, local planning department staff, and others to ensure that the mitigation goals for the mitigation parcels are not threatened or affected. This may be achieved through implementation of buffer zones, stormwater pollution prevention measures, permanent water quality infrastructure, cattle barriers, and other suitable measures.

#### **11.4.4 Failure to Meet or Retain Success Criteria**

All of the conditions discussed previously in this chapter may have affect a mitigation site's ability to meet the performance standards or success criteria. There may also be unforeseeable factors not captured in this document that can affect a site's ability to meet performance standards or success criteria. These factors can act at a landscape or local level. In any case, the initiating procedures are the same. The land manager will perform the following steps:

1. Identify the problem.
2. Develop a response and, if necessary, develop or adjust success criteria. Depending on the situation, the response may be as simple as an increase in the length of monitoring or as involved as replanting or regrading a site.
3. Implement the solution.
4. Monitor progress.
5. Make adjustments as needed.

The success of the mitigation sites will be evaluated by measuring various parameters. Because of the limited locations to mitigate in the valley, it is not practical to abandon a site and relocate the mitigation if a site fails to meet performance standards. Instead, the sites will be re-evaluated using the process outlined above. All remedial steps will be documented and included in the annual monitoring reports. In cases where performance standards are not progressing toward meeting final success criteria according to schedule, but progressive improvement is evident, an extension of the monitoring period could be considered an appropriate adaptive management action.

#### **11.4.5 Other Site Degradation**

Other site degradation may include soil erosion and vandalism. Soil erosion that negatively affects established habitats will be dealt with on a case-by-case basis using SWPPP standards. Strategies for dealing with vandalism will include signage, fencing, visual monitoring, and coordination with local law enforcement and other pertinent agencies.

### **11.5 Education, Public Access and Habitat Restoration/Enhancement**

#### **11.5.1 Education and Public Access**

The mitigation properties may represent an opportunity to encourage awareness and respect for open space and wildlife habitat in the community. Individuals or groups wishing to use the mitigation properties for educational purposes will obtain the consent of and coordinate with the land manager. If the education activities will be passive, such as a discussion of plants and animals, the consent of the land manager is sufficient. If active use (other than restoration activities) of the mitigation properties is envisioned, or regular but passive use is proposed, review and approval of the relevant regulatory agencies is required. To avoid repeated inquiries

with the regulatory agencies, a use plan could be developed by the interested party for one-time approval. The land manager has the right to refuse a request to use the mitigation properties if it is determined that the use may have a negative impact on any of the habitats or wildlife on the mitigation properties.

### **11.5.2 Habitat Restoration/Enhancement**

In the future, the land manager or Caltrans may want to conduct additional habitat establishment or rehabilitation on the mitigation properties. This could include removal of nonnative plant species, planting native plants, or other restoration activities. Restoration activities that involve work in wetlands or waters of the United States may require a CWA Section 404 permit from USACE, a CWA Section 401 water quality certification from RWB, a California Fish and Game Code Section 1602 streambed alteration agreement from CDFG, or other water quality permits. An example of a restoration activity that does not require a permit is planting acorns. An example of restoration activity that would require permits is recontouring of a creek bank and planting it with riparian species to stabilize an area of erosion. The land manager will not notify the regulatory agencies if the activities do not require a permit.

## **11.6 Funding Mechanism and Protection**

This section outlines the funding and restrictions on activities on any of the offsite mitigation properties included in the MMP. The annual costs of holding the CE and carrying out the tasks of this long-term management plan have been estimated using a property analysis record (PAR). PARs are generated using a computer program written by the Center for Natural Lands Management to allow land trust and preserve management foundations and organizations to better define and understand the financial obligations that come with managing natural areas.

Caltrans will provide the long-term endowment, in the amount of \$7,558,100.00, to CDFG, which has agreed to hold it. The long-term endowment will provide the funding necessary for the land manager to manage the mitigation properties in accordance with this plan. The annual ongoing financial requirement is estimated to be \$151,162.00. The long-term endowment principle, at a rate of 2%, will provide the income to meet this annual ongoing financial requirement. The long-term endowment does not cover the costs of initial and capital tasks (e.g., construction, short-term maintenance), which are covered under a separate endowment. To see a full breakdown of the endowment estimate, refer to Chapter 13.

## **11.7 Prohibited Uses**

It is understood that the following activities are prohibited, except as needed to accomplish the management and maintenance activities in this plan. In addition, if any of these activities must be undertaken because of special circumstances, they may be reviewed and approved by the regulatory agencies on a case-by-case basis. A CE also defines prohibited uses and will include those defined here. A CE will be placed on the mitigation parcels no later than 1 year after the

purchase date of the final mitigation parcel. The CE, once recorded, will supersede the list of prohibitive uses outlined in this plan. The CE will be held by CDFG.

### **11.7.1 Public Access to Mitigation Area**

The intent of this long-term management plan is to maintain the mitigation in perpetuity, and limiting public access to the mitigation area will further this goal. Off-trail pedestrian access to the mitigation area will be discouraged through fencing.

