# Willits Bypass Project

# Mitigation and Monitoring Proposal

U.S. Highway 101

Mendocino County, near the City of Willits, California

PM 43.1-52.3

01-26200

CDFG Streambed Alternation Agreement file no.: 1600-2010-0044-R1

CDFG Incidental Take Permit file no.: 2081-2010-007-01

NCRWQCB CWA Certification file no.: R1-2010-0066

**April 2013**

Caltrans

CALIFORNIA DEPARTMENT OF TRANSPORTATION

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STATE OF CALIFORNIA
Department of Transportation

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# List of Abbreviated Terms

| | |
|---|---|
| AA | assessment area |
| AFY | acre-feet per year |
| APN | assessor's parcel number |
| ART | Agency Review Team |
| B-IBI | Benthic Index of Biological Integrity |
| BMI | benthic macroinvertebrate |
| BMP | best management practice |
| bypass project | Willits Bypass project |
| Cal-IPC | California Invasive Plant Council |
| Caltrans | California Department of Transportation |
| CDFG | California Department of Fish and Game |
| CE | conservation easement |
| CEQA | California Environmental Quality Act |
| cfs | cubic foot per second |
| CMP | Conceptual Mitigation Plan |
| CNPS | California Native Plant Society |
| CRAM | California Rapid Assessment Method |
| CRZ | clear recovery zone |
| CWA | federal Clean Water Act |
| dbh | diameter at breast height |
| DEIS/DEIR | draft environmental impact statement/draft environmental impact report |
| DSEIR | Draft Supplemental Environmental Impact Report |
| DWR | California Department of Water Resources |
| EA | expenditure authorization |
| EPA | Environmental Protection Agency |
| ESA | environmentally sensitive area |
| FAC | facultative |
| FACW | facultative wetland |
| Feasibility Study | *Wetland Mitigation Feasibility Study* |
| $feet^2$ | square feet |
| FEIS/FEIR | final EIS/EIR |
| FHWA | Federal Highway Administration |
| GPS | global position system |
| in/yr | inches per year |
| IRT | interagency review team |
| ITP | Incidental Take Permit |
| LEDPA | least environmentally damaging practicable alternative |
| LOS | level of service |

| | |
|---|---|
| MCRCD | Mendocino County Resource Conservation District |
| $mi^2$ | square miles |
| MMP | mitigation and monitoring proposal |
| mph | miles per hour |
| MPR | Mitigation Parcels Report |
| MRP | Monitoring and Reporting Program |
| MRP | Monitoring and Reporting Program |
| NCRWQCB | North Coast Regional Water Quality Control Board |
| NCSG | North Coast semaphore grass (*Pleuropogon hooverianus)* |
| NIDIS | National Integrated Drought Information System |
| NMFS | National Marine Fisheries Service |
| NRCS | Natural Resources Conservation Service |
| OBL | obligate |
| OHWM | ordinary high water mark |
| PAR | Property Analysis Record |
| RCB | reinforced concrete box |
| RDM | residual dry matter |
| RSP | rock slope protection |
| sf | square feet |
| SONCC | Southern Oregon/Northern California Coast |
| SR | State Route |
| SWPPP | Storm Water Pollution and Prevention Plan |
| TMDL | total maximum daily load |
| TRM | turf reinforcement mat |
| US 101 | U.S. Highway 101 |
| USACE | United States Army Corps of Engineers |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |
| WWTP | Willits Wastewater Treatment Plant |

# Chapter 1 Introduction

The California Department of Transportation (Caltrans) in conjunction with the Federal Highway Administration (FHWA) is proposing to construct the Willits Bypass project (bypass project), a new section of U.S. Highway 101 (US 101) that will bypass the city of Willits in Mendocino County (Figure 1-1). The bypass project will result in impacts on natural resources in and adjacent to the bypass right-of-way.

This document is a mitigation and monitoring proposal (MMP) that proposes compensatory mitigation for effects of the bypass project on waters of the State, riparian habitat, listed plants and fish, and oak woodlands. The MMP will be used to support compliance with Section 401 of the federal Clean Water Act (CWA), Section 1602 of the California Fish and Game Code, Section 2081 of the California Endangered Species Act, and Sections 15065 and 15125.4 of the California Environmental Quality Act (CEQA). Accordingly, it addresses impacts under the jurisdiction of two agencies and CEQA.

- North Coast Regional Water Quality Control Board (NCRWQCB)—impacts on waters of the State.
- California Department of Fish and Game (CDFG)—North Coast semaphore grass (*Pleuropogon hooverianus*) (NCSG), riparian and oak woodlands, and State-listed fish.
- CEQA—impacts on Baker's meadowfoam (*Limnanthes bakeri*) (BM).

This introductory chapter identifies the responsible parties for the project and presents an overview of the bypass project, including bypass features, impacts, and refinements to the project design to avoid and reduce impacts. The balance of the document is organized as shown below.

- Chapter 2, "Objectives," presents a description of the resource types and amounts that will be affected, followed by a description of the resource types and amounts that will be provided as part of the bypass project mitigation package and the method of compensation (establishment, rehabilitation, reestablishment, and preservation). The chapter also describes the functions and values of the affected resources and how the mitigation strategy will address the needs of the bypass project area, Little Lake Valley, and the Eel River basin.
- Chapter 3, "Site Selection," describes the factors considered in identifying parcels for offsite mitigation.
- Chapter 4, "Site Protection Instruments," presents information on provisions for long-term mitigation site protection and management.

- Chapter 5, “Baseline Information,” describes the existing ecological characteristics of the affected resources in the proposed bypass project impact area and on the offsite mitigation parcels.
- Chapter 6, “Determination of Credits,” describes the amount and type of acres to be provided by the mitigation package for each affected resource and presents a brief rationale for the determination.
- Chapter 7, “Mitigation Work Plan,” describes the implementation plan for onsite and offsite mitigation.
- Chapter 8, “Mitigation Maintenance Plan,” describes the onsite and offsite mitigation maintenance and monitoring program, including post-implementation site management, mitigation monitoring, interim performance standards, and reporting.
- Chapter 9, “Performance Standards,” describes the ecologically based performance standards used to determine whether bypass project mitigation is achieving its objectives.
- Chapter 10, “Monitoring Requirements,” describes the parameters to be monitored to determine whether the compensatory mitigation is on track to meet performance standards or adaptive management is needed, and includes a schedule for monitoring activities. This chapter also discusses reference sites.
- Chapter 11, “Long-Term Management Plan,” summarizes the proposed management of compensatory mitigation after performance standards have been achieved to ensure long-term sustainability, as well as long-term financing mechanisms and the party responsible for long-term management.
- Chapter 12, “Adaptive Management Plan,” presents a management strategy to address unforeseen changes in site conditions or other components of compensatory mitigation, including the party responsible for implementing adaptive management measures.
- Chapter 13, “Financial Assurances,” describes financial assurances that will be provided, as well as justification of their sufficiency to ensure a high level of confidence in successful completion of compensatory mitigation in accordance with agreed-upon performance standards.
- Chapter 14, “References,” lists the references and source materials used in preparation of the MMP.
- Chapter 15, “List of Preparers and Reviewers,” identifies the staff persons responsible for the preparation and quality control of the MMP, and the internal and external QA/QC reviewers.

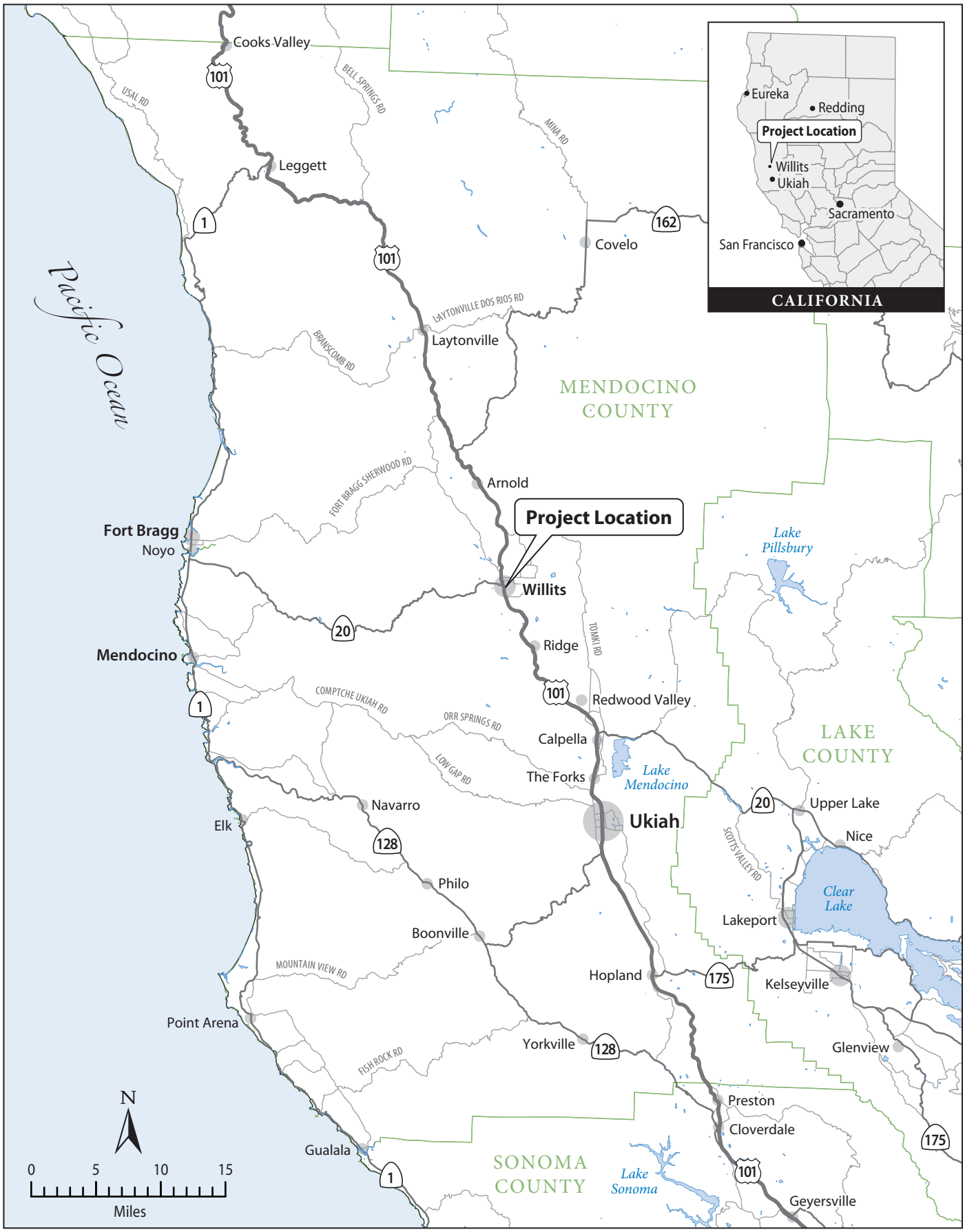


**Figure 1-1**
**Regional Location**

Several appendices are included as part of the MMP.

- Appendix A, *Nomenclature of Plant and Animal Species Mentioned in the MMP.*
- Appendix B, Willits Bypass—Sensitive Biological Resources Impact Maps.
- Appendix C, Willits Bypass—Sensitive Biological Resources on Mitigation Parcels and Proposed Mitigation Actions.
- Appendix D, Willits Bypass—Design Plans for Onsite Wetland and Riparian Reestablishment.
- Appendix E, *Design Plans for Offsite Mitigation*.
- Appendix F, *Haehl and Upp Creek Stream Restoration and Fish Passage Design Plans.*
- Appendix G, Wetland Inundation Mapping for Onsite Mitigation Areas.
- Appendix H, Wetland Inundation Mapping for Offsite Mitigation Areas.
- Appendix I, CRAM AA Wet Meadow Sampling Areas for Offsite Mitigation Areas.
- Appendix J, CRAM AA Riverine Sampling Areas for Onsite and Offsite Mitigation Areas.
- Appendix K, *Baker's Meadowfoam Occurrence Maps.*
- Appendix L, Location of Wetland Establishment and Rehabilitation Line Transect Sampling Areas.
- Appendix M, Location of Other Waters Rehabilitation Line Transect Sampling Areas.
- Appendix N, Assessment of Erosion Sites on Offsite Mitigation Parcels in Little Lake Valley.
- Appendix O, Wetland Hydrology and Soil Analysis for Offsite Wetland Establishment Areas.
- Appendix P, Vegetation Sampling of Proposed (Group 1) Wetland Establishment Sites.
- Appendix Q, Grazing Management Plan for Offsite Mitigation Parcels.
- Appendix R, *Property Analysis Record.*

All appendices are bound as separate volumes to the MMP.

## 1.1 Project Overview

The project is a four-lane highway with several bridges spanning creeks and local roads, viaducts spanning a floodplain, and interchanges with existing US 101 at each end of the bypass. Maps of project features are located at the end of this chapter (Figures 1-2a to 1-2d). The bypass alignment meanders through the southwestern portion of Little Lake Valley, just east of Willits in Mendocino County. The 5.9-mile bypass begins approximately 0.6 mile south of the current Haehl Creek crossing of US 101 and ends approximately 1.8 miles south of Reynolds Highway.

The bypass alignment passes through the 100-year floodplains of Haehl, Baechtel, Broaddus, Mill, and Upp Creeks, all of which are tributaries of Outlet Creek, a tributary of the Eel River. To avoid increasing the base flood elevation of the floodplain, the bypass design incorporates 1.2 miles of viaduct consisting of two parallel elevated structures (one for each direction of traffic) spanning the floodplain (Figure 1-2c).

Because of funding constraints, the bypass will be constructed in two phases. Phase 1 entails construction of a functional interim facility consisting of a two-lane highway. 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 2 entails construction of the other two lanes—creating a full four-lane facility—when sufficient funding becomes available. The environmental study limits encompass the proposed full four-lane bypass. Right-of-way purchased for the bypass will satisfy the requirements of the full four-lane facility. Although only the two southbound lanes will be constructed in Phase 1, Caltrans will implement mitigation for the impacts of Phase 1 as well as advance mitigation for Phase 2 concurrently with the beginning of Phase 1 construction. This MMP addresses the mitigation needs for the entire four-lane bypass (i.e., Phases 1 and 2).

For the purpose of this MMP, *bypass* refers to the four-lane bypass alignment footprint, which comprises the area disturbed by construction activities and the footprint of completed structures. Parcels located within the bypass alignment footprint are referred to as the *onsite mitigation area* throughout this document. Parcels located outside the bypass alignment footprint that are included in the bypass project's compensatory mitigation package are referred to as *offsite mitigation parcels*. Because the bypass alignment footprint passes through several offsite mitigation parcels (Benbow, Brooke, Ford, Lusher, and Niesen), these locations are referred to in both onsite and offsite parcel discussions. Although the contractor may choose not to use the proposed fill material borrow site at Oil Well Hill, and the borrow site is not within the limits of the bypass alignment footprint, the site is considered part of the onsite parcel resources.

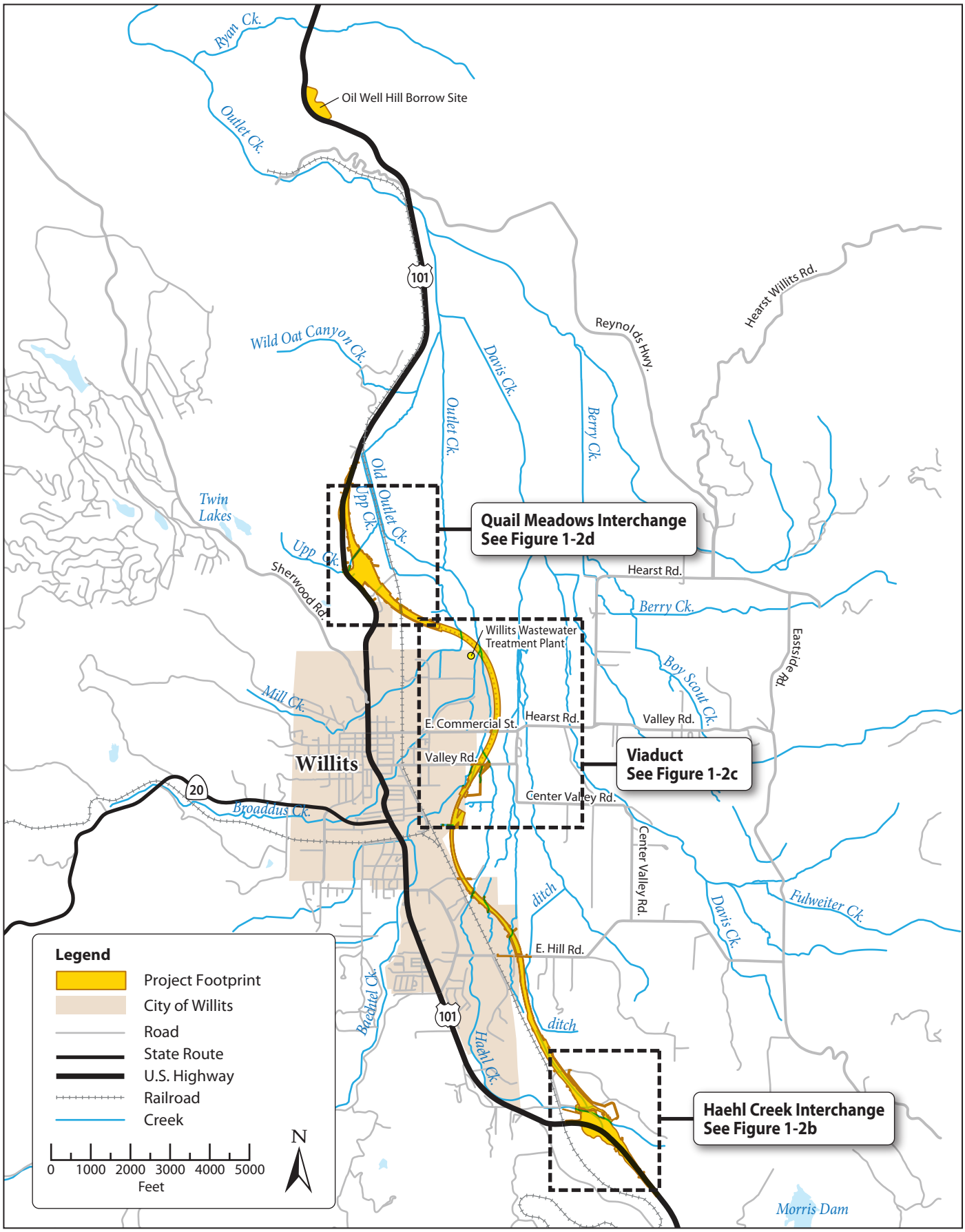


**Figure 1-2a**
**Project Footprint—Overview Phase 1**
Willits Bypass Project

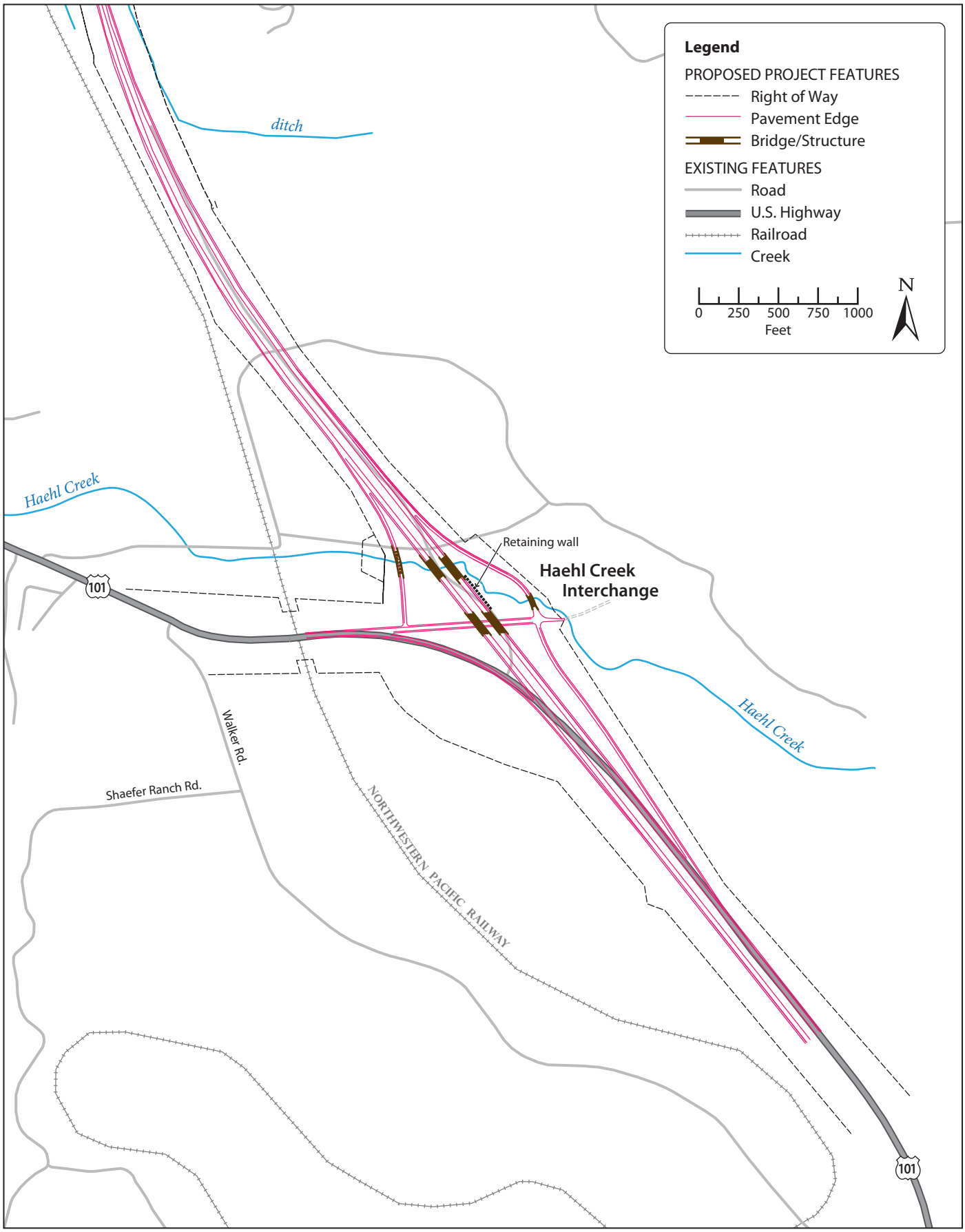


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**Figure 1-2b**
**Southern End Project Features—Haehl Creek Interchange Phase 1**
Willits Bypass Project

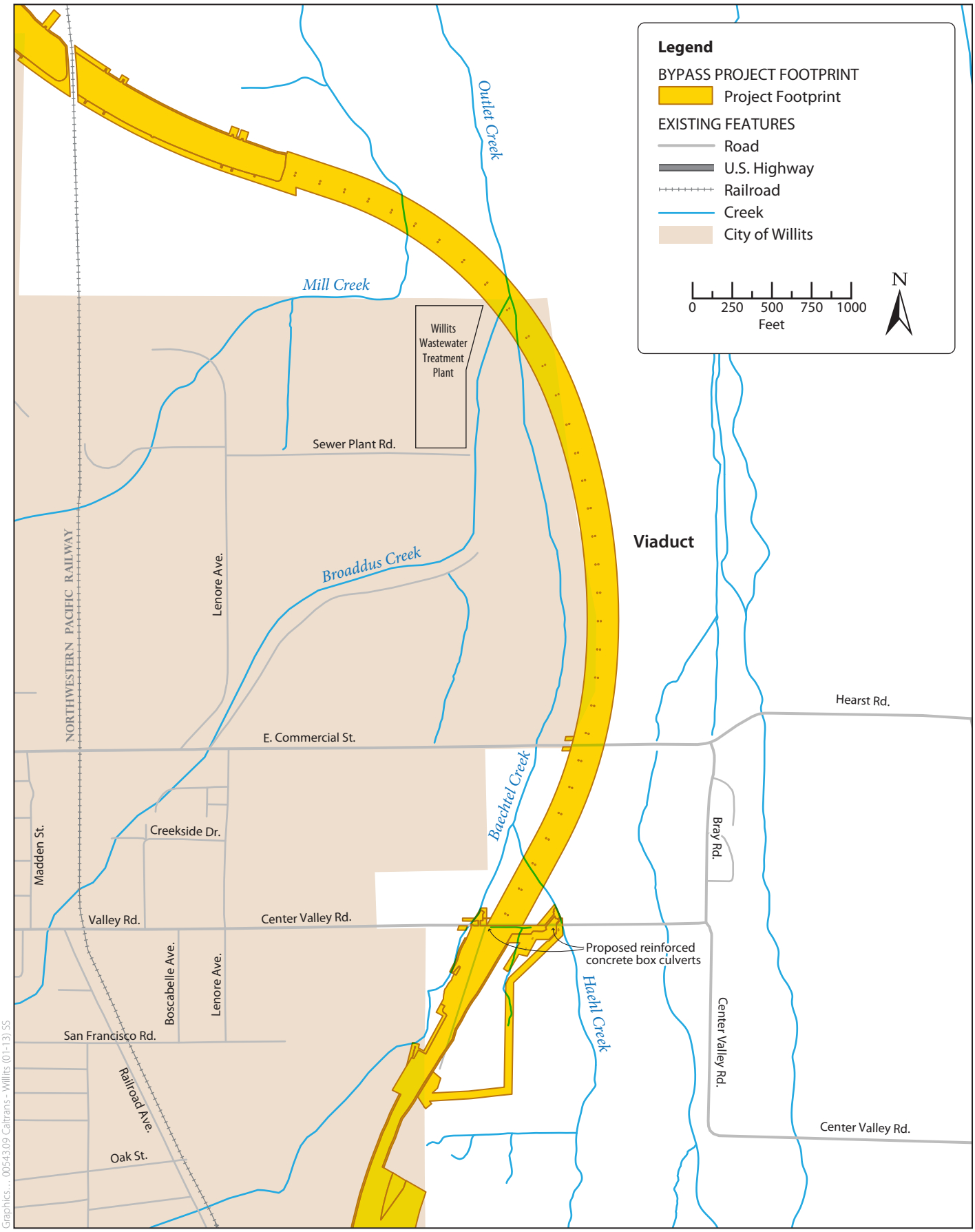


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**Figure 1-2c**
**Middle Project Footprint—Viaduct Phase 1**
Willits Bypass Project

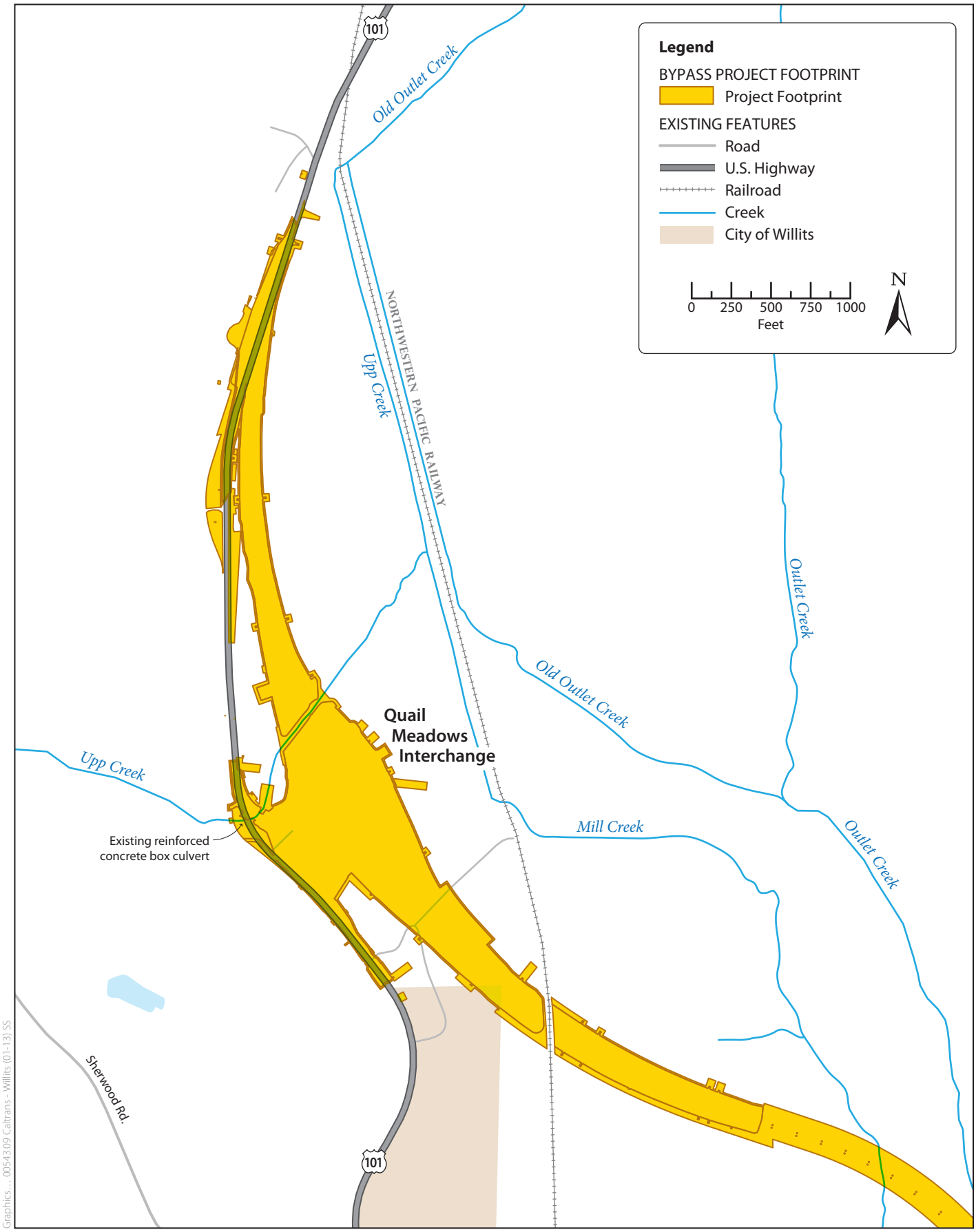


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**Figure 1-2d**
**North End Project Footprint—Quail Meadows Interchange Phase 1**
Willits Bypass Project

Section 1.2.2 below describes the components of the proposed four-lane facility.

## 1.2 Project Requiring Mitigation

### 1.2.1 Design Revisions after Final Environmental Impact Statement/Final Environmental Impact Report

As part of the environmental review process, several project alternatives were developed, and Modified Alternative J1T was selected as the preferred alternative. Although this alternative was not identified specifically as an alternative in the draft environmental impact statement/draft environmental impact report (DEIS/DEIR), it evolved from the CWA Section 404(b)(1) analysis, which seeks to identify the least environmentally damaging practicable alternative (LEDPA). Modified Alternative J1T shares similar project design elements with other alternatives discussed in the DEIS/DEIR, such as the J1T and LT alternatives, but it further reduces environmental and community impacts.

Since publication of the final EIS/EIR (FEIS/FEIR) in December 2006, Modified Alternative J1T has undergone several design revisions. The primary reasons for the design revisions were: (1) to avoid or further reduce impacts on sensitive resources, including avoiding conflicts with the planned Willits Wastewater Treatment Plant (WWTP) expansion project; and (2) to accommodate phased construction of the bypass. Additional design refinements to avoid or minimize impacts on sensitive resources are discussed further in Section 1.3.

The design revisions to Modified Alternative J1T are minor but have important implications for minimizing impacts on sensitive resources. The project remains a four-lane highway bypass with several bridges spanning creeks and local roads, viaducts spanning a floodplain, and interchanges at either end of the bypass. However, as noted above, because of funding constraints, the bypass will be constructed in two phases.

A functional interim two-lane facility will be constructed initially; the remaining lanes will be constructed later, when adequate funding becomes available, to complete the four-lane facility. This phased approach necessitated design revisions, including modifying the Quail Meadows interchange at the north end of the bypass. Phasing the construction of the original Quail Meadows interchange proved geometrically complex and wasteful; therefore, the interchange was shifted approximately 1,200 feet north and redesigned as a two-lane interchange in Phase 1. A roundabout was added to the west side of the interchange to connect two ramps to local roads. One of the benefits of the project is that a box culvert under US 101 at Upp Creek can be

removed to address existing fish passage issues. In addition, all crossings of Upp Creek, previously planned as box culverts, now will be clear-span bridges (Appendix F).

Relocating the Quail Meadows interchange moved the interchange ramps such that they no longer constrained vertical clearance over the railroad, so the profile for the bypass could be lowered. Additionally, the railroad agreed to temporarily reduce clearance during construction, so the profile could be lowered further. These profile reductions, along with the interchange relocation, decreased the overall footprint of the project.

### 1.2.2 Willits Bypass Project Description

The following design elements will be incorporated into the bypass project.

#### 1.2.2.1 Roadway Design

The bypass is designed to accommodate the predicted interregional average annual daily traffic in 2028 at a level of service (LOS) of C or better. The bypass will be a four-lane highway with a 22-foot-wide median and barrier separating the northbound and southbound lanes. Each lane will be 12 feet wide. The inside shoulder width (nearest the median) will be 5 feet, and the outside shoulder width will be 10 feet. The highway sections will be designed for a maximum design speed of 68 miles per hour (mph) and will meet the purpose of providing at least LOS C. Where local roads will be improved or constructed, there will be two 12-foot lanes and shoulder widths meeting local design standards. The bypass alignment is shown in detail in Appendix B and Figures 1-2a through 1-2d.

#### 1.2.2.2 Interchanges

Two interchanges will be constructed for the bypass. The Haehl Creek interchange, at the south end of the bypass near Haehl Creek, will connect the existing US 101 south of Willits with the new facility (Figure 1-2b). The Quail Meadows interchange, near the north end of Little Lake Valley, will connect the new facility to the existing two-lane highway north of Willits (Figure 1-2d). The interchange ramps will be one lane.

#### 1.2.2.3 Bridges and Other Structures

The bypass will traverse creeks, riparian corridors, streets, and railroad rights-of-way using 22 bridges, overcrossings, and viaducts and one retaining wall, as listed below and shown in Figures 1-2a to 1-2d:

- Six bridges in the Haehl Creek interchange area:

Northbound highway lanes separation with State Route (SR) 20

  - Southbound highway lanes separation with SR 20
  - Southbound off-ramp over Haehl Creek
  - Northbound on-ramp over Haehl Creek
  - Northbound highway lanes over Haehl Creek
  - Southbound highway lanes over Haehl Creek
- Two overcrossings at East Hill Road:
  - Southbound highway lanes (Phase 1)
  - Northbound highway lanes (Phase 2)
- Two clear-span bridges crossing the middle reach of Haehl Creek south of Shell Lane:
  - Southbound highway lanes (Phase 1)
  - Northbound highway lanes (Phase 2)
- One retaining wall on the west side of the southbound highway lanes just south of Center Valley Road.
- Two viaducts spanning the 100-year floodplain:
  - Southbound (Phase 1)
  - Northbound (Phase 2)
- Two overcrossings of the railroad tracks in the Quail Meadows interchange area:
  - Southbound highway lanes (Phase 1)
  - Northbound highway lanes (Phase 2)
- Two overcrossings at the new connector road to the existing US 101 in the Quail Meadows interchange area:
  - Southbound highway lanes (Phase 1)
  - Northbound highway lanes (Phase 2)
- Six clear-span bridges crossing Upp Creek directly north of the Quail Meadows interchange:
  - Southbound highway lanes (Phase 1)
  - Northbound highway lanes (Phase 2)

- Northbound on-ramp (Phase 1)
- Northbound on-ramp (Phase 2)
- Southbound off-ramp
- Local intersection (roundabout)

#### 1.2.2.4 VIADUCTS

The bypass alignment encroaches on the 100-year floodplain and includes two elevated structures, approximately 20 feet high, referred to as the *viaducts*. This design feature is intended to minimize floodplain and wetland impacts. The viaducts will be located in the central part of the bypass and will span Center Valley Road, the lower reach of Haehl Creek just upstream of the confluence with Baechtel Creek, East Commercial Street, Baechtel and Broaddus Creeks at the confluence with Outlet Creek, and Mill Creek (Figure 1-2c). The viaducts will span wetlands on two offsite mitigation parcels (Benbow parcels 007-010-04 and 007-020-03).

The approximately 6,000-foot-long viaducts will consist of separate northbound and southbound elevated superstructures, each approximately 42.6 feet wide. The edge-to-edge distance between the structures will be approximately 10 feet, and each generally will have at least 16.5 feet minimum clearance underneath.

#### 1.2.2.5 CULVERTS

Two large reinforced concrete box (RCB) culverts and numerous smaller culverts will be built as part of the project. The RCB culverts will cross under Center Valley Road, near Shuster's Trucking, and will mitigate floodplain impacts associated with the roadway embankment south of Center Valley Road. The two culverts crossing Center Valley Road will be concrete boxes and will use turf reinforcement mats (TRMs) to minimize the use of rock slope protection (RSP) at the inlets and outlets.

#### 1.2.2.6 RETAINING WALLS

One concrete retaining wall will be constructed just before the south end of the viaducts near Baechtel Creek. The retaining wall will be built to avoid the potential for the roadway embankment to be undermined by Baechtel Creek.

#### 1.2.2.7 EXCAVATION, EMBANKMENT, AND IMPORTED BORROW MATERIAL

The estimated embankment (fill) requirement for Phase 1 is approximately 1.4 million cubic yards. Because all soil that is excavated on site will be reused as embankment, no disposal sites

will be required for the bypass project. From just north of the Haehl Creek interchange to the south abutment of the viaducts, and from the north abutment of the viaducts to the terminus of the bypass, the alignment is on embankment. Cut slopes generally will vary from 1:2 (vertical:horizontal) to 1:2.5. Fill slopes will vary between 1:2 and 1:4.

Because Modified Alternative J1T will be constructed largely on embankment, it will require imported borrow material in addition to material excavated on site. The construction contractor will have the option to determine whether the source of material for earthwork fill will be the Caltrans-designated borrow site at Oil Well Hill, a commercial borrow site, or another site(s). This MMP assumes that Oil Well Hill (Figure 1-2a) will be used as a borrow site by the construction contractor; therefore, impacts on sensitive resources at the site and mitigation for those impacts are included in this document. Standard best management practices (BMPs) will be used to control the potential spread of invasive plants to and from the borrow site.

#### 1.2.2.8 FISH PASSAGE

Current fish passage opportunities at Haehl and Upp Creeks are constrained or absent as the result of the stream channel alignment or presence of artificial barriers (e.g., culverts) within the Caltrans right-of-way. Therefore, the project design incorporates improvements at these stream crossing locations to facilitate fish passage and improve instream habitat. Fish passage design elements were developed in consultation with CDFG and National Marine Fisheries Service (NMFS).

Stabilization of both creek channels that pass through the interchange areas (the Haehl Creek interchange on upper Haehl Creek and the Quail Meadows interchange on Upp Creek) will consist of grade control structures at appropriate heights and intervals for the distance necessary to stabilize the natural stream gradient. Fish passage design elements comply with guidelines established by CDFG and NMFS. Additional details of these fish passage design elements are included in Section 3.5.1, and the design drawings are presented in Appendix F.

#### 1.2.2.9 LANDSCAPING, LIGHTING, AND FENCING

Permanently affected areas such as the cut-and-fill slopes adjacent to the roadway and along interchange ramps, as well as the median between the inside roadway shoulders, will be revegetated with native plants appropriate for Little Lake Valley. In compliance with Caltrans design standards, no trees will be planted within the clear recovery zone (CRZ) where errant vehicles could hit them. Only shrubs and herbaceous native species may be planted in these areas to prevent abrupt slowing, redirection, or launching of stray vehicles.

Highway lighting will be provided at the Haehl Creek and Quail Meadows interchanges. No lighting will be provided along the viaducts.

Fencing will be erected along the bypass right-of-way where appropriate. Right-of-way fencing is not expected to be installed at creek crossings or along the viaducts.

#### 1.2.2.10 STREAMBANK STABILIZATION

To prevent bank erosion and damage to the bypass, RSP will be required along short lengths of creek banks. The use of RSP will be minimized through the substitution of TRMs in appropriate locations where water velocities would not result in significant bank scour.

At locations where Haehl and Upp Creeks cross the project right-of-way, the stream channel will be designed to improve fish passage in accordance with guidelines established by NMFS and CDFG.

## 1.3 Design Refinements to Avoid and Minimize Impacts

Caltrans has developed a bypass alignment that avoids or minimizes impacts on sensitive resources to the greatest extent feasible. Following public circulation of the DEIS/DEIR dated May 2002, a final alternatives analysis was prepared (California Department of Transportation 2005b), which identified Modified Alternative J1T as the LEDPA for the project. In accordance with CWA Section 404(b)(1) guidelines, United States Army Corps of Engineers (USACE) and Environmental Protection Agency (EPA) issued letters of concurrence in 2005 that Modified Alternative J1T constitutes the LEDPA and that the other alternatives considered do not meet the LEDPA criterion because of their overall environmental impacts.

Since adoption of the FEIS/FEIR and record of decision, several design elements/refinements have been incorporated into the project that further reduce the overall project footprint and impact area, avoiding or minimizing effects on natural resources. These design elements are listed below.

- Reduction in the roadway median width to reduce the bypass alignment footprint.
- Incorporation of steeper-than-standard embankment slopes at some locations, with additional erosion control measures to minimize the bypass alignment footprint.
- Extension of the length of the floodway viaducts to reduce the amount of fill in wetlands.
- Reduction in the height of the railroad overcrossing to reduce the footprint of the embankment.

- Shift in the alignment to avoid the WWTP expansion project and thereby avoid wetland impacts that would have been necessary to relocate the WWTP aeration ponds.
- Installation of clear-span bridges, rather than culverts, at the Haehl Creek interchange and the Quail Meadows interchange across Upp Creek to avoid permanent fill in other waters of the United States, decrease future maintenance-related impacts, and provide better passage for fish and wildlife.
- Lowering of the profile near the Quail Meadows overcrossing.
- Relocation of the Quail Meadows interchange to reduce the bypass alignment footprint.
- Elimination of the Center Valley Road interchanges from the project, thereby reducing the bypass alignment footprint.
- Removal of fish barrier culverts at Haehl and Upp Creeks.

These design elements have further reduced the extent of permanent impacts on existing resources by reducing the bypass alignment footprint.

## 1.4 Developing the Mitigation Monitoring Proposal Vision

To address remaining project impacts, Caltrans has developed a compensatory mitigation strategy with extensive input from resource agencies. The vision of the project's compensatory mitigation strategy is to establish, rehabilitate, reestablish, and preserve a mosaic of high-functioning habitats in perpetuity, thus increasing the ecological value of Little Lake Valley and improving water quality in the Eel River basin.

Caltrans developed the MMP vision and individual program elements, or strategies, with the overall objective to enhance the ecological values in Little Lake Valley. Accordingly, Caltrans habitat restoration experts assessed each available parcel using the following criteria: feasibility of acquisition (i.e., which property owners would be willing sellers); inventory of habitats present or historically present (i.e., opportunities for preservation, rehabilitation, reestablishment, and/or establishment); and capacity of each parcel to achieve the performance standards. Caltrans reviewed historical information to facilitate understanding of lost ecological values that feasibly could be regained and also evaluated the ongoing natural vegetation succession to identify mitigation efforts that would result in a sustainable natural ecosystem.

Based on a review of historical aerial photographs and other information, the entire Little Lake Valley was generally wetter than it is today. Consequently, the valley supported extensive riparian forests, meandering streams, and wide floodplains fringed with marshes and wet

meadows. Valley areas that were not inundated for long periods of time supported oak savanna. Dense forests of mixed oaks and conifers were present on the surrounding hills. The compensatory mitigation strategy presented in this MMP seeks to return to the valley many of the ecological functions and values represented by early hydrology and habitat types that have been lost or reduced as a result of past development and agricultural practices. This will be achieved through establishing, rehabilitating, reestablishing, and preserving the distinctive resources and habitats present in the valley, while balancing the needs of development, agriculture, and ecosystem sustainability. Further details of the mitigation vision are presented in Section 2.4.

## 1.5 Agency Coordination in the Development of the Mitigation Vision

The development of the MMP has been a collaborative effort among Caltrans, the NCRWQCB, and CDFG. The USACE, EPA, NMFS, and U.S. Fish and Wildlife Service (USFWS) also provided input. Numerous meetings and onsite field reviews have been held with Caltrans and resource agency staff to develop the mitigation vision proposed in this MMP. In 2008, the Mendocino County Resource Conservation District (MCRCD) signed a cooperative agreement with Caltrans and began attending agency meetings in anticipation of their potential role in developing management plans and implementing mitigation. This document was preceded by a Wetlands Mitigation Feasibility Study (California Department of Transportation 2005b), Conceptual Mitigation Plan (California Department of Transportation 2006a), Mitigation Parcels Report (California Department of Transportation 2007), and a feasibility study of additional parcels inside and outside Little Lake Valley (ICF Jones & Stokes 2009). These studies focused on the identification of suitable/available mitigation properties in Little Lake Valley and the development of the general extent and nature of mitigation strategies to offset temporary and permanent impacts. This MMP provides the temporary and permanent impact quantities for the bypass project and provides detailed information on how the mitigation effort will be implemented to help offset bypass project impacts. MCRCD is the intended partner in implementing the MMP, but Caltrans may need other entities to perform specific tasks related to implementation and long-term management.

# Chapter 2 Objectives

Farming and urban development have resulted in major changes to the landscape of Little Lake Valley. The overall goal of this MMP is to compensate for impacts on sensitive biological resources resulting from bypass project construction by improving the valley's ecological functions and values through a combination of habitat reestablishment, establishment, rehabilitation, and preservation.

This chapter includes a discussion of the watershed approach to determining mitigation success in compensating for unavoidable impacts on sensitive biological resources resulting from bypass project construction and the nexus between the mitigation program and the EPA's TMDL (Total Maximum Daily Loads) for the Upper Main Eel River and tributaries (U.S. Environmental Protection Agency 2004). A discussion of the mitigation vision, goals, and objectives as well as information on affected sensitive biological resources and impact amounts by resource type that was used to develop the vision, goals, and objectives is also presented in this chapter. Mitigation objectives, paired with the ecological needs of the Outlet Creek basin, are presented in Section 2.4. The mitigation actions are identified in Figures 2-1a, 2-1b, and 2-1c.

Information also is presented on various components of the mitigation strategy, such as impact minimization measures; habitat reestablishment, establishment, rehabilitation, and preservation efforts; and benefits to Little Lake Valley from increased functions and values that will result from implementation of the mitigation plan. *Reestablishment* in this MMP refers to areas temporarily affected by onsite or offsite construction activities that will be brought back to pre-project conditions. *Establishment* means the creation of a new sensitive biological resource or habitat. *Rehabilitation* refers to the enhancement of an existing sensitive biological resource or habitat as a result of a proposed action. *Preservation* in the MMP refers to those areas where no mitigation actions are proposed; instead, the existing sensitive biological resource(s) will be actively managed to prevent a decline in their condition.

## 2.1 Sensitive Biological Resources Occurring within the Bypass Project Footprint

During development of the FEIS/FEIR, potential impacts on State-listed wildlife and plants were addressed. State-listed plants in the bypass project footprint include NCSG and BM. Because NCSG was not discovered until after publication of the FEIS/FEIR, it was not addressed in the FEIS/FEIR but was addressed in the 2009 Draft Supplemental Environmental Impact Report (DSEIR) (California Department of Transportation 2009a).

This MMP addresses mitigation for impacts on the following sensitive biological resources.

- State-listed fish: Southern Oregon/Northern California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*).
- State-listed plant: NCSG.
- CEQA significant impact: BM.
- Riparian woodland encompassing protected fisheries resources (Category I Riparian Corridors).
- Waters of the State.
- Riparian woodlands (Category II and III Riparian Corridors).
- Oak woodland and associated grassland.

These resources also occur at the offsite mitigation parcels. The existing condition of these resources at the offsite mitigation parcels is described in Chapter 5. Scientific names of plants and animal species mentioned in the MMP are included in Appendix A.

### 2.1.1 Listed Plant Species

State-listed plants (listed plants) that occur within the bypass project footprint are shown in Table 2-1.