### **11.7.2 Removal of Native Vegetation**

No killing, removal, or alteration of any existing native vegetation will be allowed in the mitigation area except as described in the CE or this plan, or as reasonably necessary for the land manager to conduct land management activities, such as remedial grading associated with necessary adaptive management activities or use of prescribed burns in thatch management.

### **11.7.3 Burning and Dumping**

No burning will be allowed in the mitigation area. This prohibition does not prohibit controlled burning as a method of thatch management. No dumping of rubbish, garbage, or any other wastes or fill materials will be allowed in the mitigation area. This prohibition excludes fill material, such as clean dirt or gravel, that may be necessary to carry out land management of the property according to this plan or the CE.

### **11.7.4 Disking**

Plowing, disking, cultivating, ripping, planting, sowing, irrigation, or any other conversion or disturbance of the mitigation area is prohibited, except: 1) disking for fire prevention at historical levels or 2) to establish, re-establish, rehabilitate, preserve, or protect the mitigation. Any change in the topography of the mitigation area through the placement of soils, fill, dredging spoils, or other materials is prohibited, except as incidental and necessary to the activities permitted under the CE, or as necessary to establish, re-establish, rehabilitate, preserve, or protect the mitigation. Notwithstanding any provision of the CE and this plan to the contrary, in no event shall any permitted plowing, disking, cultivation, ripping, planting, sowing, irrigation, or any other conversion or disturbance of the mitigation area that impairs the mitigation be allowed.

### **11.7.5 Changes to Roads and Trails**

Existing roads and trails may be maintained in their current location with the same or similar material. Roads and trails not called out in this plan will not be allowed in the mitigation area unless it is determined by the land manager and regulatory agencies that they will not impair the mitigation.

### **11.7.6 Equipment or Fuel Storage**

Storage or disassembly of inoperable automobiles, machinery, equipment, trucks, and similar items for purposes of storage or sale, or rental of space for any such purpose, is prohibited on the mitigation area. The use, dumping, storage, or other disposal of noncompostable refuse, trash, sewer sludge, or unsightly, toxic, or hazardous materials or agrichemicals is prohibited.

Equipment and supplies, such as mowers, fencing supplies, plant stock, and herbicides permitted for use under the CE, necessary to accomplish the management tasks outlined in this plan and the CE may be stored at existing developed sites, such as the house and barns on the southern Benbow parcel. Herbicides permitted under the CE may be stored within the mitigation area, provided all such use and storage complies with applicable health, safety, and environmental laws and regulations, and does not diminish or impair the mitigation.

### **11.7.7 Changes to Topography**

Plowing, disking, cultivating, ripping, planting, sowing, irrigating, or any other conversion or disturbance of the mitigation area is prohibited except as set forth in the CE.

### **11.7.8 Use of Pesticides and Chemical Agents**

Except as needed for management of the habitat as outlined in this plan or the CE, there will be no use of any pesticides, fungicides, insecticides, or any other chemical agents used to kill or suppress plants, animals, or fungi in the mitigation area unless it is determined, after consultation with the regulatory agencies, that it will not impair the mitigation.

### **11.7.9 Use of Motor Vehicles**

No motorized vehicles will be ridden, brought, used, or permitted on any portion of the mitigation area, except as follows. Motorized vehicle use will be restricted to that required for mitigation area maintenance purposes such as monitoring, authorized mosquito abatement, and emergency or law enforcement situations requiring access by medical, fire, or law enforcement vehicles.

### **11.7.10 Construction Activities**

No construction will be allowed in the mitigation area, except for the activities mentioned in this plan or the CE.

### **11.7.11 Introduction of Non-Native Plants**

Except as expressly permitted by the terms of CE, this plan, or to establish, re-establish, , rehabilitate preserve or protect the mitigation area, no seeding, planting, or introduction of nonnative grasses, clovers, or any other plant species is permitted. Non-native plants include invasive and noxious species, as defined in Chapter 8. Intentional or reckless introduction of exotic plant or animal species that may, in the land manager's determination, threaten to impair the mitigation is prohibited.

## **11.8 Inspection, Monitoring, and Reporting**

### **11.8.1 Schedule**

Long-term monitoring begins (Year 1) when the regulatory agencies have agreed that the mitigation has met the success criteria at the end of the performance (short-term) monitoring period. The following surveys will be conducted during the long-term management period:

- The land manager will conduct two general inspections each year.
- The monitoring biologist will conduct biological monitoring by collecting quantitative data for the mitigation in Years 5, 10, and 15, and every 10 years thereafter.
- Followup inspections of the mitigation properties will occur as often as needed to protect the mitigation.

### **11.8.2 General Inspections**

General inspections will occur in May and November of each year. They will be conducted by the land manager or qualified personnel. The inspections will concentrate on an evaluation of erosion, fire hazard reduction, fencing integrity, trash accumulation, thatch accumulation, nonnative noxious plant species, and evidence of unauthorized use by motor vehicles. The entire perimeter of the mitigation properties will be covered, as well as meandering transects through its interior. The inspection sheet found at the end of this chapter (or a similar one) will be used to evaluate the criteria included on the inspection sheet during each field visit. Previous inspection sheets will be reviewed before each visit to help ensure that a possible or recurring problem area is not missed.