**Table 2-1. Listed Plants in the Willits Bypass Project Vicinity**

| Common and Scientific Name | State[a] | CNPS[b] | Natural Communities | Blooming Period |
|---|---|---|---|---|
| North Coast semaphore grass (*Pleuropogon hooverianus*) | T | 1B.1 | Broadleaf upland forest; meadows and seeps; North Coast coniferous forest areas; mesic openings and edges | April–June |
| Baker's meadowfoam (*Limnanthes bakeri*) | R | 1B.1 | Meadows and seeps; marshes and swamps (freshwater); valley and foothill grassland (vernally mesic); vernal pools | April–May |

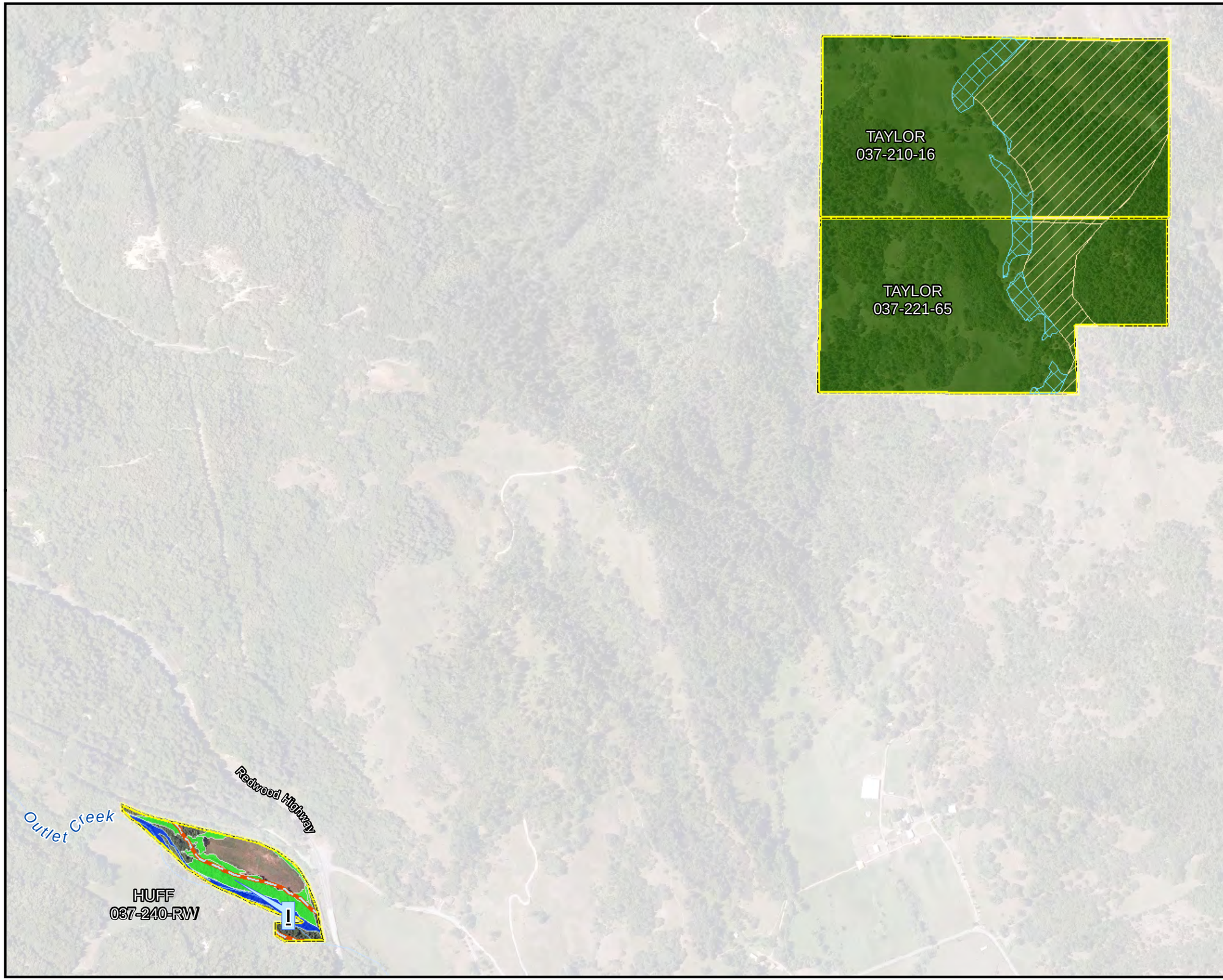
[a] **California Status Codes**

T = Listed as *Threatened* under the California Endangered Species Act. Species likely to become endangered within the foreseeable future.

R = Listed as *Rare* under the California Endangered Species Act. Plant species that, although not presently threatened with extinction, may become endangered within the foreseeable future. This category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation.

[b] **California Native Plant Society (CNPS)**

1B.1 = Rare, threatened, or endangered in California and elsewhere; seriously threatened in California (high degree/immediacy of threat).




Offsite Mitigation Parcel

**Mitigation Actions**

Grazing

**Preservation**

Other Waters Preservation

Wetland Preservation

Oak Woodland Preservation

Oak Woodland Grassland Preservation

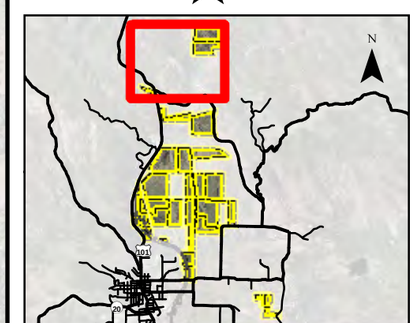
**Stream Categories**

Category I Riparian Corridor

Category II Riparian Corridor

Category III Riparian Corridor

N




0 1000

Scale in Feet

**Figure 2-1a**

**Offsite Mitigation Actions for Wetlands and Other Waters of the U.S.**

Willits Bypass Project

Offsite Mitigation Parcel

**Bypass Project Footprint**

- Permanent Impact Area
- Temporary Impact Area
- Right of Way
- Grazing

**Wetland Management**

**Wetland Establishment**

- Group 1
- Group 2

**Wetland Rehabilitation**

- Grazing
- Type 1
- Type 2
- Type 3
- Type 4
- Type 5

**Riparian Establishment**

- Riparian Establishment

**Riparian Rehabilitation**

- Riparian Rehabilitation

**Other Waters Rehabilitation**

- Other Waters Rehabilitation
- Repair Headcut or Eroding Bank

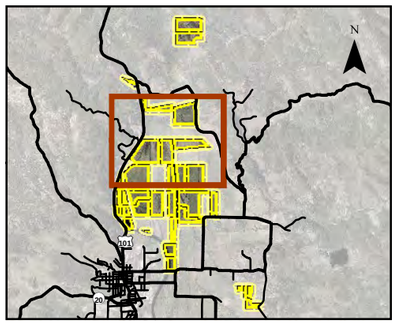
**Oak Woodland Establishment**

- Oak Woodland Establishment

**Stream Categories**

- Category I Riparian Corridor
- Category II Riparian Corridor
- Category III Riparian Corridor

N

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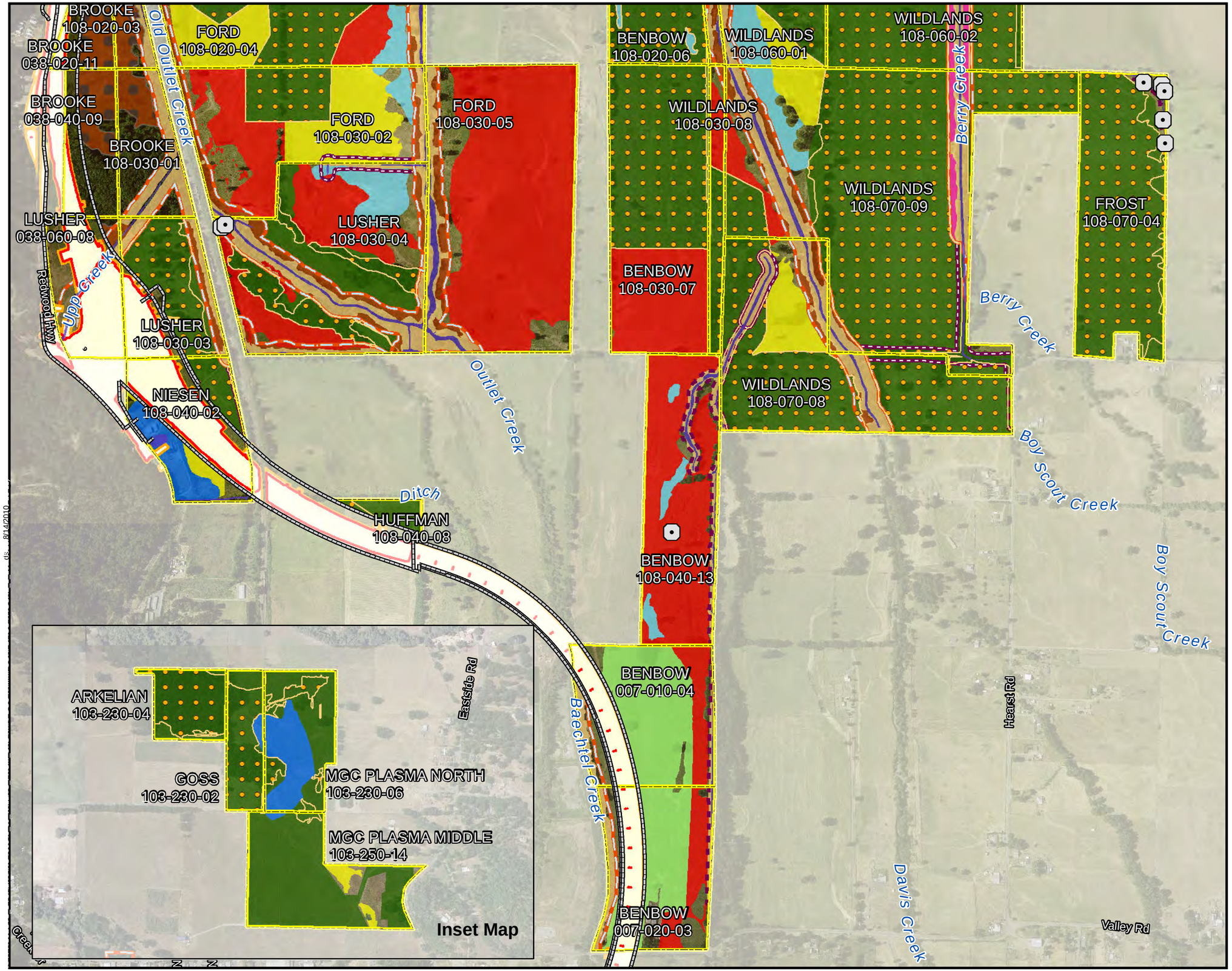
Scale in Feet

**Figure 2-1b**

**Offsite Mitigation Actions for Wetlands and Other Waters of the U.S.**

Willits Bypass Project




Offsite Mitigation Parcel

**Bypass Project Footprint**

- Permanent Impact Area
- Temporary Impact Area
- Right of Way
- Grazing

**Wetland Management**

**Wetland Establishment**

- Group 1
- Group 2

**Wetland Rehabilitation**

- Grazing
- Type 1
- Type 2
- Type 3
- Type 4
- Type 5

**Riparian Establishment**

- Riparian Establishment

**Riparian Rehabilitation**

- Riparian Rehabilitation

**Other Waters Rehabilitation**

- Other Waters Rehabilitation
- Repair Headcut or Eroding Bank

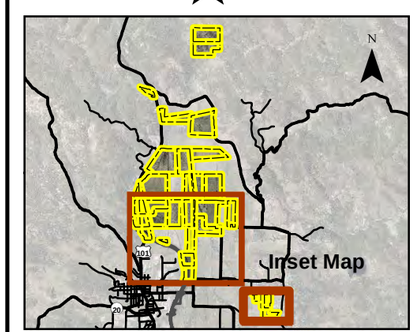
**Oak Woodland Establishment**

- Oak Woodland Establishment

**Stream Categories**

- Category I Riparian Corridor
- Category II Riparian Corridor
- Category III Riparian Corridor

N

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Scale in Feet

**Figure 2-1c**

**Offsite Mitigation Actions for Wetlands and Other Waters of the U.S.**

Willits Bypass Project

Many remaining populations of NCSG and BM are stressed or in decline. Because of hydrologic alterations in Little Lake Valley, such as stream diversions, impoundments, and conversion of wetlands to other uses, the areal extent of habitat for these two species has been substantially reduced. The primary threat to BM has been the conversion of habitat to various types of development. Overgrazing by livestock could pose a threat to the remaining populations. NCSG only recently has been confirmed in Little Lake Valley, and the status of populations there has not yet been determined. Populations across the species' range are subject to many types of habitat disturbance, including vegetation removal, mowing, road construction and maintenance, grazing, and competition from invasive grass species.

Maps of NCSG and BM populations for the bypass footprint are provided in Appendix B.

Maps of NCSG and BM populations for the offsite mitigation parcels are provided in Appendix K. Maps of NCSG are also presented in Figure 5-7 through 5-10.

#### 2.1.1.1 NORTH COAST SEMAPHORE GRASS

NCSG is State-listed as threatened and is on California Native Plant Society (CNPS) List 1B.1. This species is known from 24 occurrences in Mendocino, Marin, and Sonoma Counties (California Natural Diversity Database 2009). In Mendocino County, there are reported occurrences near the town of Cahto, near Comptche southwest of Willits, in Mendocino Pass east of Covelo, and in areas west of the project vicinity near Boonville (Smith and Wheeler 1991; California Natural Diversity Database 2009). Additionally, nine occurrences have been documented west of Ukiah on the Orr Springs U.S. Geological Survey (USGS) 7.5-minute quadrangle in the vicinity of Low Gap. NCSG grows in meadows, seeps, openings, and mesic areas in broad-leafed upland and North Coast coniferous forest at elevations of 33–2,201 feet above mean sea level. The reported blooming period of NCSG is April–June (California Native Plant Society 2009). This species most commonly is associated with forest and woodland edges and other partially to fully shaded mesic sites. Field surveys conducted in 2007, 2008, 2009, and 2010 located occurrences of NCSG both within the bypass project footprint and on the offsite mitigation parcels.

#### 2.1.1.2 BAKER'S MEADOWFOAM

BM is State-listed as rare and is on CNPS List 1B.1. This species is restricted to Mendocino County, and there are 21 reported occurrences, including populations in Little Lake Valley, Laytonville, and north of Covelo (California Natural Diversity Database 2009). BM is an annual herb that occurs in wet meadows, seeps, freshwater marshes and swamps, vernally mesic areas in

grasslands (e.g., swales), and vernal pools at elevations of 574–2,985 feet above mean sea level. The reported blooming period of BM is April–May (California Native Plant Society 2009).

The majority of existing BM populations in Little Lake Valley are centered in the wetter northern end of Little Lake Valley and other areas that the bypass project will avoid. The largest and highest-density populations of this species occur east of the bypass project footprint. However, two other populations occur throughout wet meadow, vernal pool, and other wetland habitats within the bypass project footprint. These two populations are at the edge of larger and more central populations.

In an effort to better identify the extent of potential BM habitat in the bypass project footprint, a 1993 study (Balance Hydrologics 1993), which defined the environmental conditions (soil types, hydrology, elevation, and geomorphology) associated with the occurrence of BM, was reviewed. The distribution of these environmental conditions within the project limits, as well as the distribution of known plant locations reported in 1997 and 2003, was imported into ArcView GIS, and the overlap of these data was used to develop areas of high probability for the presence of BM. The BM areas from the 1993, 1997, and 2003 surveys were used to develop polygons of observed and potential BM habitat and were depicted in the Conceptual Mitigation Plan (CMP) (California Department of Transportation 2006). These areas of high-probability BM habitat encompass and extend beyond the areas of the observed plant locations reported during the 1997 and 2003 surveys. Subsequent to preparation of the CMP, additional surveys were conducted in 2007, 2008, and 2009. Information from those additional surveys was merged with the previous data to create a complete dataset of BM observed and potential habitat in Little Lake Valley. This merged dataset contains all observed and potential BM habitat and was used in this document for the calculation of impacts and preserved acreage of BM.

### 2.1.2 Protected Fisheries and Riparian Habitats

Hydrologic alterations, fish barriers, increased fine sediment load, cattle grazing, crop production and other agricultural uses, and the introduction of invasive species have negatively affected the wetland functions and values of riparian corridors throughout Little Lake Valley.

One anadromous salmonid species listed by the State as tthreatened occurs in Little Lake Valley: SONCC coho salmon. Based on CDFG consultation, five tributary streams of Outlet Creek (Haehl, Baechtel, Broaddus, Mill, and Upp Creeks) and their adjacent riparian zones within the bypass project area support anadromous fish. For the purpose of this project, and in consultation with resource agencies, the riparian zones along these anadromous fish streams and their tributaries have been categorized based on their relationship to designated critical habitat areas

for listed anadromous fish. Consequently, impacts on anadromous fish and mitigation for these impacts are discussed in the context of the riparian categories. Only Category I Riparian Corridors (not Category II and III) are considered habitat for protected fisheries in this MMP. These categories are defined below.

- **Category I Riparian Corridors** are those vegetated areas that occur along streams where anadromous fish are known to occur (i.e., Haehl, Baechtel, Broaddus, Mill, and Upp—all tributaries of Outlet Creek, Figure 1-2a). These corridors provide designated critical habitat for anadromous fish. The health of these corridors has an immediate and direct effect on anadromous fish populations. The riparian mitigation areas for Category I Riparian Corridors extend 100 feet from the ordinary high water mark (OHWM) on each side of the stream.
- **Category II Riparian Corridors** are those vegetated areas along tributaries of Category I Riparian Corridors that are within 1,000 feet of the confluence with the Category I stream. One example of a Category II Riparian Corridor is Fulweiter Creek on the MGC Plasma South parcel (outside the bypass project footprint). Fulweiter Creek is a tributary of Davis Creek, a Category I Riparian Corridor (Appendix C). The riparian mitigation areas for Category II Riparian Corridors extend 50 feet from the OHWM on each side of the stream.
- **Category III Riparian Corridors** are those vegetated areas along tributaries of Category I Riparian Corridors that are more than 1,000 feet upstream of the confluence with the Category I stream. Fulweiter Creek on the MGC Plasma South parcel is also a Category III Riparian Corridor upstream of the Category II section. The riparian mitigation areas for Category III Riparian Corridors extend 25 feet from the OHWM on each side of the stream.

Category I, II, and III riparian corridors are subject CDFG jurisdiction under Sections 1600–1616 of the California Fish and Game Code.

The offsite mitigation parcels also support riparian species that are outside the Category I, II, or III corridors. These areas are referred to as *other riparian woodland* in parcel descriptions in Chapter 5 and preservation calculations in Chapter 6. They are included in this report because they represent a significant component of the habitat occurring on the offsite mitigation parcels by providing additional habitat for wildlife and increasing habitat complexity of parcels largely dominated by herbaceous cover.

Parts of Category I, II, and III riparian corridors, as well as parts of *other riparian woodlands*, also fall under USACE jurisdiction as wetlands or other waters of the United States.

Maps of these riparian corridors are provided in Appendix B for the bypass project footprint and Appendix C for the offsite mitigation parcels.

The main vegetation types occurring in the Category I, II, and III riparian corridors are riparian scrub and riparian woodland. These are divided further into five plant communities: willow riparian scrub, mixed riparian scrub, mixed riparian woodland, ash riparian woodland, and valley oak riparian woodland.

### 2.1.3 Waters of the State

According to Cal Water Code § 13050(e) *waters of the State* are defined as "any surface water or groundwater, including saline waters, within the boundaries of the State." All waters in the mitigation areas are considered waters of the State. The State of California does not define waters of the State into subcategories. In order to separate and track mitigation for impacts on wetlands and riverine-type aquatic resources that fall within the State definition, this document defers to the definition established by the USACE. Therefore, for the purpose of this document, *wetlands* refers to all aquatic resources that were found to satisfy the definition outlined in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Western Mountains, Valleys, and Coast Region Interim Regional Supplement* (US Army Corps of Engineers 2008). The term *other waters* refers to all other jurisdictional drainages/water bodies that do not fall under the wetlands classification. Other waters discussed in this document are creeks or streams, ponds, and drainage ditches. USACE has verified jurisdictional wetland delineations for the bypass project footprint and the offsite mitigation parcels. Wetlands and other waters in the bypass project footprint are shown in Appendix B; wetlands and other waters in the offsite mitigation parcels are shown in Appendix C. Wetlands at the Oil Well Hill borrow site are shown on Figure 2-2.

#### 2.1.3.1 WETLANDS

Wetlands included in this document have been categorized using the Cowardin classification system (Cowardin et al. 1979). Table 2-2 shows the Cowardin system categories and the corresponding riparian vegetation communities discussed above.

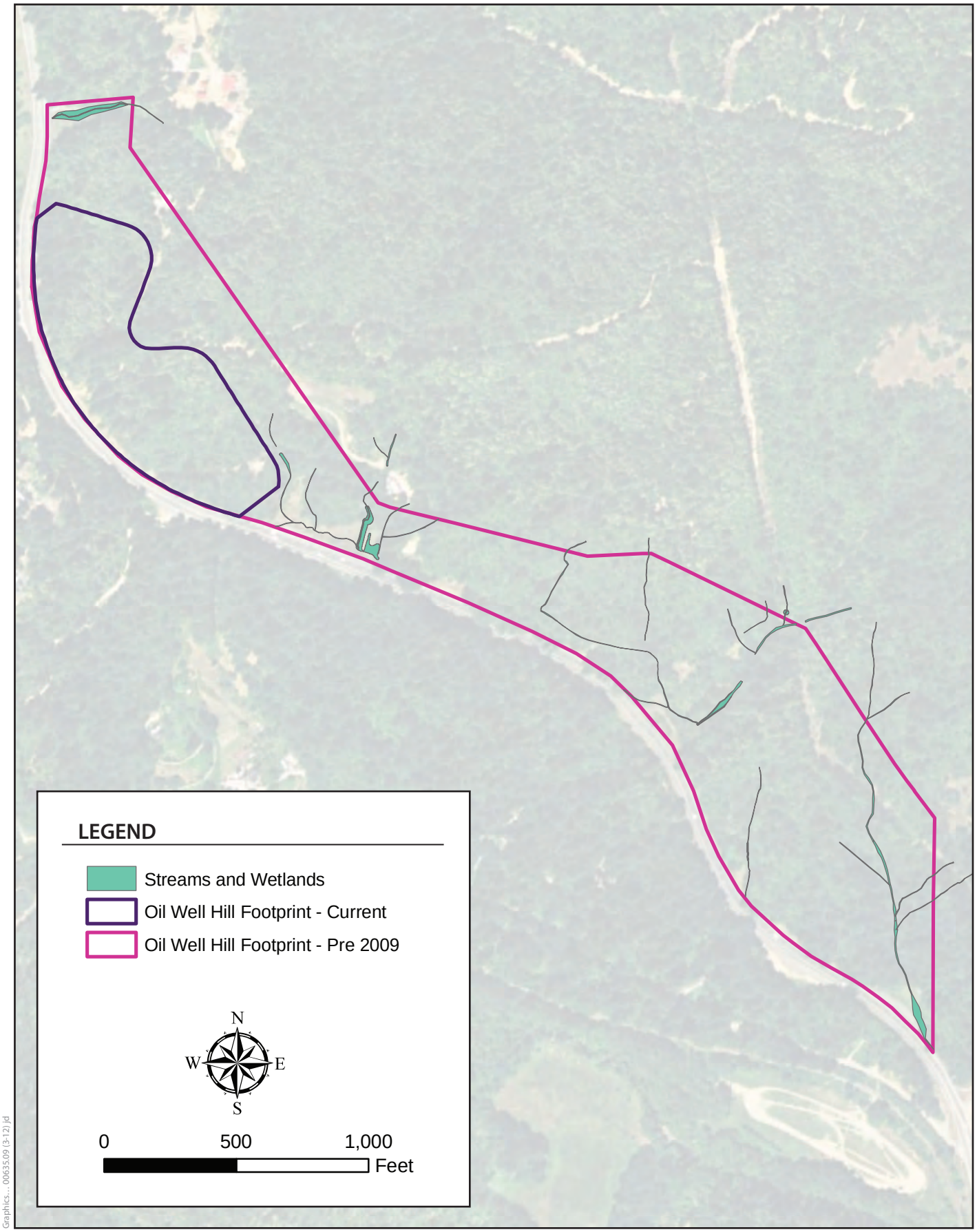


**Figure 2-2**
**Oil Well Hill Project Footprint and Waters of the State**
Willits Bypass Project

**Table 2-2. Wetland Habitat Types in the Bypass Project Footprint**

| Vegetation Type | Wetland Habitat Type<br>Cowardin Classification |
|---|---|
| Riparian Scrub | Willow Riparian Scrub<br>*Palustrine Scrub-Shrub Broad-Leaved Deciduous* |
| | Mixed Riparian Scrub<br>*Palustrine Scrub-Shrub Broad-Leaved Deciduous* |
| Riparian Woodland | Mixed Riparian Woodland<br>*Palustrine Forested Broad-Leaved Deciduous* |
| | Oregon Ash Riparian Woodland<br>*Palustrine Forested Broad-Leaved Deciduous* |
| | Valley Oak Riparian Woodland<br>*Palustrine Forested Broad-Leaved Deciduous* |
| Marsh | Mixed Marsh<br>*Palustrine Emergent Persistent* |
| | Tule Marsh<br>*Palustrine Emergent Persistent* |
| Wet Meadow | Wet Meadow<br>*Palustrine Emergent Non-Persistent* |
| Swale | Wetland Swale<br>*Palustrine Emergent Non-Persistent* |
| Vernal Pool | Vernal Pool<br>*Palustrine Emergent Non-Persistent* |

The following discussion provides definitions of wetland habitat types occurring within the bypass project footprint (California Department of Transportation 2006).

### *RIPARIAN SCRUB*

Riparian scrub is found in scattered locations throughout Little Lake Valley along streams and drainage ditches.

- **Willow Riparian Scrub:** Willow riparian scrub is found in scattered locations throughout the bypass project footprint. Additionally, willow riparian scrub extends throughout the same ranges as valley oak riparian woodland. The main species are arroyo willow, red willow, and Scouler's willow.
- **Mixed Riparian Scrub:** Mixed riparian scrub usually develops in artificial or highly disturbed habitats along ditches. Mixed scrub vegetation grows 10–30 feet tall and is dominated by coyote bush, poison-oak, California rose, nonnative Himalayan blackberry, blue elderberry, and arroyo willow. Wet meadow species form the dominant understory in portions of the mixed scrub community. Mixed riparian scrub in upland areas generally lacks a herbaceous layer and is dominated by coyote bush, poison-oak, and Himalayan blackberry.

### *RIPARIAN WOODLAND*

Riparian woodlands in the bypass project footprint range from multi-layered, multi-species woodlands with dense scrub understory to small groups of trees. Riparian woodland communities may have occupied extensive portions of Little Lake Valley before these areas were cleared for pasture and agriculture. In general, riparian communities qualify as sensitive plant communities because they are relatively scarce compared to their historical extent and because they provide important foraging and nesting habitat for many resident and migratory wildlife species (Gaines 1974; Remsen 1978; Harris et al. 1988; Sanders and Flett 1989).

Three types of riparian woodland habitat occur in the bypass project footprint.

- **Mixed Riparian Woodland:** Mixed riparian woodland, comprising canopy, midstory, shrub, and herb layers, is found along major creeks and drainages throughout the bypass project footprint. The canopy and midstory layers are dominated by box elder, red alder, Oregon ash, Fremont cottonwood, valley oak, and arroyo willow. The shrub layer is dominated by Himalayan blackberry, California blackberry, dogwood, twinberry, gooseberry, California rose, blue elderberry, and clematis. Common plants in the herb layer include short-scale sedge, creeping ryegrass, spreading rush, avens, cow parsnip, common dandelion, and common meadow-rue (California Department of Transportation 2000, 2005a).
- **Ash Riparian Woodland:** Ash riparian woodland is common in the northern and central portions of the bypass project footprint, where it is found along creeks, fence rows, levees, troughs, and low terraces. This community occurs in wetter landscape positions than other riparian woodland types in Little Lake Valley, and the long-term flooding and soil saturation that characterize it may preclude the establishment of other riparian tree species. The overstory consists entirely of Oregon ash. The shrubs and herbaceous species found in the understory vary with the amount of soil moisture. Oregon ash saplings, arroyo willow, and blackberry are commonly observed in the understory; in wetter areas, other dominant species are sedges, rushes, perennial ryegrass, western buttercup, cutleaf geranium, common spikerush, reed canary grass, broadleaf cattail, and tule. In drier areas, blackberry shrubs are interspersed with hawthorn, poison-oak, honeysuckle, Pacific ninebark, and white snowberry (California Department of Transportation 2005a).
- **Valley Oak Riparian Woodland:** Valley oak riparian woodlands are scattered throughout the bypass project footprint, typically along low and high terraces adjacent to creeks and intermittent drainages. Scattered individual valley oaks are common in open fields, while groves of valley oaks grow along creeks, fences, and roads on higher terraces (California Department of Transportation 2005a).

### *MARSH*

Two marsh communities were identified in the bypass project footprint: mixed marsh and tule marsh. Floodwater from Outlet Creek that is trapped in basins and shallow groundwater are the principal sources of water for marshes in Little Lake Valley.

- **Mixed Marsh:** Mixed marsh in the bypass project footprint is found in internally drained basins and low-lying troughs throughout the northern portion of Little Lake Valley. In the bypass project footprint, mixed marsh occurs primarily in the Quail Meadows area. Mixed marsh is characterized by annual and perennial herbs and grass-like species with taller perennials scattered throughout. Dominant species include knotweed, broadleaf water plantain, common spikerush, reed canary grass, broadleaf cattail, tule, and Nebraska sedge (California Department of Transportation 2000, 2005a).
- **Tule Marsh:** Tule marsh is found in the northern portion of Little Lake Valley, where it borders wet meadows and riparian woodlands and forms small to large patches within mixed marsh wetlands. Unlike mixed marshes, which support a diversity of plants, tule marshes are dominated by dense monotypic thickets of tule, with minimal cover by other species (California Department of Transportation 2005a).

### *WET MEADOW*

Wet meadow is the most extensive wetland type in the bypass project footprint, found in multiple locations in both natural and artificial settings. Wet meadows develop in areas where the soil and vegetation have remained undisturbed (or only minimally disturbed) for many years. Wet meadows typically have poorly drained soils and receive water from winter and spring precipitation, agricultural field and pasture irrigation, creek floodplain aquifers, overbank flooding, and sheet drainage from excessive runoff. Obligate wetland species such as sedges and rushes often compose a significant component of the total hydrophytic vegetation in wet meadows in the bypass project footprint. Other dominant species include Davy's semaphore grass, creeping bentgrass, meadow foxtail, California oatgrass, creeping ryegrass, pennyroyal, western buttercup, and curly dock. In addition, Oregon ash and valley oak trees are found sporadically in some wet meadows. This community is one of the primary types in which BM is found.

During wet winters, portions of the wet meadow areas flood, providing habitat for a number of waterfowl species, including cinnamon teal, mallard, American widgeon, northern shoveler, wood duck, and American coot. The stream reaches in the valley are usually dry during the summer months. Wet meadow wetlands serve as a source of water for Outlet Creek downstream

of Little Lake Valley, where Outlet Creek eventually is a perennial stream that flows into the Eel River.

#### *VERNAL POOL AND SWALES*

Vernal pools and swales are found throughout the wet meadow communities and also in upland grassland habitats south and north of East Hill Road. Swales are shallow, vegetated channels that tend to accumulate surface runoff during wet seasons (California Department of Transportation 2005a). Vernal pools consist of small to large depressions in areas where heavy clay soil horizons occur. They are internally drained basins that collect rainfall and surface runoff from surrounding grasslands. The impervious layer of subsoil prevents water from quickly infiltrating into the soil, forming a shallow, perched water table that is exposed in some depressions. The frequency and duration of ponding and saturation vary among vernal pools depending on the size of the watershed, depth to the impervious subsoil layer, and timing and amounts of rainfall during each rainy season. Characteristic annual hydrophytic plant species in the vernal pools and swales include bracted popcornflower, purslane speedwell, downingia, Bolander's water-starwort, toad rush, BM, Douglas' meadowfoam, semaphore grass, and owl's-clover. Herbaceous perennials include spreading rush, slender beak sedge, greensheath sedge, meadow foxtail, Timothy grass, pennyroyal, and curly dock (California Department of Transportation 2005a).

### 2.1.3.2 OTHER WATERS

The bypass project is in the southern part (subbasin) of the Outlet Creek basin. The Outlet Creek basin complex is one of the headwater tributaries of the Eel River, the third largest river system in California. The five major streams intersecting the bypass project footprint are Haehl, Baechtel, Broaddus, Mill, and Upp Creeks. A number of smaller jurisdictional streams are present in the southern bypass project footprint.

Most streams that traverse the bypass project footprint, with the exception of Upp Creek, are shaded by mature riparian vegetation. These streams provide fish habitat and support juvenile and adult salmonids. Instream habitat consists of pools, riffles, and shallow runs and glides. Streambanks are typically steep and channels incised.

All five streams within the bypass project footprint as well as the lower parts of their tributaries provide important habitat for adult and juvenile anadromous salmonids migrating to and from Outlet Creek. Some spawning and seasonal rearing may occur in some reaches of these creeks in the bypass project footprint (California Department of Transportation 1997; Harris pers. comm.). California roach and introduced warmwater species (e.g., sunfish, largemouth bass) are predominant during reduced flow periods in summer and early fall. The need/opportunity for

improving water quality and general stream habitat conditions exists at several locations. The general conditions of the five streams are discussed in Chapter 5.

### 2.1.4 Oak Woodlands

Four different types of oak woodlands occur in the bypass project footprint and offsite mitigation parcels: valley oak woodland, Oregon white oak woodland, black oak woodland, and canyon live oak woodland. In some cases these oak woodlands are mixed, forming communities such as the black oak–valley oak association. In other cases they are mixed with other species, primarily Douglas-fir or California fescue, forming associations such as Oregon white oak–Douglas-fir/California fescue association, Douglas-fir–canyon live oak forest alliance, and black oak–Douglas-fir association). In these mixed woodland and forest associations, only 50% of the area was counted as oak woodland for the purpose of assessing impacts. The areal extent of the canopy and grassland component of all oak woodland and forest communities in the bypass project footprint is shown in Appendix B.

In the bypass project footprint, valley oaks occur in three different settings: lowland seasonal wetlands, riparian areas, and uplands. Upland valley oak woodlands typically consist of scattered individual valley oaks or small groves in open fields and along fences and roads on higher terraces.

In the bypass project footprint, Oregon white oak woodlands vary from open savannas in the valley floor areas to denser woodlands in the foothills. Oregon white oak woodlands are regionally common from Marin County to Mendocino, Humboldt, and Siskiyou Counties, extending through the Cascade Range to British Columbia. Oregon white oak woodlands also are found farther south in the Santa Cruz Mountains. Locally, Oregon white oak woodland is a common natural community in Little Lake Valley and the surrounding foothills.

The steeper slopes on the edges of the bypass project footprint, as well as some riparian areas, are dominated by California black oak woodlands. The shrub layer is sparse to moderate; associated species include common manzanita and buck brush. The ground layer is composed of native grasses, such as California brome and oniongrass, and wildflower species. Typically, black oak woodland is an upland tree-dominated community; however, in the bypass project footprint, it occurs in some lowland areas as well. This community occurs on well-drained soils more fertile than those supporting Oregon white oak.

Canyon live oak woodlands are found on sheltered, north-facing slopes and moderate- to steep-sloped canyons. They are a common element in the mixed and evergreen forests of Oil Well Hill.

Canyon live oaks are the most widely distributed oaks in California, found from southwest Oregon through the Coast Ranges and Sierra Nevada to southern California. Associated tree species include black oak, Douglas-fir, and Pacific madrone. Associated shrubs, such as Himalayan blackberry and poison-oak, tend to be infrequent, and the herbaceous ground layer is typically sparse or absent.

Maps of oak woodlands are provided in Appendix B for the bypass project footprint and Appendix C for the offsite mitigation parcels.

## 2.2 Impacts on Sensitive Biological Resources within the Bypass Project Footprint

As discussed above, construction of the bypass project will result in temporary and permanent impacts on the following biological resources: NCSG, BM, riparian vegetation, waters of the State, oak woodlands, and oak woodland grassland. Impacts on SONCC coho salmon are addressed in the context of riparian habitat associated with salmonid streams.

In considering the impacts on sensitive biological resources and mitigation of those impacts, it was recognized that some resources occur together as components of the same habitat or community (e.g., BM occurs in wetlands, some oak woodland occurs in protected fisheries habitat). Accordingly, some of the specific mitigation described in this MMP will compensate for more than one resource where habitats overlap (i.e., multiple in-kind mitigation). In an effort to accurately account for the mitigation of overlapping portions of various resources, an order of mitigation was established to prevent duplicate counting of mitigation credits (California Department of Transportation 2006). The order of mitigation was determined as shown below.

- Listed plants
- Category I Riparian Corridors
- Waters of the State
- All other resources (Category II and III Riparian Corridors and oak woodlands and grassland)

The concept of overlapping resources and order of mitigation is illustrated in Appendix C.

Determination of temporary and permanent impacts on sensitive biological resources was calculated as shown below.

- All areas under new roadways and associated embankments were considered permanently affected. Temporary impacts were calculated as the area from the roadway embankment catchpoint (i.e., the toe of the embankment) to 3 meters beyond and any areas around new drainages that will be temporarily disturbed.
- Areas under newly placed utility poles were considered permanent impacts, and impacts from trenching to the new utility pole locations were considered temporary.
- Areas of stream reestablishment were calculated as temporarily affected for all resources within the area of disturbance.
- Drainages, primarily culverts, were calculated as temporary impacts for all resources within the area of disturbance.
- The construction areas along the viaducts extend out 100 feet east and 55 feet west of the viaducts. Within the construction area, the areas where pier footings will be placed were calculated as permanent. The remaining areas were calculated as temporary impacts.
- A portion of the Rutledge pond will be filled. This area was considered a permanent impact. In addition, the pond will be reconfigured to allow the same water retention as currently is afforded. The area occupied by the reconfigured pond was considered a permanent impact.
- Individual oak trees in areas predominantly characterized as riparian habitat were not counted as oak woodlands. Widely scattered oaks in wet meadows outside riparian areas were counted as oak woodland.
- Oak woodlands on the proposed Oil Well Hill borrow site occur in stands with Douglas-fir. In these cases, the oak woodlands were counted at 50% of the total area occupied by the two species.
- Oak grasslands are those areas within 150 feet of oak woodland habitat.
- Non-grassland areas within 150 feet of the oak woodland habitats were excluded from the oak grassland areas. These non-grassland features included structures, roadways, riparian habitats, marshes, and other non-grassland areas.

Because the distribution of BM changes substantially each year, impacts on BM were calculated for the overall habitat where the species has potential to occur.

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**Table 2-3. Bypass Project and Mitigation Construction Impacts**

| Resource | Project Impacts *before* Overlaps Removed (acres)[a] | | | Project Impacts *after* Overlaps Removed (acres)[a] | | | Mitigation Impacts *before* Overlaps Removed (acres)[b] | | | Mitigation Impacts *after* Overlaps Removed (acres)[b] | | | Total Project and Mitigation Impacts *after* Adjustment for Overlaps (acres)[i] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Temporary Impact Area | Permanent Impact Area | Total | Temporary Impact Area | Permanent Impact Area | Total | Temporary | Permanent | Total | Temporary | Permanent | Total | |
| North Coast semaphore grass | 0.08 | 0.22 | **0.30** | 0.08 | 0.22 | **0.30** | - | - | **-** | - | - | **-** | **0.30** |
| Baker's meadowfoam[c] | 5.05 | 25.39 | **30.44** | 5.05 | 25.39 | **30.44** | 12.77 | 77.80[d, e] | **90.57** | 12.75 | 77.80 | **90.55** | **120.99** |
| Category I Riparian Corridor[e] | 4.74 | 3.59 | **8.33** | 4.67 | 3.53 | **8.20** | | 1.27 | **1.27** | | 1.27 | **1.27** | **9.47** |
| Jurisdictional wetlands | 25.23 | 48.48 | **73.71** | 19.92 | 25.46 | **45.38** | 13.75 | - | **13.75** | 9.92 | - | **9.92** | **55.30** |
| Other waters | 3.49 | 2.57 | **6.06** | 1.70 | 2.31 | **4.01** | 0.38 | - | **0.38** | 0.38 | - | **0.38** | **4.39** |
| Category II Riparian Corridor[f] | 0.22 | 3.66 | **3.88** | 0.02 | 2.83 | **2.85** | | 0.76 | **0.76** | | 0.55 | **0.55** | **3.40** |
| Category III Riparian Corridor[g] | 0.71 | 3.07 | **3.78** | 0.58 | 2.61 | **3.19** | - | - | **-** | - | - | **-** | **3.19** |
| Oak woodland (tree canopy) | | | | | | | | | | | | | |
| Lowland[h] | - | 9.24 | **9.24** | - | 4.73 | **4.73** | - | 0.11 | **0.11** | - | 0.02 | **0.02** | **4.75** |
| Upland[h] | - | 10.45 | **10.45** | - | 7.71 | **7.71** | - | - | **-** | - | - | **-** | **7.71** |
| Oak woodland (grassland component) | | | | | | | | | | | | | |
| Lowland | - | 48.71 | **48.71** | - | 31.75 | **31.75** | 10.84 | - | **10.84** | 8.83 | - | **8.83** | **40.58** |
| Upland | - | 13.06 | **13.06** | - | 12.52 | **12.52** | - | - | **-** | - | - | **-** | **12.52** |
| **Total** | **39.52** | **168.44** | **207.96** | **32.02** | **119.06** | **151.08** | **37.74** | **79.94** | **117.68** | **31.91** | **79.64** | **111.52** | **262.60** |

[a] Temporary impacts: Direct impacts outside the permanent impact area (bypass footprint), as depicted in Appendix B. Includes temporary access roads and staging areas. Permanent Impacts: Direct impacts within the bypass project footprint as depicted in Appendix B.

[b] Temporary mitigation impacts: Impacts caused by the construction and installation of offsite mitigation for the bypass project. These areas of impact will be capable of restoration after the disturbances so are considered to be self-mitigating .The majority of these impacts result from work associated with wetland establishment and the removal of cattle grazing. Permanent mitigation impacts: Impacts caused by construction and installation of offsite mitigation for the bypass project. These areas of impact will not be capable of restoration and so are considered permanent.

[c] Impacts on Baker's meadowfoam: Acreages reported combine observed plants (reported in 1997, 2003, 2008, and 2009) and potential habitat based on described environmental conditions that support species' occurrences.

[d] Literature review suggests that areas where grazing does not occur create conditions that do not support Baker's meadowfoam and will cause it to be extirpated from those areas. As a result, areas where grazing will be removed are considered permanently affected.

[e] Areas of oak planting are considered permanent impacts on Baker's meadowfoam.

[f] Category I Riparian Corridors: Areas of salmonid streams and adjacent riparian areas extending laterally from the ordinary high water mark (OHWM)100 feet on each bank.

[g] Category II Riparian Corridors: Tributaries of Category I Riparian Corridors that are within 1,000 feet of the confluence with a Category I stream, extending 50 feet from the OHWM on each bank.

[h] Category III Riparian Corridors: Tributaries of Category I Riparian Corridors that are more than 1,000 feet upstream of the confluence with the Category I stream, extending 25 feet from the OHWM on each bank.

[h] All oak woodland (canopy) impacts are considered permanent because of the long-term loss of oak woodland functions in areas where oaks would be removed.

[i] Total impacts were calculated using the total project impacts after adjustment and the total mitigation impacts after adjustment.

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- Impacts on NCSG were calculated only for observed populations because the distribution from year to year remains relatively constant.
- Impacts on oak woodland habitats were considered permanent because of the long establishment period.
- For erosion site mitigation areas, eroding bank treatments were calculated as temporary impacts on other waters. Headcut treatments were calculated as permanent impacts on wetlands and other waters, and access routes were calculated as temporary impacts for all resources within the area of disturbance.

Table 2-3 presents resources in the established order of mitigation, as well as the corresponding acreages of temporary and permanent project impacts associated with each resource *before* adjustments for overlaps with other biological resources/habitats and *after* adjustments for overlaps, using the procedures outlined above. The table also lists temporary and permanent impacts caused by installation of offsite mitigation. Table 2-4 presents impact acreages for wetlands and other waters by type.

**Table 2-4. Impacts on Wetlands (by Type) and Other Waters[a]**

| Wetland Type/Other Waters | Project Impacts on Wetlands and Other Waters (acres) | | | Mitigation Impacts on Wetlands and Other Waters (acres) | | | Total Impacts on Wetlands and Other Waters (acres) |
|---|---|---|---|---|---|---|---|
| | Temporary | Permanent | Total | Temporary | Permanent | Total | Total |
| Marsh | 0.99 | 8.06 | **9.05** | 0.50 | 0.00 | **0.50** | **9.55** |
| Riparian wetland | 2.51 | 3.72 | **6.23** | 0.43 | 0.00 | **0.43** | **6.66** |
| Swale | 0.05 | 0.46 | **0.51** | 0.44 | 0.00 | **0.44** | **0.95** |
| Vernal pool | 0.05 | 0.16 | **0.21** | 0.17 | 0.00 | **0.17** | **0.38** |
| Wet meadow | 21.63 | 36.08 | **57.71** | 12.21 | 0.00 | **12.21** | **69.92** |
| Other waters | 3.49 | 2.57 | **6.06** | 0.04 | 0.00 | **0.04** | **6.10** |
| **Total** | **28.72** | **51.05** | **79.77** | **13.79** | **0.00** | **13.79** | **93.56** |

[a] Numbers shown are impacts *before* overlaps removed.

There are a number of linear riparian and wet meadow areas generally outside the bypass project construction footprint but within Caltrans right-of-way or temporary construction easements that are available to the contractors during construction for vehicle access during the dry season. These areas often are associated with access for utility relocation along the bypass alignment. These areas do not qualify as fill in a wetland and are not included in the sum of the temporary impacts; they require no compensatory mitigation. Wetland areas will be monitored to confirm that they are not affected and that they are in their original condition after project completion.

Temporary impacts as a result of construction and installation and implementation of the mitigation are considered to be self-mitigating because they will be restored, protected, and managed in perpetuity.

## 2.3 Functions and Values of Wetlands

Wetland functions and values were considered in developing the mitigation vision, goals, objectives, and strategies/actions. *Wetland functions* are the processes by which the normal physical and biological properties of wetlands are supported and maintained (Brinson 1993; Smith et al. 1995). Not all wetlands perform the same functions or level of function; rather, these vary with the wetland category, size, proximity to other wetlands, type and degree of previous and current disturbances, and adjacent land uses. In general, *wetland values* are benefits that wetland functions provide to human society, such as flood protection, maintenance of water quality, and recreation (Mitsch and Gosselink 2007) and societal value. Wetland functions and values are equivalent to the beneficial uses presented in the Water Quality Control Plan for the North Coast Region (North Coast Regional Water Quality Control Board 2007).

Wetlands in the bypass project footprint and vicinity perform functions in three basic categories.

- Hydrology
- Water quality and related functions
- Flora and fauna habitat support

Current land use substantially reduced the areal extent of wetlands and streams (other waters) that once covered most of Little Lake Valley. These wetlands and streams used to provide high-function fish, wildlife, and plant habitat long into the summer season. These wetland and stream complexes allowed anadromous fish to feed and migrate through the valley into foothill spawning areas. Wetlands also served as a natural filter to retain fine sediment brought down by the numerous streams, and they recharged the groundwater aquifers. The extensive modern-day reduction of wetland acreage throughout the valley has severely affected the environmental health of the entire Outlet Creek basin.

The natural resources of Little Lake Valley described in the sections above are threatened by current land use practices, which include heavy grazing in wetland and riparian areas, mechanical vegetation clearing to increase grazing habitat, cattle access to streambeds and streambanks, and water diversions for irrigation. Not only do these land use practices negatively affect resources in Little Lake Valley, but they also affect downstream water quality and habitat for aquatic species. These current practices limit the capacity of the wetlands in Little Lake

Valley to absorb nutrients and sediments from the surrounding uplands and limit the capacity of the streams and associated riparian habitat to provide important dispersal corridors to areas up- and downstream of the valley and breeding and foraging habitat for fish and wildlife, including listed salmonids.

### 2.3.1 Hydrology Functions

Wetland hydrology comprises "all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season" (Environmental Laboratory 1987). Wetland hydrology provides the basis for all wetland functions. Wetlands in the project vicinity carry out three general hydrologic functions.

- Groundwater recharge
- Groundwater discharge
- Floodflow alteration

#### 2.3.1.1 GROUNDWATER RECHARGE

Groundwater recharge is the process in which surface flows are stored for a period sufficient for water to percolate into the soil or into the groundwater table. Groundwater recharge helps maintain the wetland hydrology of wetlands dependent on groundwater discharge, such as wet meadow.

In the project vicinity, the potential for groundwater recharge is generally low. The terrain is relatively flat, but numerous artificial drainages and swales convey runoff into streams. Mixed marsh, which is found in internally drained basins and low-lying troughs in the northern portion of Little Lake Valley, has the highest potential for groundwater recharge. Vernal pools also have basins, but the subsurface restrictive layer that causes inundation prevents percolation. Groundwater recharge is equivalent to the *groundwater recharge* and *wetland habitat* beneficial uses in the Water Quality Control Plan for the North Coast Region (North Coast Regional Water Quality Control Board 2007).