Photodocumentation will also be collected. Permanent photo points will be established, and a site map showing the photo points will be prepared for the mitigation project file. Representative photos will be taken once per year during the same season.

If any problems are identified, followup inspections will be done to closely track the problem and ensure that remedial actions are effective. Evaluation and corrective actions for each factor are described below.

### **11.8.2.1 Erosion**

If it is determined during the inspection that the adjacent stream or sheet-flow runoff is causing any erosion or other adverse effects on the mitigation, immediate standard erosion control measures (e.g., installation of straw waddles, silt fences, straw bales) will be implemented. If corrective measures are not effective, the land manager will identify the causes of the erosion and develop solutions to prevent further erosion problems. If erosion is the result of lateral channel migration, then further assessment would be required to determine appropriate restoration options, such as biotechnical bank stabilization.

### **11.8.2.2 Fire Hazard**

Vegetation will be mowed or hayed in areas required by the authority agency or agencies for local and/or state fire control.

### **11.8.2.3 Fencing and Gates**

During general inspections, the condition of fences and gates will be recorded. Fences and gates will be maintained as necessary by replacing posts, wire, gates, or other components as needed. Fences and gates will be maintained to prevent casual trespass, allow necessary access, and prevent livestock access from adjacent pastures.

### **11.8.2.4 Trash Accumulation**

At least twice yearly (once before fall and once after the first heavy rain), trash will be collected and disposed of on the mitigation sites. Vandalism and trespass impacts will be repaired and rectified. Sources of trash and trespass will be monitored.

### **11.8.2.5 Motor Vehicle Use**

The perimeter of the mitigation properties will be inspected for evidence of unauthorized motor vehicle use/access. If necessary, corrective actions such as repairing locks, fences, and gates will be completed by the land manager.

### **11.8.2.6 Invasive Plant Species Management**

The sites currently functions with a number of nonnative species, some of which have become naturalized. They are predominantly annual species that occur in grasslands. It is unreasonable to require or expect eradication of established nonnative species at the sites. Therefore, required management of nonnative plants will be limited to management of newly introduced nonnative pest plants and controlling the spread of existing nonnative pest plant populations that are a threat to the offsite establishment and rehabilitation mitigation units or adjacent nonjurisdictional mitigation land. Management of these plants will be done to the maximum extent practicable. The monitoring biologist and land manager can reference the sources identified in Section 8.3.2, Control Weeds, to assist them in determining whether a plant is a nonnative plant species of concern, particularly a species designated as invasive or noxious, and which species should be given priority for management. Methods of removing or controlling these species are outlined

below. An invasive plant management plan has been developed for the offsite mitigation properties and is found in Appendix G.

- **Hand/mechanical:** Hand removal or use of small hand-powered or handheld equipment (such as a Weed Wrench or chainsaw) should always be the preferred method of removing exotic pest plant species from the mitigation properties. If these methods are found to be ineffective or labor-intensive, or the problem is too widespread for hand removal to be practical, then mechanical methods (i.e., use of larger equipment with motors, such as mowers) or biological controls can be implemented as described in the next bullet.
- **Biological controls:** The Mendocino County agricultural commissioner would be the point of contact for use of biological controls on the mitigation properties. If biological controls are tried and found to be ineffective, or if they are not available for the target species, then herbicides can be used, but only as outlined in the next bullet.
- **Herbicides:** Herbicides will be applied by hand or mechanical means by the land manager or qualified personnel during the time of year and at an application rate that allow for the least amount of herbicide use while still eliminating the targeted species. Only herbicides that are approved for aquatic use will be used in or near aquatic areas. Mixing, loading, storing, or rinsing of equipment or containers will not take place in aquatic areas. BMPs that may be used to protect aquatic areas include: 1) avoiding application of herbicides under windy conditions; 2) using ground-based applicators, low tank pressures, and equipment calibration for larger droplet sizes; and 3) avoiding application of herbicides within 24 hours before or during rain.

#### 11.8.2.7 Mosquito Abatement

The additional established wet meadow wetlands located throughout the offsite mitigation properties are not expected to create a mosquito nuisance, primarily because of their seasonal nature and lack of long-standing open water. However, if mosquitoes associated with any of the aquatic habitats (e.g., the existing tule marsh) within the offsite mitigation properties become a nuisance or health hazard, mosquito abatement issues will be addressed through the development of a plan by the land manager and the local and/or regional mosquito and vector control district.

#### 11.8.3 Biological Monitoring

Long-term management of the mitigation sites' biological resources involves monitoring of selected characteristics in Years 5, 10, and 15, and every 10 years thereafter to determine stability and ongoing trends of the established and rehabilitated wetlands and riparian corridors. This effort will include monitoring aerial canopy cover for Type 5 wetland rehabilitation management units and other waters rehabilitation management units that included woody plant installation, wetland species plant cover, and photomonitoring.