#### 2.3.1.2 GROUNDWATER DISCHARGE

Groundwater discharge occurs where the groundwater table intercepts the soil surface. It is important for maintaining streamflows during the summer as well as maintaining seeps, springs, and wetlands dependent on a shallow groundwater table. In the project vicinity, the potential for groundwater discharge is generally low. Groundwater discharge occurs in some areas of wet meadow where seeps and springs are present. These wetlands serve as a possible partial source

of water during the summer months for Outlet Creek downstream of Little Lake Valley, where it is a perennial stream, when the stream reaches within the valley are usually dry. Groundwater discharge is equivalent to the *freshwater replenishment* and *wetland habitat* beneficial uses in the Water Quality Control Plan for the North Coast Region (North Coast Regional Water Quality Control Board 2007).

#### 2.3.1.3 FLOODFLOW ALTERATION

Short-term water storage decreases the amount and velocity of runoff, reducing peak floods and distributing storm flows over longer periods of time. The dissipation of energy in moving water lessens its erosive impact and helps reduce downstream sedimentation. This function is provided primarily by vegetated wetlands associated with riverine and lacustrine ecosystems. Stream channels in the project vicinity have moderate to high potential for floodflow alteration, with the highest potential occurring in riparian woodland. Marsh communities also have moderate potential for floodflow alteration because they occur in shallow basins, but this potential is limited by the size and depth of the basins. Riparian communities not associated with stream channels, wet meadows, vernal pools, and swales help slow floodflow velocities but have low potential for floodflow retention because they lack basins. Floodflow alteration is equivalent to the *flood peak attenuation/flood water storage* and *wetland habitat* beneficial uses in the Water Quality Control Plan for the North Coast Region (North Coast Regional Water Quality Control Board 2007).

### 2.3.2 Water Quality and Related Functions

Water quality and related functions (biogeochemical functions) are the characteristics that enable wetland ecosystems to transport and transform chemicals. Wetlands remove dissolved substances from water through various mechanisms such as absorption, adsorption, solubilization, oxidation, biological transformation, and precipitation. Wetlands, by definition, are vegetated, and this vegetation is responsible for a wide range of physical and biochemical processes. Wetlands in the project vicinity carry out three general biogeochemical functions.

- **Sediment/toxicant retention.** Currently, water moves too quickly through Little Lake Valley. Mitigation actions on the offsite mitigation parcels—specifically Ford, Wildlands, and Benbow—will improve both sediment and toxicant retention by allowing water to move more slowly through more mature and native wetland vegetation consisting of both woody and herbaceous species. Bank stabilization measures also will create a net benefit for the retention of sediments in the valley.

- **Nutrient removal/transformation.** High nutrient loads in Little Lake Valley are a product of agricultural activities. The offsite mitigation will improve nutrient removal and transformation through parcels being planted with wetland and riparian vegetation; moreover, the reduction of grazing will allow water to move more slowly through the valley.
- **Production export.** The fragmentation of habitats in Little Lake Valley limits the export of nutrients and carbon within the habitats of the valley. Most of the wetland establishment and rehabilitation areas on the offsite mitigation parcels are designed to increase production and nutrient export in the valley. Reducing erosional areas, enhancing water retention, and providing more natural flow regimes through the valley will increase production and allow more effective export and nutrient movement.

#### 2.3.2.1 SEDIMENT/TOXICANT RETENTION

Vegetation slows the velocity of water, reducing its ability to hold particles in suspension. Water in watersheds with more wetlands tends to have lower specific conductance (a measure of the total concentration of dissolved substances) and lower concentrations of chloride, lead, inorganic nitrogen, suspended solids, and total dissolved phosphorus than water in watersheds with fewer wetlands. Also, certain wetland plant species help remove heavy metals. Wetlands, therefore, improve water quality by removing both dissolved substances and suspended particulates.

In the project vicinity, the marsh community has high potential for sediment/toxicant retention because it occurs in a shallow basin, allowing water to be impounded and acted upon by the vegetation. Riparian woodland and scrub have moderate potential to remove sediment because the vegetation, together with riffle and pool complexes, slows the water flow, but the streams do not impound water long enough for the vegetation to remove toxicants. In addition, whether these wetlands actually function to remove sediment or toxicants depends on whether there are sources of these substances in the vicinity. Most other wetland communities in the project vicinity have low potential for sediment/toxicant retention because they lack the ability to impound water.

Sediment/toxicant retention is equivalent to the *water quality enhancement* and *wetland habitat* beneficial uses in the Water Quality Control Plan for the North Coast Region (North Coast Regional Water Quality Control Board 2007).

#### 2.3.2.2 NUTRIENT REMOVAL/TRANSFORMATION

Growing vegetation removes dissolved nutrients and other substances from the water and soil, often metabolizing them and sometimes sequestering them within plant tissues. Bacteria growing

in the soil or in plant roots also break down or alter these substances so that they are removed from the water, either by plants or as a gas.

In the project vicinity, the marsh community has high potential for nutrient removal/transformation because it occurs in a shallow basin, allowing water to be impounded and acted upon by the vegetation. Most wetland communities in the project vicinity have a low level of nutrient removal/transformation because they lack the ability to impound water.

Nutrient removal/transformation is equivalent to the *wetland habitat* beneficial use in the Water Quality Control Plan for the North Coast Region (North Coast Regional Water Quality Control Board 2007).

#### 2.3.2.3 PRODUCTION EXPORT

The nutrients and carbon fixed by plants are cycled when the plants are eaten by herbivores or when the plants die and decompose. The flow of water through wetlands provides efficient movement and distribution of nutrients and energy throughout the entire ecosystem.

In the project vicinity, none of the wetland communities has high potential for production export. Both wet meadow and marsh are highly productive communities, but the spread of nutrients within these communities or the export to other communities is limited by the seasonal wetland hydrology and lack of connectivity with other habitats. Riparian woodland and scrub have relatively high primary productivity, but much of that productivity is stored in woody material and is not readily available for export.

Production export is equivalent to the *wetland habitat* beneficial use in the Water Quality Control Plan for the North Coast Region (North Coast Regional Water Quality Control Board 2007).

### 2.3.3 Flora and Fauna Habitat Support

Wetlands are productive environments that provide diversity in the landscape. The flux of nutrients and energy in wetlands is relatively high because of the high growth rate and rapid turnover of the wetland vegetation. Dead organisms and other organic matter in wetlands are broken down into organic compounds by bacterial action, providing food for invertebrates. These invertebrates are the foundation of the foodweb that supports a broad array of wildlife species, from shorebirds to amphibians. Wetlands provide habitat where many plants and animals can fulfill one or more life cycle stages. Wetlands in the project vicinity carry out three general flora and fauna habitat support functions.

- Wildlife habitat diversity
- Connectivity of wetland corridors for wildlife
- Aquatic habitat diversity

#### 2.3.3.1 WILDLIFE HABITAT DIVERSITY

Wetlands support a diverse array of trophic levels (feeding levels) in both the wetland and the surrounding upland environments. Many species use wetlands for feeding and uplands for nesting. Habitat connectivity, fragmentation, and patchiness all affect the capability of wildlife movement within a wetland, and between the wetland and adjacent upland habitat. Barriers between the wetlands and the adjacent uplands (e.g., roads, berms, culverts) prevent some species from moving into or out of the wetlands, making them unable to reproduce or compete their life cycle. Large mammals, birds, and flying insects are less affected by such barriers. Changing land uses in or adjacent to wetlands, in addition to altering their function as habitat, limits the ability of wildlife to move between available habitat.

Disturbance also lowers the wildlife habitat function of wetlands. The more intensely land use disturbs the landscape, the more the characteristic vegetation can change. With disturbance from grazing, plowing, or grading, the characteristic vegetation can be susceptible to invasive species (both native and exotic). When wetlands are farmed or overgrazed so that the existing wetland vegetation is removed from the soil surface, wildlife use changes. Habitat for some species is diminished because there is insufficient vegetation to provide food, shelter, or nesting opportunities.

Wetlands in the project vicinity generally have moderate to high potential for wildlife habitat functions. Riparian woodland, riparian scrub, and marsh all have high structural diversity and open water areas that provide both foraging and breeding habitat. The wet meadow community has low structural diversity but high plant diversity and is used by birds and amphibians. Vernal pools and swales exist in complexes with wet meadows and have similar wildlife habitat functions, but they also provide habitat for species uniquely adapted to vernal pools.

Wildlife habitat diversity is equivalent to the *wildlife habitat* and *wetland habitat* beneficial uses in the Water Quality Control Plan for the North Coast Region (North Coast Regional Water Quality Control Board 2007).

#### 2.3.3.2 CONNECTIVITY OF WETLAND CORRIDORS FOR WILDLIFE

Wildlife habitat and migration corridors are created by buffers and wetland habitat. The offsite mitigation parcels surround the major stream draining Little Lake Valley, Outlet Creek, and several of its upstream tributaries (Haehl, Baechtel, Broaddus, Mill, and Upp Creeks). Mitigation provided by the bypass project will ensure the existence of the wildlife habitat and migration corridors surrounding Outlet Creek and its tributaries in perpetuity. Connecting riparian corridors and increasing their size also will improve landscape connectivity and breeding and foraging habitat for riparian-dependent bird species. Riparian vegetation surrounding Category I Riparian Corridors will be added throughout the length of the offsite mitigation parcels, creating a continuous cover for wildlife protection. Wetlands in the project vicinity have high potential for wildlife corridor habitat function. Specific jurisdictional wetland types providing this function include riparian woodland and riparian scrub.

Connectivity of wetland corridors for wildlife is equivalent to the *wildlife habitat* and *wetland habitat* beneficial uses in the Water Quality Control Plan for the North Coast Region (North Coast Regional Water Quality Control Board 2007).

#### 2.3.3.3 AQUATIC HABITAT DIVERSITY

Some wetlands and waters in the project vicinity have high potential for aquatic habitat functions. Streams, together with their associated riparian woodland and riparian scrub, provide fisheries habitat, for coho salmon, and support juvenile and adult salmonid runs. They also provide habitat for other native fishes such as California roach and introduced warmwater species (e.g., sunfish, largemouth bass). When inundated, marsh and vernal pools provide habitat for aquatic invertebrates. Although portions of wet meadow areas occasionally may flood, wet meadow habitat typically is not inundated and has only low potential for aquatic habitat function.

Aquatic habitat diversity is equivalent to the *warm/cold freshwater habitat* and *wetland habitat* beneficial uses in the Water Quality Control Plan for the North Coast Region (North Coast Regional Water Quality Control Board 2007).

### 2.3.4 Wetland Values

Many factors contribute to the value of wetlands in the project vicinity. They provide habitat used by threatened or endangered species, they are part of a unique wetland area, and either they constitute sensitive natural communities (e.g., riparian woodland) or they support sensitive species (e.g., valley oak) as a component.

Little Lake Valley is one of the largest valleys in the North Coast Ranges. Geologically, the valley is a *graben*, a tectonically downthrust block of ground surrounded by hills or mountains and separated from them by faults. Historically, the valley bottom contained extensive meadows, marshes, and riparian woodlands. Large expanses of these habitat types are unusual in the North Coast Ranges because wide graben-type valleys with poor drainage are uncommon. Because they are regionally uncommon, these extensive wetland and riparian habitats are particularly important to migrating waterfowl and other wildlife species such as black-tailed deer, tule elk, western pond turtle, yellow warbler, and yellow-breasted chat.

NCSG and BM are special-status species that contribute to the uniqueness and botanical heritage of Little Lake Valley. Chapter 7 discusses how wetlands on the mitigation sites will be rehabilitated. The wetland value of uniqueness/heritage is equivalent to the rare, threatened and endangered species and wetland habitat beneficial uses presented in the Water Quality Control Plan for the North Coast Region (North Coast Regional Water Quality Control Board 2007).

## 2.4 Watershed Approach to Determining Mitigation Success

The overall goal of the mitigation program is to compensate for unavoidable impacts on sensitive biological resources resulting from bypass project construction by improving the valley's ecological functions and values through a combination of habitat reestablishment, establishment, rehabilitation, and preservation. A watershed approach to determining mitigation success in compensating for unavoidable impacts on sensitive biological resources resulting from bypass project construction is used to demonstrate that mitigation is commensurate with the amount and type of project impacts. The 2008 Mitigation Rule (33 CFR Part 332.3) was used to guide the watershed approach during the development of this MMP.

A watershed approach was used to develop the mitigation program with a nexus to the TMDL for the Upper Main Eel River and tributaries (TMDL). In August 2010, Caltrans developed a memorandum identifying the nexus between the TMDL and the mitigation program that was used to drive future development of the mitigation program (California Department of Transportation 2010b). The TMDL was developed to address temperature and sediment concerns in the Upper Eel River watershed (U.S. Environmental Protection Agency 2004). The onsite and offsite mitigation for wetlands, other waters and riparian habitat were developed to address and incorporate, to the maximum extent practicable, the temperature and sediment concerns of the TMDL. As outlined in the TMDL, the project's key to compliance with the TMDL is dependent upon the following:

- Collection of baseline stream temperature data in order to draw correlations between stream temperatures and the removal, reestablishment, establishment, and rehabilitation of riparian vegetation.
- Implementation of a successful riparian mitigation plan that targets riparian establishment and rehabilitation of riparian corridors.
- Assessing existing erosion sites in the project area and offsite mitigation areas and develop plans to rehabilitate some of these features.
- Developing an effective grazing plan that will result in the minimization of local erosion and degradation of stream corridors.

As stated in the TMDL, "the primary purpose of the TMDL program for the California's Eel River is to assure that beneficial uses of water (such as salmonid habitat) are protected from adverse increases in natural sediment and temperature. The water quality problems in the Upper Main Eel River and tributaries, including the areas of Tomke Creek, Outlet Creek and Lake Pillsbury) addressed in this report are related to the decline of west coast salmon and steel head populations. Section 2.3 identifies other wetland functions and values of existing wetland resources and their nexus to the beneficial uses presented in the Water Quality Control Plan for the North Coast Region (North Coast Regional Water Quality Control Board 2007). The mitigation program was developed to increase or maintain the function and values of project area wetlands and other waters.

The MMP includes technical assurances that compensatory mitigation will support beneficial uses of waters of the State and also meet watershed needs. The conceptual model depicted in Figure 2-3 was developed as part of that assurance and to graphically represent the model components. The MMP contains other assurances, including mitigation monitoring requirements and performance standards to ensure mitigation success. In addition, funding will be provided for short-term and long-term offsite mitigation area maintenance and management.

The mitigation vision, goals and objectives for this mitigation program, and the watershed needs they directly benefit, are outlined in Section 2.6.

### 2.4.1 Conceptual Model for Mitigation Planning and Watershed Needs

The conceptual model is organized around three major mitigation presumptions for the project, which are supported by specific mitigation objectives. The mitigation presumptions were identified by an interagency review team (IRT) convened for the project. The IRT consisted of Caltrans, EPA, CDFG, and NCRWQCB. The IRT took into consideration the North Coast Water

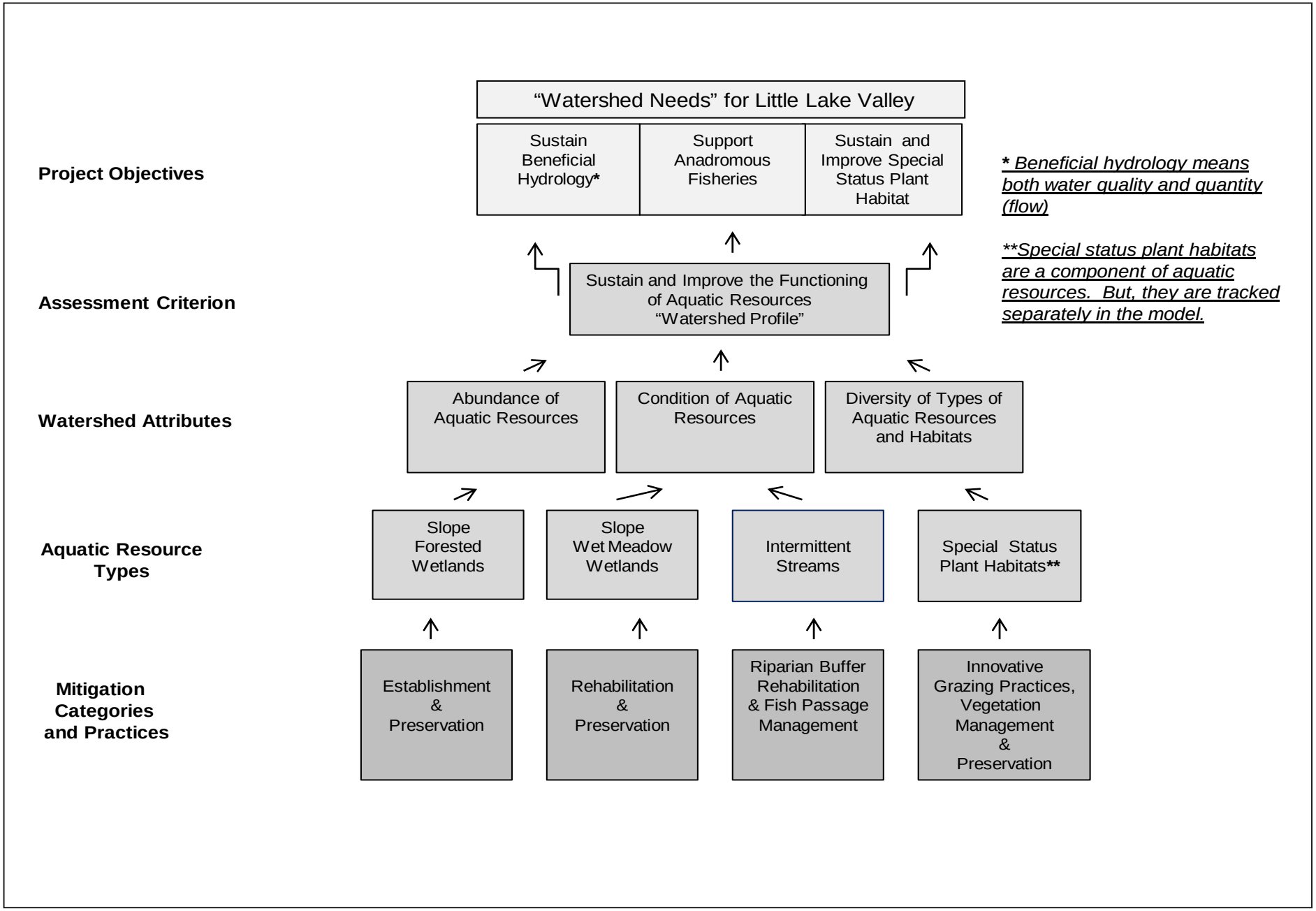


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**Figure 2-3**
**Conceptual Watershed Model for the Willits Bypass Project**

Board Basin Plan, which includes beneficial uses when developing the presumptions. The mitigation presumptions and the specific objectives that support them are listed below.

**Presumption 1. Support Beneficial Hydrology, including Water Quality and Beneficial Uses**

a. Establish wetlands that are high-quality and self-sustaining.

b. Rehabilitate wetlands to benefit listed plants and other sensitive biological resources.

c. Purchase parcels containing high-quality listed plant habitat, wetlands, and riparian and oak woodland habitat in Outlet Creek basin.

d. Manage grazing to benefit listed plants, wetlands, riparian and oak woodland habitat, and other sensitive biological resources.

**Presumption 2. Support Anadromous Fisheries**

a. Improve habitat quality for listed fish.

b. Manage grazing to benefit listed plants, wetlands, riparian and oak woodland habitat, and other sensitive biological resources.

c. Purchase parcels containing high-quality listed plant habitat, wetlands, and riparian and oak woodland habitat in Outlet Creek basin.

**Presumption 3. Support State Special Status–Plant Habitat**

a. Increase cover and diversity of native plants.

b. Rehabilitate wetlands to benefit listed plants and other sensitive biological resources.

c. Manage invasive plants.

d. Manage grazing to benefit listed plants, wetlands, riparian and oak woodland habitat, and other sensitive biological resources.

e. Purchase parcels containing high quality listed plant habitat, wetlands, and riparian and oak woodland habitat in Outlet Creek basin.

The conceptual model shows the connections between the mitigation presumptions and the implementation of specific mitigation actions. In particular, the conceptual model points out that the ecological recovery of different types of aquatic resources will have a positive cumulative effect that supports the achievement of all three mitigation presumptions. The MMP was designed to sustain and improve the following aquatic watershed attributes.

- Surface area abundance.

- Diversity.
- Ecological condition of aquatic resources.

By improving this "watershed profile," mitigation will produce positive improvements to landscape function, aquatic resource conditions, and habitat quality, thus contributing to watershed needs. A watershed profile is a tabular account of the abundance, diversity, and ecological condition of types of aquatic resources (ecosystems) in a geographically bounded area. For this project the geographic area is referred to as the *project watershed area* and is bounded by the 1,600-foot contour line in Little Lake Valley as indicated in Figure 2-4. The project watershed area is a larger area than the mitigation project, and all mitigation properties are located within the boundary of the project watershed area. The three aquatic watershed attributes influence landscape function and the capacity of an ecosystem to support aquatic life, as well as sustain the delivery of ecosystem services. When combined, the three attributes serve as a criterion for making a regulatory determination.

Watershed profiles are a representation of the criterion. When applied as a narrative criterion, a determination as to whether no net loss is achieved can be made based on the sufficiency of compensatory mitigation to sustain or improve the abundance, diversity, and condition of aquatic resources in the project watershed area (i.e., as characterized by the watershed profile). A monitoring program with a rigorous set of performance standards has been developed to help record those anticipated improvements.

The conceptual model also aligns types of mitigation actions or practices with the different types of aquatic resources on the mitigation properties. The mitigation actions are designed to actively establish and rehabilitate ecological structure on portions of the mitigation properties. These mitigation actions will entail the intensive planting of native wetland and riparian vegetation, grazing management, and bank erosion and headcut treatments at five locations identified in this MMP.

The conceptual model will support a determination that the unavoidable loss in current abundance (acreage) of wetlands as the result of the bypass project will be offset with future:

- Broadscale improvement in aquatic resource conditions and in particular stream condition.
- Improvement in aquatic habitat quality for anadromous fish and special-status plants.
- Preservation and protection of aquatic resources from urban and rural residential development.

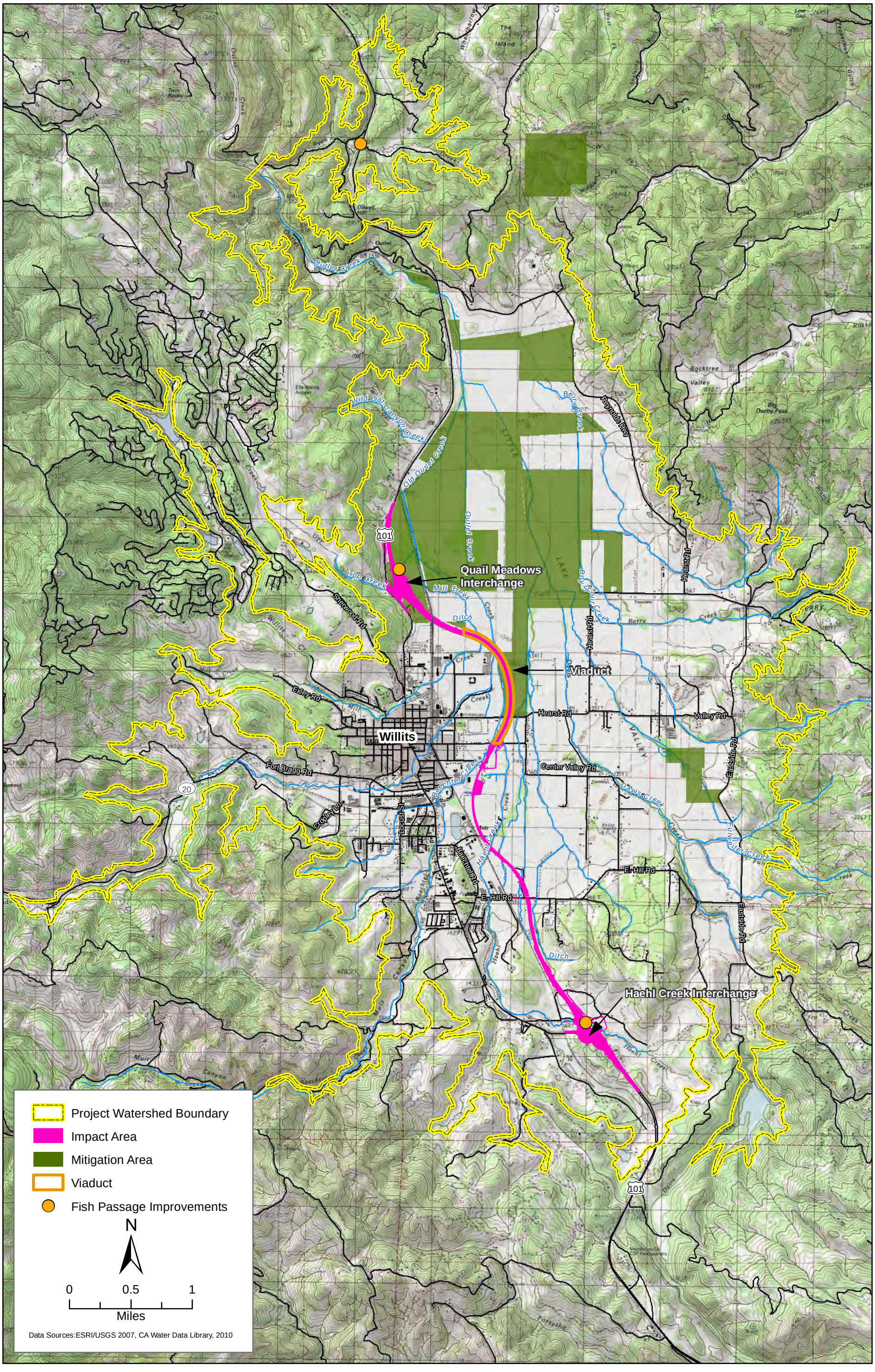



**Figure 2-4**
**Project Watershed Area**
**Willits Bypass Project**

In other words, there will be a future overall improvement in the aquatic environment and beneficial uses of Little Lake Valley.