Although major management actions are not anticipated to be necessary, one objective of this long-term management plan is to monitor and identify issues that arise, and to use adaptive management to determine what actions might be appropriate. If adaptive management actions become necessary, the monitoring schedule may be adjusted to increase the frequency or number

of followup inspections to ensure success. The qualified personnel will have the knowledge, training, and experience to accomplish monitoring responsibilities. Biological monitoring reports will be provided to the regulatory agencies during each monitoring year.

### **11.8.3.1 Established and Rehabilitated Wetlands**

Wetlands will be monitored, preserved, maintained and managed. As part of biological monitoring for established and Type 1–4 rehabilitated wetlands, data will be recorded for absolute percent cover by wetland plant species, absolute percent cover by native plant species, species richness, and absolute percent cover by noxious plant species (Chapter 10). General observations of plant community health will be documented during surveys. Notes will include observations of wildlife species encountered.

Permanent photo points for taking photographs will be established, and a site map showing the photo points will be prepared for the mitigation project file. Reference photographs will be taken of the overall wetland mosaic with the same frequency as the biological monitoring during April. Photos will be included in the monitoring report.

Invasive plants will be no more than 5% of the absolute cover from native plants in established wetlands. Noxious plants will be no more than 2% of the absolute cover from native plants in the rehabilitated wetlands (Chapter 9).

Data from established and rehabilitated wetlands will be compared to the data collected in the final year of the short-term performance monitoring period (success criteria). If the habitat has dropped below the success criteria, the land manager will determine whether an adaptive management approach should be used to incorporate changes to management practices, including corrective actions as determined to be appropriate by the land manager, in consultation with the appropriate resource agency.

### **11.8.3.2 Type 5 Wetland and Other Waters Rehabilitation**

As part of the biological monitoring, data will be recorded for riparian canopy cover according to the schedule outlined in Chapter 10. Additional mitigation will be done through fish passage improvements on streams along US 101. During long-term management, riparian corridors will be carefully managed, monitored, conserved, and maintained.

Aerial photographs will also be taken during monitoring years, will be used to determine aerial canopy cover, and will be field-verified. General observations of plant community health and natural recruitment will be documented during field verification. Notes will also include observations of wildlife species observed.

Data from rehabilitation areas will be compared to the data collected in the final year of the short-term performance monitoring period (success criteria). If the habitat has dropped below the success criteria, the land manager will determine whether an adaptive management approach should be used to incorporate changes to management practices, including corrective actions as determined to be appropriate by the land manager, in consultation with the appropriate resource agency.

## **11.8.4 Reporting and Administration**

### **11.8.4.1 Annual General Inspection Report**

At a minimum, the written annual general inspection report will include a map of the mitigation area, representative photos documenting the status of the selected mitigation areas, a description of proposed activities and maintenance or management actions as required by this plan, observations from the general inspections, an inspection sheet (end of this chapter), endowment accounting, and recommendations for altered management practices as needed. This report will be submitted to the resource agencies and Caltrans by December 30 of each year.

### **11.8.4.2 Biological Monitoring Report**

This report will be written and submitted to the resource agencies in Years 5, 10, and 15, and every 10 years thereafter. The report is intended to track whether the mitigation is self-sustaining in perpetuity. The report will be submitted to the resource agencies and Caltrans by December 30 of each year.

### **11.8.4.3 Erosion**

Caltrans assessed the existing erosion sites on the offsite mitigation properties in May 2010; 40 erosion features were identified (Appendix H). Of the 40 sites, five were recommended for restoration as part of the mitigation because this action could immediately improve water quality in the area, among other factors outlined in Appendix H. If it is observed during general inspections that any of the five restored erosion sites are deteriorating and contributing to excessive sediment, the land manager will document this observation as part of the general inspection report and begin adaptive management to rectify the situation.

## **11.9 Task Prioritization**

This section establishes a procedure to prioritize tasks in case unforeseen circumstances or events result in insufficient funding to accomplish all tasks. The land manager and resource agencies will discuss task priorities and funding availability to determine which tasks will be implemented. In general, tasks would be prioritized as follows: 1) those required by a local, state, or federal agency; 2) those necessary to maintain or remediate habitat quality; and 3) those that monitor resources, particularly if past monitoring has not shown downward trends. Equipment and materials necessary to implement priority tasks will also be considered priorities. Final determination of task priorities in any given year of insufficient funding will be determined in consultation with the resource agencies and Caltrans.

## **11.10 Transfer of Responsibilities and Plan Modification**

### **11.10.1 Transfer of Management Responsibilities**

Any subsequent transfer of management responsibilities under this long-term management plan to a different land manager will be requested in writing by the land manager. The request will be made to the resource agencies, which will issue written approval that will be incorporated as an amendment to this long-term management plan. Any subsequent land manager assumes the responsibilities described in this long-term management plan and as required by the CE, unless otherwise amended in writing by the resource agencies.

### **11.10.2 Replacement of Land Manager**

If the land manager fails to implement the tasks described in this long-term management plan and is notified of such failure in writing by any of the resource agencies, the land manager will have a minimum of 90 days to remediate such failure. A longer timeframe may be granted by the resource agencies depending on the complexity of the specific infraction. If failure is not remediated within 90 days, the land manager may request a meeting with the resource agencies to resolve the failure. This meeting will occur within 30 days or a longer period if approved by the resource agencies. Based on the outcome of the meeting, or if no meeting is requested, the resource agencies may designate a replacement land manager in writing amending this long-term management plan accordingly.