### 2.4.2 Mitigation Presumptions

#### 2.4.2.1 SUPPORT BENEFICIAL HYDROLOGY

This mitigation presumption is focused on improving water quality and lessening the effects hydromodification has had on Little Lake Valley. By addressing these forms of degradation, the project will support the beneficial uses of the State's aquatic resources.

***WATER QUALITY***

The degradation of stream water quality is observed by occurrences of elevated temperature, bacteria, sediments, and nutrients. The Eel River watershed is listed on the CWA Section 303(d) list as impaired for sediment and temperature. In 2004, the EPA established sediment and temperature TMDLs for the Upper Main Eel River and tributaries (including Outlet Creek). The watershed approach used in the MMP includes a nexus to address the degradation associated with temperature and sediment impairments. Compensatory mitigation has been designed to treat this degradation with the rehabilitation of a large expanse of wet meadow wetlands, establishment of wet meadow wetlands, the establishment and rehabilitation of an extensive network of riparian habitat, and implementation of a grazing management plan. Specific mitigation actions will include:

- Establishment of wet meadows through planting and seeding.
- Rehabilitation of wet meadows through planting and seeding.
- Rehabilitation of stream corridors through planting of riparian vegetation.
- Streambank stabilization.
- Installation of exclusionary fencing to prevent cattle access to creeks and riparian corridors and portions of the wet-meadow mitigation areas.

These actions will increase the abundance and condition of riparian habitat in the project watershed area. Riparian habitat will improve mainstream channel structure and bank stabilization, increase pollutant attenuation capacity, and provide increased shade to help reduce water temperatures. Preservation and management of the broader mitigation area will help protect the recovering aquatic resources from future sources of human-caused disturbance (e.g., excessive erosion).

Improvements in aquatic resource and landscape function are attributed to increased rates of pollutant assimilation and reductions in pollutant loads. These improvements support the beneficial uses associated with the protection of aquatic resources in, and downstream of, the mitigation areas.

#### *HYDROMODIFICATION*

Hydromodification in the project watershed area is observed as a disruption of the natural conveyance of surface water flow through wetlands and streams. Most of the disruption is attributed to historical stream channel modifications (ditching), ongoing stream maintenance activities, and the effects of traditional grazing. The following actions are expected to help address the effects of ongoing stream maintenance and traditional grazing.

- Restore eroding channel banks and headcuts at select locations.
- Stabilize unvegetated channel banks and increase shaded stream surface area by planting riparian vegetation.
- Rehabilitate existing riparian corridors by planting riparian vegetation.
- Discontinue cattle access to streams and streambanks, thereby providing opportunities for the colonization of riparian vegetation on unvegetated and/or disturbed bank areas.
- Discontinue historical, routine channel maintenance activities conducted for purposes other than watershed needs. Any future channel maintenance will focus on the need to maintain certain watershed processes and beneficial uses (e.g., anadromous fish migration and habitat) or responding to emergency situations (e.g., localized flooding that threatens neighboring landowner).

Improvements in aquatic resource and landscape function are attributed to reduced effects from hydromodification. Beneficial use support is associated with the protection of in situ and downstream aquatic life use.

### 2.4.2.2 ANADROMOUS FISHERIES

This mitigation presumption will be supported by the above-described mitigation practices aimed at improving water quality and aquatic resource conditions in the project watershed area. Improvements in stream condition will yield parallel habitat improvements with respect to water quality and instream structure. In addition, fish passage work along the bypass alignment and at Ryan Creek will improve and/or provide passage to upstream habitat. Planting riparian vegetation will increase shaded stream surface and should result in reductions in water temperatures, particularly on stream reaches that presently are unvegetated.

Improvements in aquatic resource and landscape function are attributed to improvement in fish migration and potentially increased natality. These improvements support the beneficial uses associated with the protection of aquatic resources in, and downstream of, the mitigation areas.

#### 2.4.2.3 SUPPORT STATE SPECIAL STATUS–PLANT HABITAT

This mitigation presumption assertion is focused on the remediation of past and present land use stressors that have resulted in plant habitat loss and degradation. The removal of invasive species and the planting and seeding of native grasses, forbs, and woody vegetation will result in a reduction of vegetative competition with nonnative species. Mitigation actions or practices such as grazing management, invasive species control, and removal of woody vegetation in NCSG areas are expected to sustain, if not increase, BM and NCSG populations. At a minimum it will improve their habitat. It also is expected to increase native plant species cover and richness. This increase, in turn, will support vertebrate and invertebrate communities and provide uniqueness to wet meadows.

The improvements support the beneficial uses associated with the preservation of rare and endangered plant species in, and downstream of, the mitigation areas.

### 2.4.3 Uncertainties

The simple conceptual model is derived from first principles in landscape and restoration ecology. To simplify the process, there is a major assumption that factors influencing the current natural and human environment, and that are external to Little Lake Valley, remain essentially unchanging into the future. While this assumption is not plausible, it does support the utility of the model for showing relationships that can inform the review of mitigation needs and adaptive management strategies.

## 2.5 Watershed Profile of Little Lake Valley

Preproject and estimated post-project watershed profiles of the condition of aquatic resources in Little Lake Valley to compare the baseline watershed condition and the projected watershed condition following implementation of the mitigation program.

Preproject profiles were developed for valley wetlands and stream corridors in the project watershed areas (i.e., lands below the 1,600-foot contour line in Little Lake Valley). For the purpose of this assessment wetlands were categorized as wet meadow, forested slope (riparian wetland), and riverine wetland. Wetland acreage for the project watershed in the bypass

alignment and the offsite mitigation parcels was obtained from the project's GIS database. Aerial photograph interpretation was to determine the wetland acreage in the remainder of the valley.

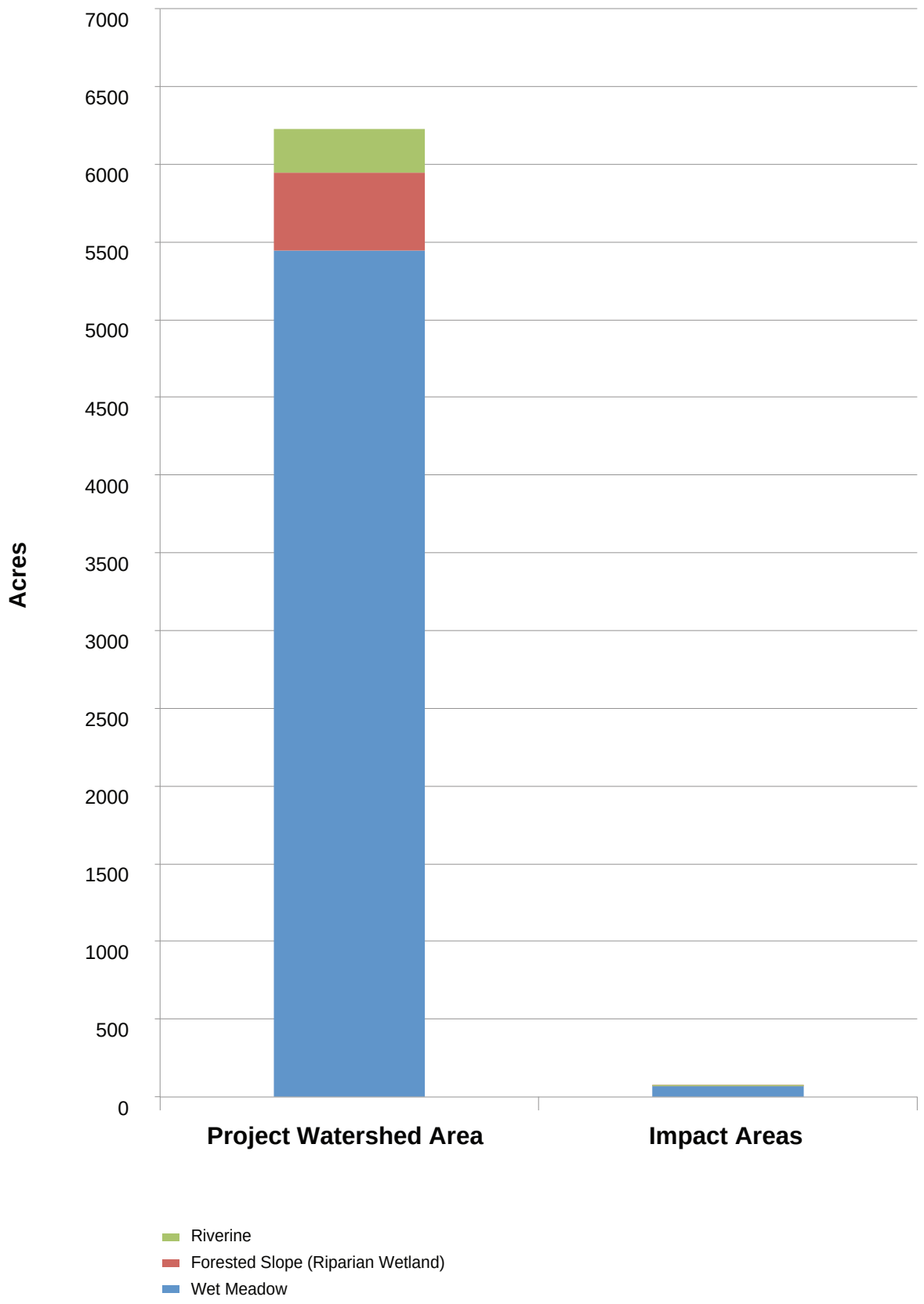
Figure 2-5 compares the existing wetland acreage in the project area watershed and the onsite impact areas. Wet meadow wetland is the most abundant wetland type in the valley. Wet meadow wetlands comprise approximately 87% of wetlands in project watershed area and 67% in the project impact areas (Table 2-10).

Figure 2-6 compares the post-mitigation wetland acreage in the project watershed (outside of the offsite and onsite mitigation areas), permanent wetland impacts, and offsite and onsite mitigation areas. The mitigation program will result in the establishment, reestablishment, and rehabilitation of approximately 1,500 acres of wetland, riparian and other waters habitats. This represents a direct improvement to 24% of valley wetlands. Some level of indirect improvement of existing wetlands is anticipated, but cannot be measured, by habitat improvements on adjacent mitigation lands.

Stream lengths for the project watershed in the bypass alignment and the offsite mitigation parcels were obtained from the project's GIS database. Figure 2-7 compares the existing stream lengths in the project watershed, offsite mitigation parcels, and onsite impact areas in the project area watershed and the onsite impact areas. The post-mitigation stream improvements will occur on the offsite mitigation parcels (16% of valley stream length) and onsite reestablishment areas (1% of valley streams). Permanent impacts on valley stream corridors are less than 1%. Approximately 83% of valley streams occur outside of the offsite mitigation parcels and bypass project area with most of these occurring upstream of the offsite mitigation parcels. As a result indirect stream improvements to stream corridors are expected to be minimal. Conversely, future upstream actions outside of the mitigation areas have the potential to affect the stream improvement areas. Depending on the actions, these effects could have a positive or adverse effect on the project's stream mitigation corridors.

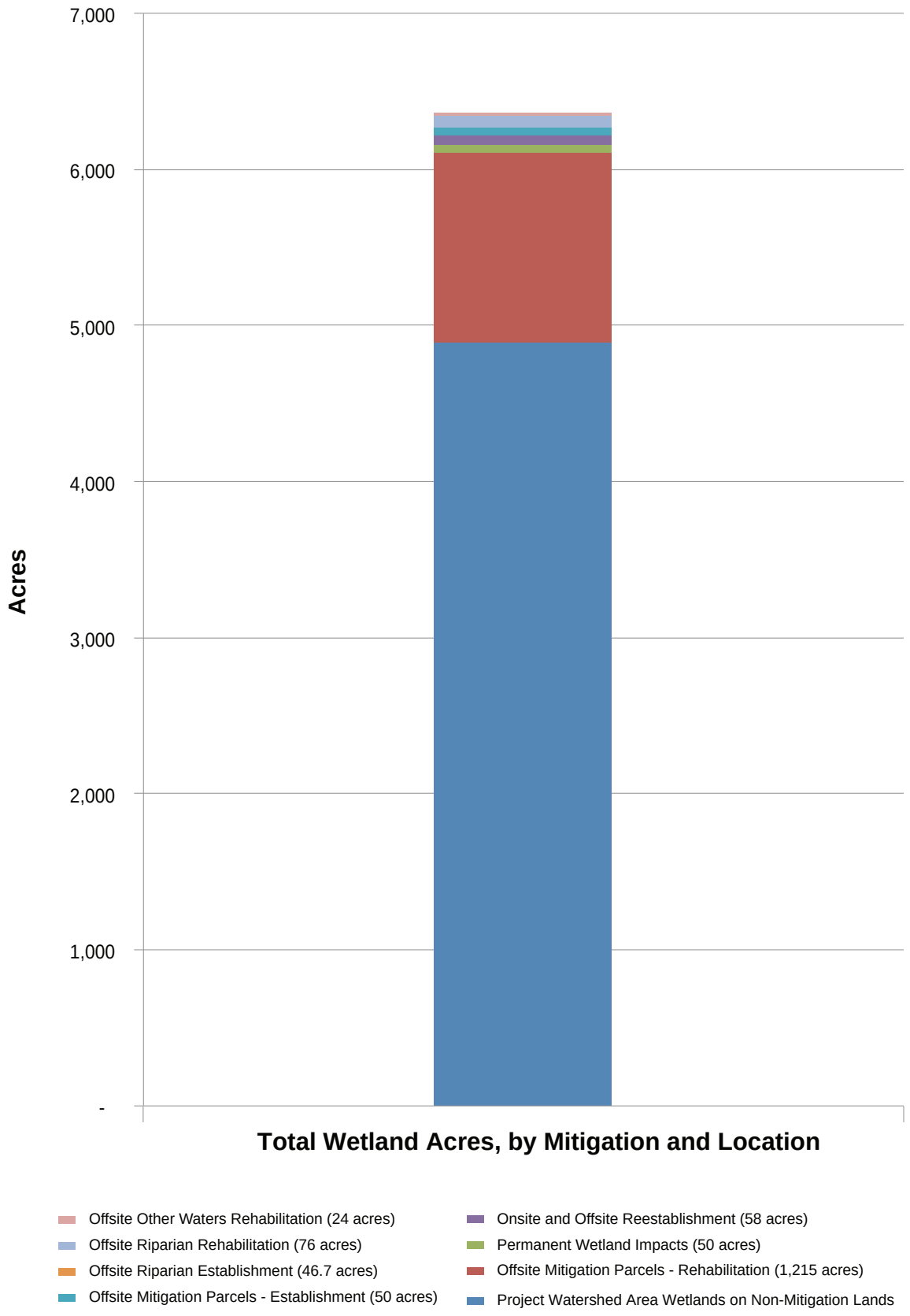
**Table 2-10. Preproject Watershed Profile for Wetlands in Little Lake Valley**

| Wetland Type | Project Watershed | | |
|---|---|---|---|
| | Non-Impact Areas | Impact Area | Totals |
| Wet Meadow | 5,444 | 68 | 5,512 |
| Forested Slope Wetland | 500 | 6 | 506 |
| Riverine Wetland | 270 | 6 | 276 |
| **Total** | **6,214** | **80** | **6,294** |



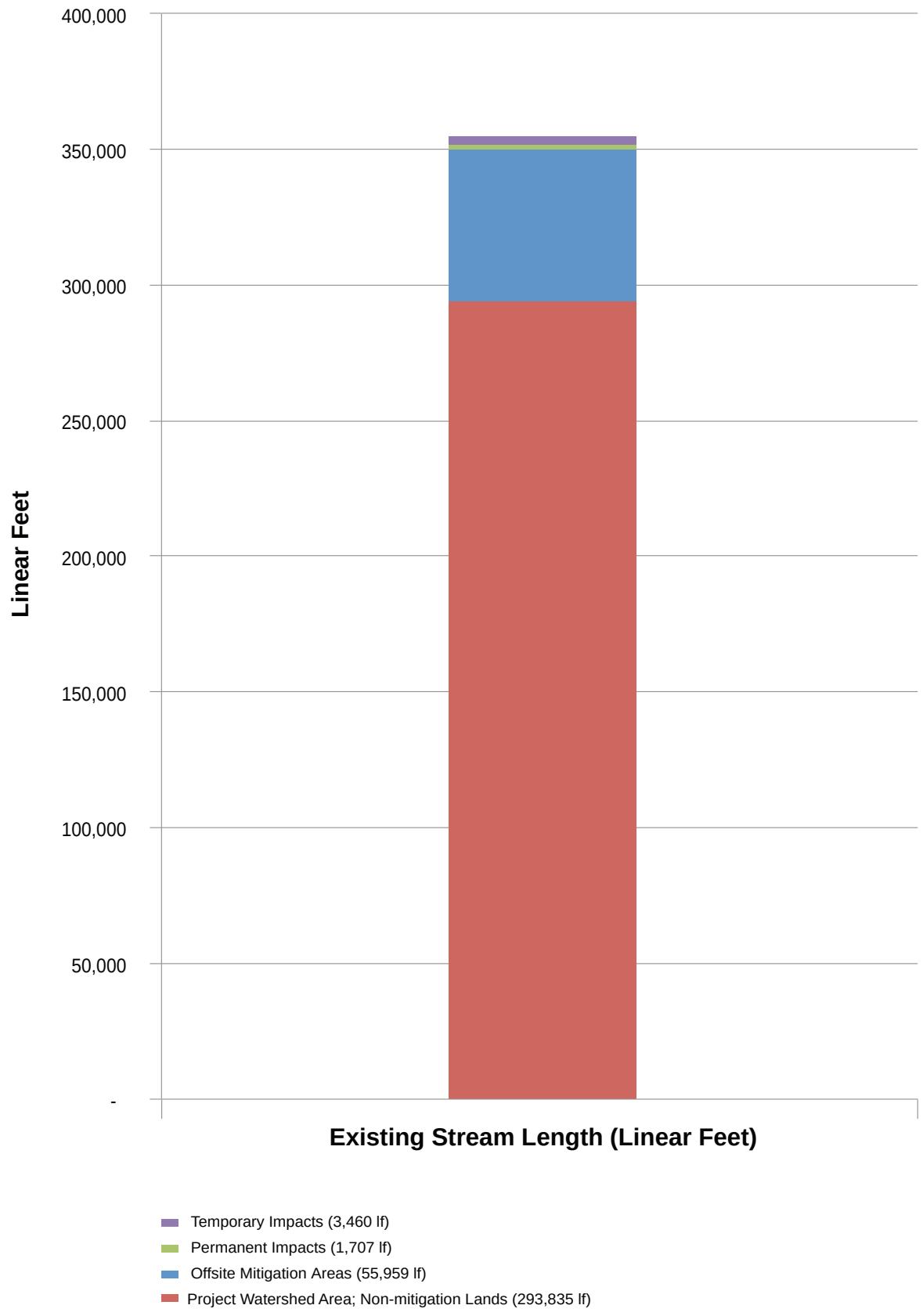

Graphics/Projects/0063509 Caltrans Willits Bypass/MMP State (01-13) SS

**Figure 2-5**
**Comparison of Existing Wetland Acreage in the Project Area Watershed and Onsite Impact Areas, by Location**




Graphics/Projects/0063509 Caltrans Willits Bypass/MMP State (01-13) SS

**Figure 2-6**
**Comparision of Post-Mitigation Wetland Acreage in the Project Watershed, Offsite Mitigation Areas, and Onsite Impact Areas**




Graphics/Projects/0063509 Caltrans Willits Bypass/MMP State (01-13) SS

**Figure 2-7**
**Comparison of Stream Lengths in the Project Watershed, Offsite Mitigation Areas, and Onsite Impact Areas**

**Table 2-11. Post-Mitigation Watershed Profile for Wetlands in Little Lake Valley**

| Post-Mitigation Wetlands (acres) | | Permanent Project Impacts on Wetlands (acres) | Existing Watershed Wetlands (from Table 2-10) |
|---|---|---|---|
| Existing Wetlands Outside Mitigation Areas | 4,894 | - | - |
| Onsite and Offsite Reestablishment | 58 | - | - |
| Wetland Establishment | 50 | - | - |
| Wetland Rehabilitation | 1,215 | - | - |
| Riparian Establishment | 47 | - | - |
| Riparian Rehabilitation | 90 | - | - |
| Other Waters Rehabilitation | 46 | - | - |
| **Totals** | **6,400** | **50** | **6,294** |

**Table 2-12. Watershed Profile for Stream Lengths in Little Lake Valley**

| Location | Existing Stream Length (Linear Feet) |
|---|---|
| Existing Streams Outside Mitigation Areas | 293,835 |
| Offsite Mitigation Areas | 55,959 |
| Permanent Impacts | 1,707 |
| Temporary Impacts | 3,460 |
| **Totals** | **354,961** |

## 2.6 Mitigation Vision, Goals, and Objectives

The vision for this MMP was developed by evaluating Little Lake Valley through historical research and study of current conditions with an eye toward developing a comprehensive and successful ecosystem restoration project with positive effects on listed plants, sensitive habitats, and fish. The mitigation actions are identified in Figures 2-1a, 2-1b, and 2-1c.

The bypass project will be constructed in Little Lake Valley, which is currently a mosaic of agricultural fields, human-altered stream corridors, and wetlands. Historically, the valley flooded regularly during typical winter rains, creating large expanses of emergent wetlands, wet meadows, riparian forest, floodplain, and streams that flow north into Outlet Creek, the Eel River, and the Pacific Ocean (LeDoux-Bloom and Downie 2008). Based on historical aerial photographs (1952, 1956, 1978, and 1988), information from historical reports, and more recent field studies, the valley historically supported wider floodplains, a series of meandering streams, and riparian forests surrounded by wet meadows, marshes, and oak savannas (Dean 1920; LeDoux-Bloom and Downie 2008). Carpenter and Millberry (1914) reported:

> Little Lake Valley at the most contains about 12,000 acres, two-thirds of which is cultivatable land when properly drained. But little over half that amount is now so used, the balance being pastured or cut to wild hay…. As pasture land it is unrivaled in the county, the natural grasses keeping green until later summer, affording dairies the best of opportunity for profitable business (p. 110–111).

The overall vision of the project's compensatory mitigation strategy is to establish, rehabilitate, reestablish, and preserve a mosaic of high-functioning habitats in perpetuity and increase the ecological values of Little Lake Valley and the Eel River watershed.

This vision will be attained through the following mitigation goals.

- Implementing impact avoidance measures prior to and during bypass project construction.
- Restoring (reestablishing) all temporarily affected areas in the bypass project footprint to their pre-project condition or better.
- Establishing, rehabilitating, or preserving suitable offsite habitats in Little Lake Valley to compensate for permanently affected biological resources.
- Preserving or improving the functions and values of aquatic resources in the Outlet Creek basin.
- Reducing habitat fragmentation by mitigating on large contiguous parcels that are adjacent to existing habitats.
- Improving riparian connectivity.
- Increasing habitat complexity by creating a mosaic of habitats (riparian, wetland, and oak woodlands) in mitigation areas.
- Enhancing water quality through the improvement of aquatic functions.
- Preserving existing habitats through the acquisition of parcels that contain special-status species or sensitive habitats.
- Developing self-sustaining ecosystems that allow natural succession.
- Protecting and maintaining all offsite mitigation parcels in perpetuity.