### **11.10.3 Amendments to Management Plan**

The land manager, property owner, and resource agencies may meet and confer from time to time, at the request of any of them, to revise the long-term management plan to better meet management objectives and preserve the habitat and mitigation. Any proposed changes to the long-term management plan will be discussed with the resource agencies and land manager. Any proposed changes will be designed with input from all parties. Amendments to the long-term management plan will be approved by the resource agencies in writing and will be implemented by the land manager.

# Conservation Area Inspection Sheet

Location: \_\_\_\_\_ Date: \_\_\_\_\_

Inspector: \_\_\_\_\_

General Observations: \_\_\_\_\_

Yes	No	Potential Issues
<input type="checkbox"/>	<input type="checkbox"/>	<b>Erosion</b> Is there any adjacent sheet-flow drainage causing erosion?
<input type="checkbox"/>	<input type="checkbox"/>	<b>Fire Hazard Reduction</b> Are there any fire dangers or hazards at this site?
<input type="checkbox"/>	<input type="checkbox"/>	<b>Fencing and Gates</b> Are there any gates or fencing needing to be repaired or replaced?
<input type="checkbox"/>	<input type="checkbox"/>	<b>Trash Accumulation</b> Does trash need to be removed from preserve?
<input type="checkbox"/>	<input type="checkbox"/>	<b>Unauthorized Motor Vehicle Use</b> Is there any unauthorized motor vehicle use identified at the preserve?
<input type="checkbox"/>	<input type="checkbox"/>	<b>Grazing Management</b> Are grazing leases in compliance?
<input type="checkbox"/>	<input type="checkbox"/>	<b>Disking and Topography</b> Has any land disturbance occurred?
<input type="checkbox"/>	<input type="checkbox"/>	<b>Additional Roads and Trails</b> Have any new roads or trails been created?
<input type="checkbox"/>	<input type="checkbox"/>	<b>Equipment or Fuel Storage</b> Is there any equipment or fuel being stored on the Conservation Area?
<input type="checkbox"/>	<input type="checkbox"/>	<b>Pesticides and Chemical Agents</b> Is there any indication that pesticides, fungicides, insecticides or any other chemical agents have been used on the Conservation Area?
<input type="checkbox"/>	<input type="checkbox"/>	<b>Construction</b> Has any construction occurred on the Conservation Area?
<input type="checkbox"/>	<input type="checkbox"/>	<b>Thatch Accumulation</b> Is excess thatch present that is hindering the Conservation Values of the property?
<input type="checkbox"/>	<input type="checkbox"/>	<b>Nonnative Invasive Species</b> Have any additional invasive plants been introduced?
<input type="checkbox"/>	<input type="checkbox"/>	<b>Mosquito Abatement</b> Have mosquitoes become a health hazard?

For every YES, document the noncompliance and identify how situation is to be resolved.  
For all compliance issues, record the date the land owner was advised of the situation and the steps taken to resolve the issue. Attach to preserve inspection sheet.

Date of followup site visit to determine compliance: \_\_\_\_\_

Were all issues resolved?

If NO, what additional steps will be taken? Attach to preserve inspection sheet.



# Chapter 12 Adaptive Management Plan

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This chapter presents the general framework for using adaptive management to rapidly detect potential threats to project mitigation, implement responses to those threats, and assess the effectiveness of those responses.

Adaptive management is appropriate when there is uncertainty in predicting effects or outcomes, there are clearly defined performance standards, and there is a commitment to monitor. The need for adaptive management could be triggered by changed conditions, such as a natural disaster, or by failure to maintain success criteria because of the uncertainty in predicting effects of mitigation actions.

Reference sites provide a useful tool to help determine when conditions at a mitigation management unit warrant adaptive management. Reference sites will be monitored and used as a gauge in determining when adaptive management actions are needed. Qualitative and quantitative information will be used to guide decision-making regarding specific management actions.

The overall adaptive management strategy will be to evaluate and work within the constraints of typical environmental conditions (e.g., ongoing sedimentation due to upstream land use) and natural environmental processes (e.g., meandering creekbeds) at the mitigation management units. Adaptive management will be performed by MCRCDC in consultation with Caltrans and the permitting resource agencies.<sup>1</sup> These typical conditions and natural processes create a dynamic environment.

Mitigation will be allowed to conform to the dynamic environment as it responds to the normal conditions and natural processes. Adaptive management actions will avoid creating situations that require recurring intervention to redirect or compete with the valley's typical environmental conditions and natural environmental processes. Natural recruitment, succession, and vegetation type changes within natural resource habitats will be accepted as part of this approach. For example, if a stream meanders into a planted riparian area and washes out the plants, the reasons for the stream's lateral movement would be determined and an assessment would be made about whether the stream should be allowed to meander. If it is allowed, lost riparian vegetation could be replanted in the abandoned creekbed or another more stable area if one is available. If no other areas suitable for riparian plantings are available, then replanting may not be recommended by the AMT. The AMT may also determine that the riparian vegetation lost because of the meandering creekbed is considered part of the natural processes of the site and no adaptive management actions are required.

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<sup>1</sup> These agencies are referred to collectively as the adaptive management team (AMT).

## 12.1 Responsible Parties

MCRCDD, as the land manager, will be responsible for implementing adaptive management at the mitigation sites.

## 12.2 Conditions That May Warrant Adaptive Management

### 12.2.1 Changes in Hydrology

Changes in hydrology could be short- or long-term, be natural or artificial, and include reductions or increases in duration or volume. The AMT will evaluate each of the circumstances, and hydrologic changes would be addressed with appropriate actions where it is reasonable and within the MMP's scope and the AMT's control. Some of those foreseeable situations, such as flooding, drought, and water supply issues, are discussed below.

Winter and early spring flooding of varying extent typically occurs in Little Lake Valley. After large storms, water in the relatively large upper Outlet Creek Basin backs up at the constricting mouth of Outlet Creek in the north end of Little Lake Valley (CH2M HILL 2006). Additional localized flooding in the valley is generally related to debris or erosion problems in the creeks. Flooding was recorded in the Outlet Creek Basin in 1907, 1938, 1950, 1955, 1964, 1983, and 1997 (CH2M HILL 2006).

In situations during the establishment period where wetland establishment, wetland rehabilitation, or other waters rehabilitation (riparian) mitigation has been washed away or otherwise damaged during a flood event or realignment of a watercourse, those habitats will be replanted if site conditions allow. The specific location of the planting will be evaluated to determine whether flooding will be an ongoing problem, in which case a more sustainable location may be selected. In the case of prolonged flooding, specific actions may not be required, but instead may be recorded as a type change within a natural resource habitat. If the watercourse realignment is determined to be a natural environmental process, no action will be required. Where flood debris interferes with the success of the management units, it will be removed; however, in cases where flood debris adds to habitat complexity, it will be retained. In cases where flood debris adds habitat complexity but causes a neighboring property to flood or dry up (downstream), or threatens culverts, bridges, or other structures, the debris will be removed. Acute sedimentation from large flood events, such as those described in the previous paragraph, will be remediated if it interferes with mitigation establishment. However, chronic long-term sedimentation, which is a typical condition of Little Lake Valley, will not be removed, and the management units will be allowed to adapt in response to that condition.

### 12.2.2 Drought

According to the National Integrated Drought Information System (NIDIS), Mendocino County has experienced 106 reported events since 1900 that had negative impacts relating to agriculture, fires, and water/energy reduction, and that compromised environmental and social conditions

associated with drought. Given that drought is foreseeable and is expected throughout the establishment period, the following actions will be considered to reduce its detrimental effects:

- During periods of seasonal drought, soil moisture will be checked on a regular basis during the first two to three growing seasons, and planted habitats should be evaluated for drought stress. The watering regime will be scheduled according to plant needs. Irrigation will provide the minimum amount necessary to keep the plants healthy, but will prevent them from becoming dependent on supplemental irrigation.
- If a prolonged drought continues beyond the establishment period, additional years of supplemental irrigation may be required.

The historical natural water supply of the valley has been reduced by the development of Willits, agricultural drainage projects, and a number of reservoirs in the surrounding hills. Furthermore, California is currently experiencing a statewide water crisis, and northern California's water supply is pressured by the demand to supply southern California's water needs. Continuation of this trend through future increase in private and public projects in and around the valley that diminish natural water supplies may prevent the mitigation from reaching success criteria. This situation would require the intervention of regulatory agencies or other governing bodies for remediation because it would be beyond the scope of the project and the authority of Caltrans.

### **12.2.3 Fire**

Despite wetter conditions and ease of access, an accumulation of thatch or understory could cause an increased fire risk in nongrazed lowland mitigation areas over time. If so, fire officials can use thinning, mowing, or controlled burning (to the minimum extent necessary) to reduce the threat of fire in these areas. Alternatively, a firebreak can be placed around the perimeter of the areas, if fire officials consider this efficient, but the potential effects on sensitive resources (e.g., disking in wet meadow) would need to be considered and avoided. In general, the least amount of human management possible should be used to remediate problems in the ungrazed mitigation areas.

If a wetland establishment, wetland rehabilitation, or other waters rehabilitation management unit that includes plantings is burned due to a controlled burn or other causes during the establishment period, the management unit will be evaluated for damage and monitored for regrowth. Based on the time of year of the fire and extent of damage and plant regeneration, a revegetation or reseeding plan may be drafted and implemented.

### **12.2.4 Extensive Adjacent Development**

Extensive development on adjacent properties may alter current hydrologic regimes supporting the mitigation management units, cause management unit disturbance that encourages growth and spread of invasive plant species, contribute to fragmentation of sensitive plant populations, involve management unit alterations that increase erosion or sedimentation within the mitigation management unit, or introduce grazing or other activities or features that pollute or create barriers in shared streams or creeks.