To meet these goals, mitigation objectives were established that are linked to the ecological needs of the Outlet Creek basin. Table 2-5 lists the ecological needs of the watershed, coupled with the mitigation objectives and the success criteria associated with each. Success criteria, agency direction, or the mitigation requirements also are listed, which link to the mitigation

objective and the ecological need driving the mitigation objective. The mitigation objectives and ecological needs of the watershed are discussed below.

**Mitigation Objective 1.** Improve habitat quality for listed fish. This mitigation objective satisfies the ecological needs of the watershed by improving fish passage, increasing riparian cover, improving hydrology, and reducing sediment in the Outlet Creek basin. The performance standards that will be used to measure this objective include vegetation survival, health, vigor, and cover; water quality; and select California Rapid Assessment Method (CRAM) biotic attributes.

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**Table 2-5. Ecological Needs of Outlet Creek Basin and Corresponding Mitigation Objectives and Performance Standards**

| Ecological Needs of Outlet Creek Basin | Mitigation Objective | Performance Standards/Resource Agency Direction | Location of Performance Standard in MMP |
|---|---|---|---|
| Improve fish passage in Outlet Creek and major tributaries that support listed fish | Improve habitat quality for listed fish | Fish passage improvements at Haehl and Upp Creeks | Chapter 3, Section 3.5;<br>Appendix F, Haehl and Upp Creek Stream Restoration and Fish Passage Design Plans |
| | | Fish passage improvements on Ryan Creek | Chapter 3, Section 3.5 |
| Increase riparian cover over Outlet Creek and major tributaries that support listed fish | | Vegetation survival, health and vigor, and cover performance standards for riparian habitat; select CRAM biotic attributes | Chapter 9, Section 9.2.7 |
| | | Water quality performance standards | Chapter 9, Section 9.2.10 |
| Minimize sedimentation in Outlet Creek basin | | Water quality performance standards | Chapter 9, Section 9.2.10 |
| Improve Outlet Creek hydrology | | Water quality performance standards | Chapter 9, Section 9.2.10 |
| Increase native plant cover and diversity | Increase native plant cover and diversity of wetlands | Vegetation survival, health and vigor, and cover performance standards; select CRAM attributes | Chapter 9, Sections 9.2.2, 9.2.5, 9.2.7 and 9.2.9 |
| | | Invasive plant performance standard | Chapter 9, Section 9.2.7 |
| | Increase cover of native riparian plant species | Vegetation survival, health and vigor, and cover performance standards for riparian plantings; select CRAM attributes | Chapter 9, Section 9.2.7 |
| | | Invasive plant performance standard | Chapter 9, Section 9.2.7 |
| | Increase cover of oak woodland habitat | Vegetation survival and health and vigor performance standards for oak woodland habitat | Chapter 9, Section 9.2.9 |
| Protect and rehabilitate wetlands in Outlet Creek basin | Establish wetlands that are high-quality and self-sustaining to benefit listed plants and other sensitive biological resources | Vegetation survival, health and vigor, and cover performance standards | Chapter 9, Section 9.2.5 |
| | | Wetland establishment hydrology performance standards | Chapter 9, Section 9.2.5 |
| | | Invasive plant performance standard | Chapter 9, Section 9.2.5 |
| | | Water quality performance standards | Chapter 9, Section 9.2.10 |
| | Enhance wetlands to benefit listed plants and other sensitive biological resources | Wetland rehabilitation performance standards | Chapter 9, Section 9.2.6 |
| | | Invasive plant performance standards | Chapter 9, Section 9.2.6 |
| | | Water quality performance standards | Chapter 9, Section 9.2.10 |
| Improve riparian habitat connectivity in Outlet Creek basin | Increase cover of native riparian plant species | Vegetation survival, health and vigor, and cover performance standards for riparian plantings; select CRAM attributes | Chapter 9, Sections 9.2.2 and 9.2.7 |
| Manage grazing to benefit listed plants, wetlands, riparian and oak woodland habitat, and other sensitive biological resources | Manage grazing to benefit listed plants, wetlands, riparian and oak woodland habitat, and other sensitive biological resources | Grazing practices | Chapter 9, Section 9.2.6;<br>Appendix Q, Grazing Management Plan for Offsite Mitigation Parcels |
| | | Water quality performance standards | Chapter 9, Section 9.2.10 |
| | | Invasive plant performance standards | Chapter 9, Section 9.2.6 |
| Manage and reduce the cover of invasive plants | Manage invasive plants so that their absolute cover does not increase over baseline | Invasive plant performance standards | Chapter 9, Section 9.2.6 |
| Protect listed plants, wetlands, and riparian and oak woodland habitats in the Outlet Creek basin long-term | Purchase parcels containing high-quality listed plant habitat, wetlands, and riparian and oak woodland habitat in the Outlet Creek basin | Purchase fee title for all offsite parcels; record conservation easements on all offsite mitigation parcels | Chapter 4 |
| | Monitor purchased parcels long-term to ensure mitigation success | After long-term management phase begins, monitor purchased parcels in years 5, 10, and 15 and then every 10 years thereafter | Chapters 10, 11, and 12 |

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**Mitigation Objective 2.** Increase cover and diversity of native plants. This objective is also an ecological need. Increasing cover of riparian habitat will increase riparian habitat connectivity. Native plant cover will be increased for riparian and oak woodlands and will be measured through vegetation survival, health, and vigor. Riparian areas will be measured by select CRAM biotic attributes. An invasive plant performance standard also will be used to ensure that the cover of native plants is maximized.

**Mitigation Objective 3.** Establish wetlands that are high-quality and self-sustaining. This will satisfy the ecological need of protecting and enhancing wetlands in the Outlet Creek basin. Performance standards used to ensure this objective include relative cover of wetland plant species and native wetland plant species, wetland establishment hydrology, species richness, and absolute cover of invasive plants.

**Mitigation Objective 4.** Rehabilitate wetlands to benefit listed plants and other sensitive biological resources. This also will satisfy the ecological need of protecting and rehabilitating wetlands in the Outlet Creek basin. Performance standards used to ensure the satisfaction of this objective include select CRAM biotic metrics and absolute cover of invasive plants.

**Mitigation Objective 5.** Manage grazing to benefit listed plants, wetlands, riparian and oak woodland habitat, and other sensitive biological resources. The ecological need for this mitigation objective is the same as the mitigation objective. The success of the mitigation objective will be measured through the grazing practices, water quality, listed plants, and invasive plant performance standards.

**Mitigation Objective 6.** Manage invasive plants and maintain their cover at or below baseline levels on the offsite mitigation parcels. The ecological need associated with this mitigation objective is to manage and possibly reduce the cover of invasive plants throughout the offsite mitigation parcels. The invasive plant success criteria will be used to assess performance of this objective.

**Mitigation Objective 7.** Purchase parcels containing high-quality listed-plant habitat, wetlands, and riparian and oak woodland habitat in the Outlet Creek basin. The ecological need satisfied by this mitigation objective is to protect high-quality habitats in Little Lake Valley in perpetuity. This objective will be achieved through long-term monitoring and adaptive management of the offsite mitigation parcels. Monitoring will be conducted according to the respective performance standards for each sensitive biological resource listed in this MMP.

Portions of some of the offsite mitigation parcels—such as Arkelian, Ford, and Watson—contain representative examples of existing high-quality riparian and oak habitat. Such design sites will assist in emulating the past forested riparian areas in the valley. Many areas degraded by overgrazing, agricultural practices, and channelization of streams are also present on the offsite mitigation parcels. A combination of agricultural management, riparian and oak plantings, restoring headcuts, and installing livestock exclusion fencing will increase habitat value in the valley. Some mitigation parcels—such as Benbow and Watson—contain representative examples of high-quality wet meadow wetlands. These areas helped guide the design of wet meadow on the offsite mitigation parcels. Most of the wetlands that will be rehabilitated and established as part of mitigation efforts are in areas that have been altered over time by human-induced changes associated with flood control and grazing management. An array of activities similar to those used for riparian and oak woodland mitigation management will be used to establish, rehabilitate, and preserve and reestablish wetland habitats in Little Lake Valley to improve water quality and wildlife diversity.

After the bypass is in place and the compensatory mitigation is implemented, functions and values of these resources and habitats are anticipated to increase. Part of the vision is that, once mitigation construction is complete and after 10 years of management and monitoring, the valley as a whole will exhibit greater ecological value than existed prior to project construction. The valley will enjoy a long-term benefit to habitat because the offsite mitigation parcels will not be developed and will be managed in perpetuity for the benefit of biological resources. The offsite mitigation parcels will be publicly owned or managed and will be adaptively managed to benefit wildlife, plants, and water quality. Existing amounts of wetlands and riparian and oak woodlands will be increased, and barriers to wildlife passage and movement will be reduced or eliminated.

## 2.7 Mitigation Acreages and Strategies

Construction of the bypass will result in temporary and permanent impacts on the following biological resources: NCSG, BM, riparian vegetation, wetlands and other waters, and oak woodlands and their associated grassland. Impacts on SONCC coho salmon and the mitigation of those impacts are quantified in the context of riparian habitat associated with salmonid streams. Additionally, fish passage improvements are planned for Ryan, Haehl, and Upp Creeks to mitigate impacts on anadromous fish habitat. Table 2-6 lists the total establishment, rehabilitation, preservation, and reestablishment mitigation amounts for each sensitive biological resource affected by bypass project construction.

**Table 2-6. Summary of Mitigation Actions for Sensitive Biological Resources Affected by the Bypass Project**

| Resource | Mitigation Actions (acres) | | | | | |
|---|---|---|---|---|---|---|
| | Establishment | Rehabilitation | Conservation | Preservation | Reestablishment [a, b] | Total Mitigation Acres |
| North Coast semaphore grass[c] | 2.97 | 5.09 | - | - | 0.08 | **8.06** |
| Baker's meadowfoam[c] | - | 733.17 | - | - | 17.8 | **733.17** |
| Category I Riparian Corridor | 43.89 | 81.80 | - | 5.42 | 4.67 | **131.11** |
| Wetlands | 49.58 | 1160.40 | - | 4.17 | 29.84 | **1214.15** |
| Other waters | - | 46.37 | - | 1.97 | 2.08 | **48.34** |
| Category II Riparian Corridor | 1.60 | 2.44 | - | - | 0.02 | **4.04** |
| Category III Riparian Corridor | 0.02 | 5.38 | - | - | 0.58 | **5.40** |
| Oak woodland (tree canopy) | | | | | | |
| Lowland | 6.72 | - | - | - | - | **6.72** |
| Upland | - | - | - | 43.20 | - | **43.20** |
| Oak woodland (grassland component) | | | | | | |
| Lowland | - | - | 198.69 | - | 8.83 | **198.69** |
| Upland | - | - | - | 6.77 | - | **6.77** |
| **Total** | **104.78** | **2034.65** | **198.69** | **61.53** | **63.9** | **2399.66** |

[a] Reestablishment of temporary impacts caused as a result of mitigation actions is not considered compensatory mitigation therefore is not included in the calculation for total mitigation acres.

[b] Reestablishment acreage includes both onsite and offsite reestablishment acres. Refer to Table 6-5 for wetland reestablishment acreage by offsite mitigation parcel.

[c] NCSG and BM occur in wetlands therefore the mitigation acreage for NCSG and BM cannot be added to the wetland mitigation acreage because it would result in a mitigation acreage total that exceeds the wetland mitigation acreage.

**Table 2-7. Summary of Preservation Acreages for Sensitive Biological Resources**

| Resource | Total Project Impacts[a] | Total Preservation Acreage[b] |
|---|---|---|
| North Coast semaphore grass | 0.3 | - |
| Baker's Meadowfoam | 120.99 | - |
| Category I Riparian Corridor | 9.47 | 5.42 |
| Jurisdictional wetlands | 55.30 | 4.17 |
| Jurisdictional other waters | 4.39 | 1.97 |
| Category II Riparian Corridor | 3.40 | - |
| Category III Riparian Corridor | 3.19 | - |
| Oak woodland (tree canopy) | | |
| Lowland | 4.75 | - |
| Upland | 7.71 | 43.20 |
| Oak woodland (grassland component) | | |
| Lowland | 40.58 | - |
| Upland | 12.52 | 6.77 |
| **Total** | **262.6** | **61.53** |

**Table 2-8. Summary of Onsite and Offsite Reestablishment Areas (Acres) for Sensitive Biological Resources**

| Resource | Temporary Onsite Project Impacts[a] | Onsite Reestablishment | Temporary Offsite Project Impacts[b] | Offsite Reestablishment |
|---|---|---|---|---|
| North Coast semaphore grass | 0.08 | 0.08 | - | - |
| Baker's meadowfoam | 5.05 | 5.05 | 12.75 | 12.75 |
| Category I Riparian Corridor | 4.67 | 4.67 | - | - |
| Jurisdictional wetlands | 19.92 | 19.92 | 9.22 | 9.22 |
| Jurisdictional other waters | 1.70 | 1.70 | 0.38 | 0.38 |
| Category II Riparian Corridor | 0.02 | 0.02 | - | - |
| Category III Riparian Corridor | 0.58 | 0.58 | - | - |
| Oak woodland (tree canopy) | | | | |
| Lowland | - | - | - | - |
| Upland | - | - | - | - |
| Oak woodland (grassland component) | | | | |
| Lowland | - | - | 8.83 | 8.83 |
| Upland | - | - | - | - |
| **Totals** | **32.02** | **32.02** | **31.18** | **31.18** |

[a] Temporary onsite project impacts are *after* overlaps removed (see Table 2-3).

[b] Temporary offsite project impacts are *after* overlaps removed (see Table 2-3).

**Table 2-9. Summary of Proposed Offsite Mitigation Establishment and Rehabilitation Actions for Sensitive Biological Resources**

| Resource | Total Project Impacts[a] | Establishment | | Rehabilitation | |
|---|---|---|---|---|---|
| | | Mitigation Acres | Mitigation Ratio | Mitigation Acres | Mitigation Ratio |
| North Coast semaphore grass | **0.30** | 2.97 | 9.90:1 | 5.09 | 16.97:1 |
| Baker's meadowfoam | **120.99** | - | - | 733.17 | 6.06:1 |
| Category I Riparian Corridor | **9.47** | 43.89 | 4.63:1 | 81.80 | 8.63:1 |
| Wetlands | **55.30** | 49.58 | 0.90:1 | 1160.40 | 21:1 |
| Other waters | **4.39** | - | - | 46.37 | 10.56:1 |
| Category II Riparian Corridor | **3.40** | 1.60 | 0.47:1 | 2.44 | 0.71:1 |
| Category III Riparian Corridor | **3.19** | 0.02 | 0.01:1 | 5.38 | 1.69:1 |
| Oak woodland (tree canopy) | | | | | |
| Lowland | **4.75** | 6.72 | 1.41:1 | - | - |
| Upland | **7.71** | - | - | - | - |
| Oak woodland (grassland component) | | | | | |
| Lowland | **40.58** | - | - | - | - |
| Upland | **12.52** | - | - | - | - |
| **Totals** | **262.60** | **104.78** | | **2034.65** | **-** |

[a] Total project impacts were calculated using both permanent and temporary bypass project impacts *after* adjustment and permanent and temporary mitigation impacts *after* adjustment.

Table 2-7, Table 2-8, and Table 2-9 summarize the proposed mitigation. Table 2-7 contains the preservation acreages for each sensitive biological resource. Table 2-8 contains the onsite and offsite temporary impacts that will be reestablished. Table 2-9 contains the offsite mitigation rehabilitation and establishment acreages for each sensitive biological resource.

### 2.7.1 Impact Avoidance and Minimization

In addition to the reestablishment, establishment, rehabilitation, and preservation strategies included in this MMP, Caltrans has incorporated numerous avoidance and minimization measures as part of the refinement of the project design, as described in Chapter 1 (Section 1.3).

Additional minimization measures to be implemented during bypass project construction are listed below; further details are provided in Chapter 7.

- Seed collection and salvage of NCSG plants for replanting onsite.
- Seed collection and topsoil harvesting and reapplication at offsite locations to minimize impacts on BM.

- Establishment of work windows for instream construction and vegetation clearing to minimize impacts on water quality, listed fish, and nesting birds.
- Incorporation of BMPs as part of the Storm Water Pollution and Prevention Plan (SWPPP).

Example BMPs from the FEIR/FEIS are presented below.

- All construction-related materials will be stored in designated staging areas at least 100 feet from perennial waterways and drainages.
- Refueling and vehicle maintenance will be performed at least 100 feet from creeks and other water bodies.
- Operation of heavy equipment will be minimized in perennial creeks (to the greatest extent possible). If equipment must access perennial creeks, this will occur during the late summer months when the streamflows are low, or when no water is in the channels. If water is flowing, the channels will be temporarily dewatered.
- Temporary sedimentation barriers, such as sandbags or siltation fencing, will be installed to minimize the amount of silt entering the creeks and any ephemeral drainages with water present in the channel. The location of these barriers will be determined by the resident engineer and environmental monitor and will be clearly marked in the field before construction activities begin.
- Additional BMPs will be implemented to prevent runoff from adjacent lands from flowing across construction areas, slow down the runoff traveling across construction sites, remove sediment from onsite runoff before it leaves the site, and provide soil stabilization.
- To address potential water quality impacts during construction, Caltrans will require the contractor to use a combination of BMPs to control potential erosion and sedimentation from the project site. Caltrans has developed a suite of construction site BMPs that will be implemented on the proposed project. The construction site BMP manual can be downloaded at: http://www.dot.ca.gov/hq/construc/stormwater/stormwater1.htm
- Caltrans will prohibit the contractor from discharging oils, greases, chemicals and spilling concrete and grout into receiving waters. For example, on this project, equipment operating in water bodies will be required to be steam-cleaned prior to arrival on site, and be maintained in a clean condition for the duration of activities.
- Following the construction process, the contractor will stabilize disturbed soil areas through permanent revegetation or other means. An appropriate design will be used that will allow all finished slopes to achieve stabilization, even under severe conditions, and also provide

erosion control BMPs at all point-source discharges of stormwater runoff. Treatment BMPs, such as biofiltration, will be incorporated where feasible.

- As part of standard operation and maintenance procedures, Caltrans has developed a standard Hazardous Waste and Spill Response Plan, which Caltrans will ensure is implemented during the project. This plan addresses water quality issues associated with accidental spills.

### 2.7.2 Habitat Establishment, Rehabilitation, Reestablishment, and Preservation

This multi-strategy MMP—consisting of establishment, rehabilitation, reestablishment, and preservation actions—has been developed to compensate for impacts on sensitive biological resources that cannot be avoided or minimized.

More specific discussions of these interrelated strategies are presented below.

#### 2.7.2.1 ESTABLISHMENT

Riparian, wetland, and oak woodland habitats will be established on some of the offsite mitigation parcels. Habitat establishment will expand suitable habitat for special-status species; for example, wildlife will benefit from the increased habitat establishment proposed in the MMP. Establishment areas were selected to improve habitat continuity where warranted and feasible, especially for riparian habitat.

Riparian, wetland, and oak woodland establishment areas are shown in Appendix C.

An important aspect of wetland establishment is the improvement of wetland functions and values as discussed below and presented by parcel in Table 7-2. Wetland functions and values are equivalent to the beneficial uses presented in the Water Quality Control Plan for the North Coast Region (North Coast Regional Water Quality Control Board 2007).

##### *GROUNDWATER RECHARGE*

Groundwater recharge helps maintain the hydrology of wetlands dependent on groundwater discharge, such as marsh and wet meadow. Increased plantings of native riparian and wetland vegetation as part of wetland establishment will increase groundwater recharge.

##### *FLOODFLOW ALTERATION*

This function will be provided by establishment of vegetated wetlands associated with riverine and lacustrine ecosystems. Specifically, this will occur in riparian woodland established adjacent to stream channels.

#### *NUTRIENT REMOVAL/TRANSFORMATION*

Nutrient removal/transformation will take place in established habitats such as marsh and wet meadow in conjunction with establishment actions. Changes in current cattle grazing management, such as defined watering locations, alternative sources of water for cattle, and exclusion of grazing from wetlands and near riparian corridors, will decrease soil compaction, reduce streambank erosion, and reduce nutrient and bacteria loads.

#### *WILDLIFE DIVERSITY, AQUATIC DIVERSITY, AND UNIQUENESS*

Reintroduction and planting of common, locally native wetland plant species in the wetlands and at the wetland-upland edge as part of habitat establishment will increase wildlife diversity and abundance, as well as aquatic diversity and uniqueness.

### 2.7.2.2 REHABILITATION

Rehabilitation actions are planned for riparian corridors, oak woodlands, and wetlands. Some of these rehabilitation actions entail implementation of grazing management plans to reduce grazing pressure, control invasive species, and increase the size of riparian and oak woodlands through natural recruitment or planting. Reintroduction and planting of common, locally native wetland plant species in the wetlands and at the wetland-upland edge will increase wildlife diversity and abundance. Rotational grazing and other techniques also may be employed in grazing management plans prepared for each offsite mitigation parcel.

Removal of fish passage barriers will improve the movement of anadromous fish through Little Lake Valley into the spawning areas in the surrounding foothills. Planting riparian vegetation will improve shaded riverine aquatic habitat, reduce water temperature, and increase dissolved oxygen levels in the streams.

Control of invasive plant species, including Himalayan blackberry, poison hemlock, and teasel, will increase native plant diversity and abundance and reduce competition with NCSG and BM.

Rehabilitation actions are described in detail in Chapter 7, and rehabilitation areas are shown in Appendix C.

An important aspect of rehabilitation activities is the improvement of wetland functions and values as discussed below and presented by parcel in Table 7-2. Wetland functions and values are equivalent to the beneficial uses presented in the Water Quality Control Plan for the North Coast Region (North Coast Regional Water Quality Control Board 2007).

#### *GROUNDWATER RECHARGE*

Groundwater recharge helps maintain the wetland hydrology of wetlands dependent on groundwater discharge, such as wet meadow. Planned rehabilitation actions will increase groundwater recharge through changes in grazing management practices, grading of incised channels to slow floodflows, and increased planting of native riparian and wetland vegetation.

#### *SEDIMENT/TOXICANT RETENTION*

Widening stream corridors and reducing bank slope in riparian areas will result in improved sediment and toxicant retention and reduced bank erosion. It also will greatly increase the areal extent of stream wetlands. Grading existing swales and drainage ditches in conjunction with wetland establishment activities will slow their runoff velocity and increase soil saturation. Reduced grazing pressure will increase the amount of residual dry matter on the ground, both in uplands and in wetlands, thereby reducing the amount of sediment entering drainages.

#### *NUTRIENT REMOVAL /TRANSFORMATION*

Changes in current cattle grazing management, such as defined watering locations, alternative sources of water for cattle, and exclusion of grazing from wetlands and near riparian corridors, will decrease soil compaction, reduce streambank erosion, and reduce nutrient and bacteria loads.

#### *BIOMASS INCREASE*

Establishment of wetlands and riparian and oak woodlands will enhance wetlands through increase in biomass. Increased biomass will decrease water velocity during high-flow events and will establish additional forage and cover for wildlife.

#### *WILDLIFE DIVERSITY, AQUATIC DIVERSITY, AND UNIQUENESS*

Reintroduction and planting of common, locally native wetland plant species in the wetlands and at the wetland-upland edge will increase terrestrial and aquatic wildlife diversity, abundance, and uniqueness.

### 2.7.2.3 REESTABLISHMENT

*Reestablishment*, in the context of this MMP, refers to the restoration of temporary impacts in the onsite bypass project footprint and in the offsite mitigation areas where wetlands are being established. The onsite reestablished areas will be recontoured, seeded, and replanted to encourage the reestablishment of vegetation and restoration of habitat functions. The offsite

reestablishment areas are those areas where wetland establishment activities will temporarily affect neighboring existing resources. These areas will be reestablished to pre-project conditions or better.

#### 2.7.2.4 PRESERVATION

*Preservation* in the MMP refers to those areas where no mitigation actions are proposed; instead, the existing sensitive biological resource(s) will be actively managed to prevent a decline in their condition.

The parcels chosen in Little Lake Valley for preservation only are:

- Huff (037-240-RW) containing Category I Riparian Corridor, jurisdictional wetlands, and other waters.
- Taylor (037-210-16 and 037-221-65) containing upland oak woodlands and upland oak woodland grassland.