Because the mitigation parcels will be held under a CE, future developers will be responsible for developing and implementing mitigation measures to avoid impacts on these protected lands. In the event that future development or significant land use changes are proposed on adjacent lands, the land manager will coordinate with the adjacent landowner, resource agency personnel assigned to the project, local planning department staff, and others to ensure that the mitigation goals for the mitigation parcels are not threatened or affected. This may be achieved through implementation of buffer zones, stormwater pollution prevention measures, permanent water quality infrastructure, cattle barriers, and other suitable measures.

### **12.2.5 Other Site Degradation**

Other site degradation may include soil erosion, vandalism, and other yet-unknown effects. Soil erosion that negatively affects created habitats will be dealt with on a case-by-case basis using SWPPP standards. Strategies for dealing with vandalism will include signage, fencing, visual monitoring, and coordination with local law enforcement and other appropriate agencies. Other effects will be evaluated and addressed on a case-by-case basis.

### **12.2.6 Failure to Meet or Retain Success Criteria**

All of the conditions discussed previously in this chapter may have an impact on a management unit's ability to meet the performance standards or success criteria. There also may be unforeseen factors not captured in this document that can affect a management unit's ability to meet performance standards or success criteria. All of these factors can act at a landscape or local level. In any case, the initiating procedures are the same. The land manager will perform the following steps:

1. Identify the problem.
2. Develop a response and, if necessary, develop or adjust success criteria. Depending on the situation, the response may be as simple as an increase in the length of monitoring or as involved as replanting or regrading a site.
3. Implement the solution.
4. Monitor progress.
5. Make adjustments as needed.

The success of the mitigation management units will be evaluated by measuring various parameters. Because of the limited locations to mitigate in the valley, it is not practical to abandon a management unit and relocate the mitigation if the management unit fails to meet performance standards. Instead, the management units will be re-evaluated using the process outlined above. All remedial steps will be documented and included in the annual monitoring reports. In cases where performance is not progressing toward meeting final success criteria according to schedule, but progressive improvement is evident, then extension of the monitoring period could be appropriate.

### **12.2.6.1 Wetland Hydrology**

Wetland hydrology, specifically the hydroperiod, will be evaluated as part of the performance standards and success criteria for re-established and established wetland management units. If any of the management units fail to meet performance standards or success criteria, the land manager will perform the following steps as part of the adaptive management process:

- Review current climate conditions to determine whether the failure could be caused by a drought or flood year(s). If it is determined that climate is a factor, increased monitoring may need to occur until conditions normalize.
- Evaluate the grading to determine whether establishment sites need to be regraded to intercept the water table or allow more surface flow interaction.
- Evaluate, to the extent feasible, whether actions on neighboring parcels or factors up- or downstream may be interfering with natural water supplies.
- Review success criteria to determine whether they are appropriate for the wetland in question.

This list of factors is not meant to be exhaustive. The land manager may need to investigate other factors to understand the entire situation before recommending remedial actions. If remedial actions are necessary, the monitoring schedule should be temporarily lengthened to document the success of the remediation.

### **12.2.6.2 Vegetation**

Vegetation will be evaluated as part of the performance standards and success criteria for the following habitat types: 1) re-established or established wetlands; 2) re-established riparian sites; 3) rehabilitated wetlands; and 4) rehabilitated other waters sites. If any of the mitigation units fails to meet performance standards or success criteria, the land manager will perform the following steps as part of the adaptive management process:

- Evaluate hydroperiod to determine whether an absence or overabundance of water is inhibiting plant growth.
  - If a lack of water due to drought is the issue, the irrigation schedule for woody plants may need to be increased or extended until climate conditions normalize. The irrigation systems and watering methods should be evaluated for serviceability and suitability.
  - An overabundance of water caused by temporary, localized flooding (i.e., a wet year) could necessitate increased monitoring and replanting.
  - Obstructions up- or downstream or actions on neighboring properties could require debris removal or educational discussions with neighbors to alleviate the problems.
  - Natural landscape changes may not require remedial action.
  - At wetland establishment sites, regrading might be necessary to intercept the water table or allow more surface flow interaction.

- Evaluate mortality areas for herbivory. Remediation for herbivory could include implementing additional exclusionary devices, such as plant protection cages or fencing. Replanting may be necessary, depending on the extent of mortality.
- Evaluate site for invasive species infestations. Mechanical, chemical, or biological measures or prescribed burns may be necessary to control or eradicate any infestations. Any herbicide use must first be approved as part of an invasive species control plan by RWB, per the project's CWA Section 401 water quality certification.
- Review success criteria to determine whether they are appropriate for the management unit in question.

This list of factors is not meant to be exhaustive. The Land Manager should investigate other factors to understand the entire situation before recommending remedial actions. If remedial actions are necessary, the monitoring schedule should be temporarily lengthened to document the success of the remediation.

### **12.2.6.3 Invasive Species**

Invasive species, including noxious species, will be evaluated as part of the performance standards and success criteria for wetland rehabilitation sites. Should any of the sites not meet performance standards or success criteria, the land manager will investigate the following factors as part of the adaptive management process:

- Previous and current routine management practices that could increase the opportunities to introduce new invasive or noxious species to the mitigation management units.
- Practices on neighboring properties that increase the spread of invasive or noxious species, which may require educational discussions with landowners.
- Landscape-level changes that create bare soil (flood or wildfire) and allow invasive or noxious species to take hold and dominate an area.
- Mechanical, chemical, or biological measures or prescribed burns that may be necessary to control or eradicate the infestation.<sup>2</sup>

This list of factors is not meant to be exhaustive. The land manager may need to investigate other factors to understand the entire situation before recommending remedial actions. If remedial actions are necessary, the monitoring schedule should be temporarily lengthened to document the success of the remediation.

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<sup>2</sup> Any herbicide use must first be approved as part of an invasive species control plan by RWB, per the project's CWA Section 401 water quality certification.

## **12.3 Adaptive Management Protocol**

### **12.3.1 Initiating Procedures of Adaptive Management**

Annual monitoring reports will be submitted to the AMT. If necessary, MCRCD will call for an AMT meeting on submittal of the annual monitoring report to discuss detrimental changes, or the possibility of detrimental changes, in conditions. Possible occasions that may warrant an AMT meeting include the following:

- MCRCD has exhausted all practical solutions to a problem without positive results.
- There is no obvious solution.
- The problem or solution is beyond the scope of this project.
- The success criteria no longer seems suitable.

Once the protocol is triggered, MCRCD is responsible for leading the effort with the AMT to come to a resolution. If the AMT cannot come to a resolution, the issue requiring adaptive management will be forwarded to the AMT's management-level staff for a decision.

### **12.3.2 Revisions to Maintenance Requirements**

During the course of the long-term management program, certain site conditions may change and some requirements stated in the MMP may be insufficient or have a negative effect on the intent of the mitigation efforts. If MCRCD determines that this has occurred, Caltrans will be notified, the detrimental conditions will be identified, and maintenance reports will document and suggest alternative actions to remedy the situation and bring the maintenance approach into harmony with site conditions. Actions contrary to the requirements of the MMP will only be undertaken with the permission of Caltrans and the resource agencies.

### **12.3.3 Revisions to Monitoring Requirements**

During the course of the project, certain monitoring procedures in the MMP may become insufficient or redundant. If this occurs, MCRCD will notify Caltrans, identify the deficient or redundant practices, and suggest and document in the annual monitoring reports alternative actions to remedy the situation. Actions contrary to the requirements of the MMP will only be undertaken with the permission of Caltrans and the permitting resource agencies.

### **12.3.4 Funding**

Contingency funds have been established for short- and long-term maintenance and monitoring costs and for the long-term management and monitoring costs. These funds are intended to provide money for unanticipated expenses. Costs associated with adaptive management also would be paid using these funds. The amount of money in the contingency funds is calculated at 10% of the estimated short- and long-term mitigation management and monitoring costs.

# Chapter 13 Financial Assurances

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Caltrans acknowledges its obligation to comply with the requirements of the USACE CWA Section 404 individual permit. Mitigation costs below have been calculated for actions that will be related to the USACE permit. In addition, the project will be required to comply with the California Fish and Game Code Section 1602 streambed alteration/Section 2081 incidental take permit, the RWB CWA Section 401 certification, and the NMFS incidental take permit. The 2010 MMP estimated the total costs of the full mitigation effort to be approximately \$48 million.

The compensatory mitigation proposed in this document is considered part of the scope of the project, and as such will be funded with the same level of obligation as the roadway construction. Funding of the construction, short- and long-term monitoring, management, and maintenance of the mitigation described in this document will originate from the project.

The project is programmed in the State Transportation Improvement Program in fiscal year 2009/2010. The project has been granted a 20-month extension by the California Transportation Commission. The extension began July 1, 2010, and runs through February 2012.

The estimated cost for USACE-related mitigation is \$46,616,756. This estimated cost includes land acquisition, mitigation construction (including the Ryan Creek Fish Passage Project), short- and long-term monitoring, management, and maintenance and reporting. The breakdown of the total cost of mitigation is as follows:

- Land acquisition = \$16,000,000.
- Construction costs (minus Ryan Creek) = \$12,600,000.
- Ryan Creek Fish Passage Project = \$4,000,000.
- Initial and capital task (short-term endowment) = \$5,354,029.
- Ongoing tasks (long-term endowment) = \$12,227,655.

Mitigation funding is held in the Willits Bypass Expenditure Authorization (EA) 26200 and earmarked as mitigation dollars. Although it is being managed as a separate project, a portion of the Ryan Creek Fish Passage Project will be funded as compensatory mitigation for impacts on fisheries and waters of the United States resulting from the bypass project; a separate project and EA will be established for the Ryan Creek Fish Passage Project work, and money will be transferred from the Willits Bypass EA into the new Ryan Creek Fish Passage Project EA. This money will then be available to cover the full cost of the design as well as a to contribute toward the construction costs of the Ryan Creek Fish Passage Project.

The funding for long-term management of mitigation sites, which require protection in perpetuity, will be provided through the establishment of nonwasting endowments. Funding of these endowments will come from the Willits Bypass EA mentioned above. The amount of endowment funds was established by running a PAR for the offsite mitigation parcels. A breakdown of the estimated costs is as follows:



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