The Huff parcel occurs along Outlet Creek, the preservation and management of which will contribute to the sustainability of the portions of the watershed downstream of the valley and serve to maintain important habitat linkages to upstream and upland habitat throughout the rest of the valley and surrounding hills. Preserving these properties and creating a more sustainable and functional landscape will contribute significantly to the ecological sustainability of salmonid runs through the valley and populations of listed plants in the valley.

The Taylor parcels contain stands of upland oak woodland and associated upland oak woodland grassland, which are not present on the valley floor. Because these parcels are not on the valley floor where wetlands are abundant, they will be developed more easily.

Because the project impacts are occurring in the valley, preserving these lands within the valley and increasing protection for those resources are ecologically beneficial.

#### 2.7.2.5 CONSERVATION

*Conservation* in the MMP refers to resources that will be protected by conservation easements, but unlike preservation the resources occur on parcels where mitigation actions are proposed. The *conservation* definition applies largely to lowland oak woodland grasslands that occur in association with lowland oak woodland on numerous parcels. Because lowland oak grassland often also qualifies as wet meadow wetland, mitigation actions are sometimes proposed in order to influence the wetland functions of the grassland. Therefore, this type of situation does not fall under the *preservation* definition because *preservation* applies to entire parcels where no

mitigation actions will take place. Resources that fall under the *conservation* definition will be passively managed as part of ongoing land management actions (e.g., grazing, wetland rehabilitation in the case of lowland oak grassland) and protected under the conservation easement. Because the project impacts are occurring in the valley, conserving these lands within the valley and increasing protection for those resources are ecologically beneficial.

# Chapter 3 Site Selection Criteria

The compensatory mitigation package presented in this MMP seeks to establish, rehabilitate, reestablish, and preserve a mosaic of high-functioning habitats in perpetuity, thus increasing the ecological value of Little Lake Valley and improving water quality in the Eel River basin. This will be achieved through establishing, rehabilitating, reestablishing, and preserving the distinctive habitats and resources present in the valley. This chapter describes the background and process of selecting mitigation sites for each sensitive resource.

The majority of this chapter focuses on the historical account of mitigation site selection prior to development of this MMP. As described in Chapter 2 (Section 2.4), Caltrans faced several challenges in identifying potential mitigation parcels and the necessary acreage to meet the required mitigation ratios for aquatic resources presented in the CMP. In response to these challenges, the resource agencies agreed to a shift toward a watershed approach that includes maximizing habitat establishment, rehabilitation, and preservation opportunities on the offsite mitigation parcels. The watershed approach provides the benefit of using data from the watershed instead of data from project site-specific locations only. This allows for a more comprehensive means of identifying the problems facing the area's biological resources and proposing useful solutions. Chapters 2 and 6 of this MMP define the nexus between the ecological needs of Little Lake Valley and the watershed approach.

## 3.1 History of Mitigation Site Selection

A primary goal of the mitigation effort is the long-term success and self-sustainability of the mitigation. Another goal is improvement of water quality through the return of wetland functions in the valley. To this end, the process of selecting suitable mitigation sites to offset the effects of the bypass project has considered many factors. The practicability of undertaking mitigation efforts at each potential site was the primary consideration. Selection criteria also were identified in consideration of the need to mitigate impacts on multiple sensitive biological resources on a limited number of parcels. The amount of wetland establishment available was a key factor because much of Little Lake Valley is already jurisdictional wetland and therefore unavailable for wetland establishment. The criteria listed below were considered during the site selection process.

- The presence of slowly draining soils needed for successful wetland establishment.
- The need to ensure the self-sustainability of any established wetlands by selecting mitigation sites that would have the greatest probability of long-term success.

- The degree of landscape/hydrologic manipulation required to construct the mitigation project, and the effects that such manipulation could have on other resources (natural or cultural) and on neighboring properties.
- The general condition of the habitat and presence of listed species on a given parcel.
- The desire to achieve maximum habitat connectivity and avoid habitat fragmentation by seeking a collection of larger, contiguous mitigation properties to help support habitat diversity and stability.

Before evaluating parcels on the basis of these criteria, two key limiting factors in the process of identifying suitable mitigation properties needed to be addressed: (1) the physical presence of appropriate habitat types, and (2) the willingness of landowners either to sell their parcels or to enter into conservation easement (CE) agreements. These two limiting factors are interconnected, as discussed below.

Identification and/or availability of habitat suitable for wetland establishment presented the most challenging obstacle; the identification/availability of suitable opportunities to mitigate impacts on other resource types was less challenging. Because of State policies of no net loss of wetlands, it was necessary to seek upland habitat types that could support wetland establishment. Much of Little Lake Valley historically has supported wetland habitat, and a large amount of this habitat has been degraded through historical land use practices. While degraded wetlands may provide excellent opportunities for wetland rehabilitation, they are by definition unsuitable for wetland establishment.

Although the agencies have approved the mitigation approach that uses a variety of strategies in addition to establishment to achieve no net loss, a thorough search of suitable wetland establishment sites was undertaken. Efforts to identify suitable wetland establishment and rehabilitation properties in Little Lake Valley began with preparation of the *Wetland Mitigation Feasibility Study* (Feasibility Study) (California Department of Transportation 2005c). The Feasibility Study was a preliminary investigation of candidate mitigation sites intended to determine whether onsite conditions existed that would support the establishment of wetlands. After Caltrans identified all parcels owned by willing sellers in the valley, a large-scale, reconnaissance-level field investigation of the available parcels was conducted to identify those parcels with the greatest potential for wetland establishment. Based on landowner willingness and the results of the field reconnaissance, 26 parcels totaling approximately 250 acres of potential establishment were identified as likely candidates for mitigation because they appeared to have slow-draining soils, would not require extensive grading, were contiguous with other candidate properties, were available for sale or easement, and had at least some uplands. The

Feasibility Study, therefore, concluded that favorable conditions were present on the 26 candidate parcels and that sufficient wetland establishment opportunities appeared to be available in Little Lake Valley. As the cost to study all candidate parcels in detail would have been prohibitive, the Feasibility Study by necessity was conducted at a coarse scale; no formal wetland delineations were conducted at that time. Caltrans held a number of meetings with the resource agencies during the development of the Feasibility Study and provided draft copies of the report for their review and comment. Caltrans received informal verbal concurrence on the adequacy of its findings from the agencies.

Following completion of the Feasibility Study, a CMP (California Department of Transportation 2006a) was developed. The final CMP presented a conceptual plan of the overall proposed mitigation strategy for the bypass project and provided preliminary impact numbers and projected mitigation ratios for each resource, based on the best available design information at that time. As they did in the development of the Feasibility Study, the resource agencies played a collaborative role in the development of the CMP through meeting participation and reviews and comments on draft versions of the document. Formal written concurrence was received from the agencies that the CMP established an appropriate framework to mitigate project impacts on waters of the United States, including wetlands. The CMP also presented mitigation strategies for other sensitive resources.

Following completion of the CMP and the FEIS/FEIR (California Department of Transportation 2006b), Caltrans initiated a series of more detailed field studies on the candidate mitigation parcels, the results of which were documented in the Mitigation Parcels Report (MPR) (California Department of Transportation 2007). The MPR further narrowed the search for suitable candidate mitigation properties to 15 parcels, with most of the wetland establishment efforts planned on the Gary and Diane Ford parcels and a large amount of wetland and BM preservation planned on the Rutledge parcels. Formal wetland delineations then were initiated on this short list of parcels to confirm their establishment potential. Subsequent to the completion of the MPR and during the wetland delineation fieldwork, Gary and Diane Ford and the Rutledges informed Caltrans that they were no longer interested in offering any of their land for mitigation. In addition, during a February 2008 field review involving Caltrans, staff from multiple natural resource agencies, and wetland restoration experts, it was determined that the Benbow and some of the Ford parcels had limited potential for wetland establishment because the majority of the properties were already wetland. This determination further reduced the list of prospective candidate parcels for wetland establishment. The remaining parcels on the list were concluded to have very limited opportunities for wetland establishment in the valley and had been included in the MPR primarily as mitigation for other resources. As of the date of this MMP, the known opportunities for successful, self-sustainable wetland establishment have been exhausted. The

Taylor parcels south of Reynolds Highway contain existing wetlands and listed plant locations, but were not considered as potential mitigation sites because they offer limited wetland establishment opportunities and are already under easements for protection of BM.

In view of these conclusions, and at the suggestion of the NCRWQCB, Caltrans initiated a search for wetland establishment opportunities outside the valley in early 2009, even though such an approach would not return wetland functions to Little Lake Valley. The area addressed in the 2009 feasibility study is shown in Figure 3-1. To determine the suitability of soils for wetland habitat establishment on these properties outside the valley, soil sampling results from wetland delineations, field observations on the relationship between existing vegetation and soil types, and Natural Resources Conservation Service (NRCS) soil surveys were reviewed. This feasibility study indicated that of the approximately 11,000 acres considered only a few small, isolated establishment opportunities were available on land owned by willing sellers. Consequently, even if the failure to meet the criterion of preserving habitat connectivity cited above was dismissed, Caltrans still would fall substantially short of meeting the conventional mitigation requirement for establishment, even if the few suitable sites identified outside the valley were included (ICF Jones & Stokes 2009a).

Caltrans has expended a great deal of effort and has acted diligently to identify suitable wetland establishment opportunities both within and outside the valley among landowners who have expressed willingness to participate in the mitigation process. In view of the challenges discussed above, Caltrans believes it would be in the best interest of the resources to pursue mitigation on larger contiguous parcels in the valley using multiple strategies of reestablishment, rehabilitation, and preservation in combination with practicable and available establishment opportunities to work toward achievement of no net loss of wetlands. As noted above, the resource agencies agreed to this approach.

All parcels included in this MMP are already owned by Caltrans in fee title.

The rationale behind selection of the current offsite mitigation parcels for each resource type addressed in this MMP is described below. Resources are discussed in the same sequence in which they are listed in Table 2-3. The location of the offsite mitigation parcels is shown in Figure 3-2.

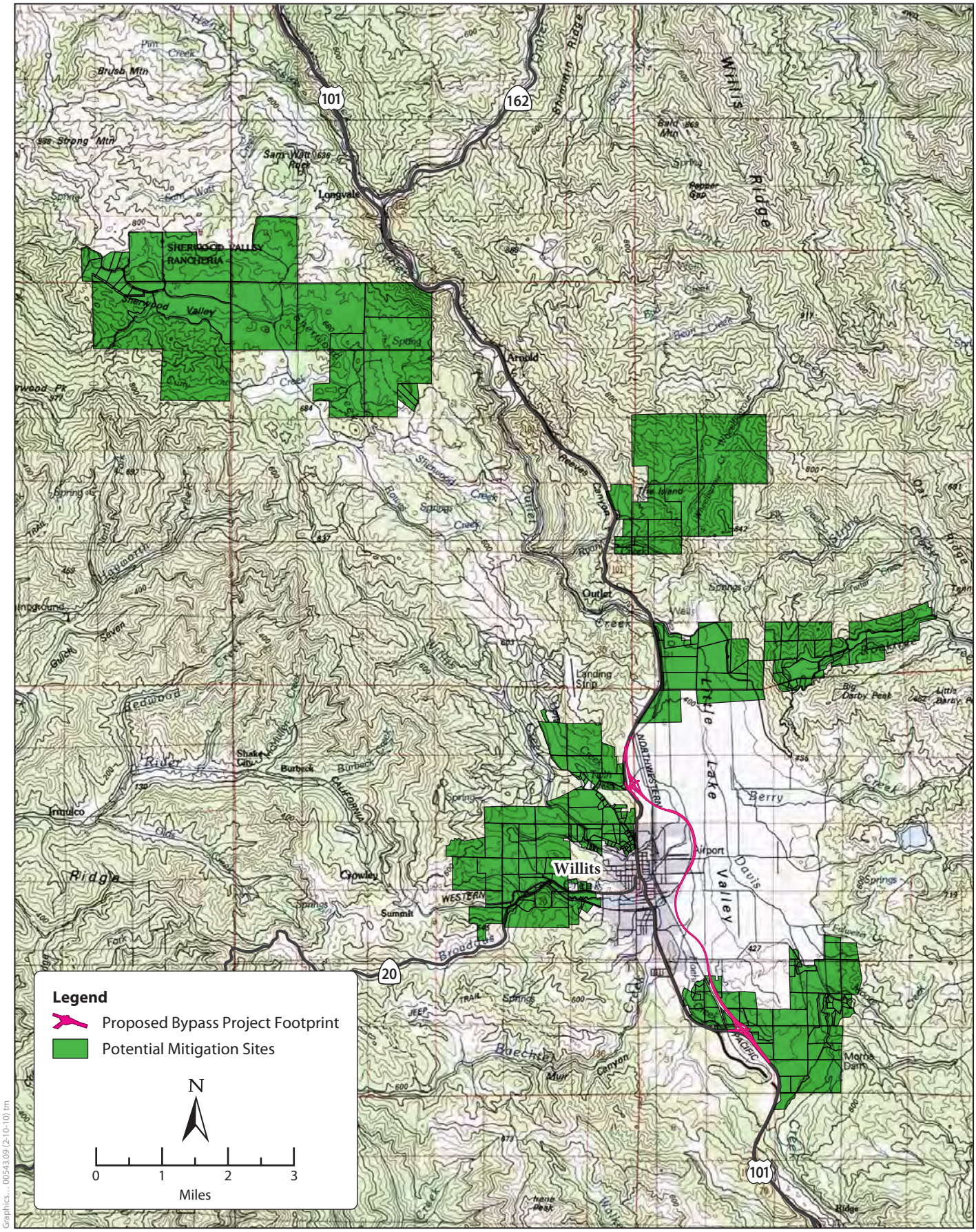


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**Figure 3-1**
**Potential Mitigation Sites Considered in the 2009 Feasibility Report**

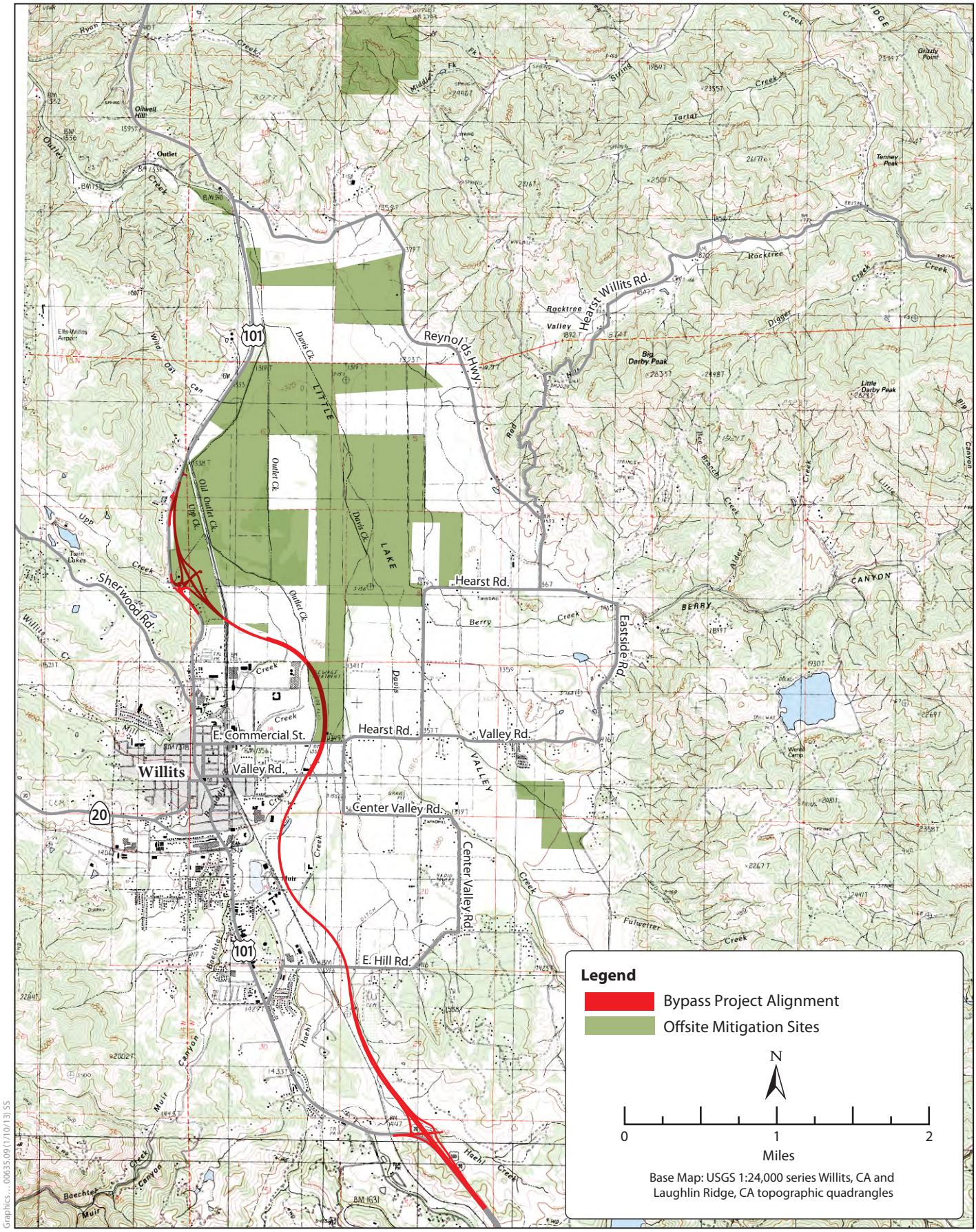


**Figure 3-2**
**Bypass and Offsite Mitigation Sites**

## 3.2 Listed Plants Mitigation Site Selection

### 3.2.1 North Coast Semaphore Grass

NCSG is a perennial species that spreads through underground rhizomes; although there is potential for its distribution to vary from year to year, that variation is not substantial. For this reason, only areas where the plant was observed during special-status plant surveys were considered during the determination of both impact and rehabilitation areas.

Opportunities for rehabilitation of NCSG were found to be very limited. The largest populations of this resource were identified on the Arkelian and Goss parcels. While these two parcels are not contiguous with the other mitigation opportunities at the north end of the valley, they offer the opportunity to conserve, and possibly rehabilitate, the largest observed populations of NCSG in the bypass project vicinity. Moreover, high-quality oak woodlands on the Arkelian and Goss parcels contribute to these parcels' richness and complexity. A small population of NCSG was observed on the Frost parcel adjacent to the eastern fence line, where it will be preserved. Two small populations of NCSG occur along the western boundary of the MGC Plasma North adjacent to the stands on the Goss parcel. A previously unmapped occurrence of NCSG was identified in the southeast corner of one of the Lusher parcels (108-030-04) near the junction of Outlet Creek and Old Outlet Creek.

The populations on Arkelian, Goss, Frost, and MGC Plasma North parcels and Lusher parcel 108-030-04 will constitute the NCSG rehabilitation for the MMP. An observed population on the Hebrand property will not be included in this MMP because Caltrans was unable to obtain fee title on the property.

### 3.2.2 Baker's Meadowfoam

Rehabilitation is the method of compensation for impacts on BM because the establishment of populations of annual plant species is considered to have limited success. Caltrans' efforts to identify suitable mitigation parcels included protocol-level surveys for BM that focused on available parcels with either observed BM populations or suitable BM habitat (determined by soil type, elevation, and slope) because the potential for distribution varies from year to year. The methods used to determine suitable habitat are presented in the MPR. Additional factors considered were contiguity with other mitigation properties, connectivity with other habitats, and the percentage of the parcel supporting the species or its potential habitat. Locations of observed and potential BM habitat are shown in Appendix K.

The largest observed populations and areas of potential habitat for BM occur on the Ford, Lusher, Nance, Benbow, and Wildlands parcels. These parcels constitute a large contiguous area where protection and coordinated resource management will provide habitat for BM in perpetuity. There is also a large population on the Watson East parcel. Smaller populations are located on the Huff, Frost, MGC North, and Goss parcels. Although these populations are small, they are patches outside the major population areas and consequently could serve as a genetic repository against future changes in surrounding land use and climate.

## 3.3 Category I Riparian Corridors (Protected Fisheries) Mitigation Site Selection

Long stream reaches that would benefit from riparian plantings are present along both Davis and Outlet Creeks. Consultations with Craig Martz and Scott Harris of CDFG and Tom Daugherty of NMFS on April 18, 2008, indicated a preference for Category I riparian mitigation to occur on Outlet Creek, as it supports populations of three listed fish species (coho salmon, Chinook salmon, and steelhead; Chinook salmon and steelhead are federally listed and so are not discussed in this document) potentially affected by the bypass project. The longest reach of Outlet Creek available for mitigation traverses several of the John Ford and Wildlands parcels; accordingly, these parcels have been selected to fulfill the Category I Riparian Corridor mitigation requirements. In addition, the John Ford and Wildlands parcels are contiguous with other mitigation parcels: the Brooke, Lusher, Benbow, Nance, and Frost parcels.

Additionally, consultations with the resource agencies, specifically CDFG and NMFS, have indicated that mitigation along Category I Riparian Corridors could be increased to substitute for any shortfalls in Category II mitigation.

In 2009, Caltrans received additional direction from the resource agencies regarding mitigation of Category I, II, and III streams (Appendix C). In the meeting held on May 14, 2009, Tom Daugherty expressed a desire to reduce the width of riparian establishment to less than 100 feet along certain Category I streams, and instead to extend the riparian establishment in a more linear fashion to encompass more streambank. This approach to riparian establishment would have a more direct effect on the quality of fish habitat.

## 3.4 Jurisdictional Wetland Mitigation Site Selection

In March 2008, prior to initiation of the 2009 Feasibility Study to search for potential wetland establishment opportunities outside Little Lake Valley, Caltrans and the resource agencies

determined that efforts (beyond those described in Section 3.1 above) should be made to identify additional willing sellers within Little Lake Valley to ensure that no wetland establishment opportunities had been overlooked. Caltrans, therefore, reinitiated contact with parcel owners initially contacted in 2004 during the first wetland establishment Feasibility Study effort, as well as additional parcel owners who had not responded previously. As a result of this effort, 11 additional candidate parcels (six parcel owners) were identified for further reconnaissance-level review: Frost, MGC Plasma, Goss, Arkelian, DeFranco, and Carrillo. Of these parcels, Frost East and West appeared to have the most readily available water sources and appeared to be the most promising for wetland establishment and rehabilitation. At the time, formal wetland delineations conducted on the Frost parcels identified a substantial amount of upland—more than 100 acres—that could provide opportunities for wetland establishment. Later, during the wetland verification process, USACE classified these areas as wetland; consequently, they were no longer available for wetland establishment. The Frost parcels were desirable because of their continuity with one of the 11 contiguous John Ford and Wildlands parcels. Combined, the Frost, Nance, Ford, and Wildlands parcels would result in a large contiguous mitigation area at the north end of the valley.

The remaining parcels analyzed in 2008—Carrillo, DeFranco, Arkelian, Goss, MGC Plasma North, and MGC Plasma Middle—appeared to present limited establishment opportunities as a result of difficult-to-access water sources; consequently, wetland establishment would require extensive manipulation of hydrology. In some instances (DeFranco and Carrillo), established wetlands potentially could affect the groundwater level on neighboring properties. The establishment of a raised water table could limit the neighbors' crop production and grazing. These issues called into question the proposed wetlands' long-term ability to support successful, naturally functioning wetland systems. In addition, many of these parcels are small and lack overall connectivity. In light of these potential complications, the DeFranco and Carrillo properties were ruled out as candidates for wetland establishment.

A letter sent to the resource agencies in July 2008 indicated that establishment opportunities continued to be elusive. Establishment opportunities on the Frost parcels were unlikely to result in as much acreage as originally estimated, and adequate opportunities on the remaining properties were doubtful. The letter indicated that it was the intent of Caltrans to focus on a mixed strategy of wetland establishment, rehabilitation, and preservation. The NCRWQCB responded with a letter in September 2008 reaffirming the State's no-net-loss policy. On October 20, 2008, Caltrans and NCRWQCB met to determine a mutually agreeable strategy for wetland mitigation. The NCRWQCB requested that Caltrans expand its search for wetland establishment opportunities to further demonstrate due diligence in meeting the no-net-loss policy.

In response to this request, Caltrans initiated the 2009 Feasibility Study (ICF Jones & Stokes 2009a). Caltrans contacted owners to determine willingness to sell in a much broader geographic area surrounding Little Lake Valley. The result of this study was the review of several thousand acres of land to assess their potential for wetland establishment. Of the sites with willing owners, the eastern Watson parcel was identified as the best new opportunity for wetland establishment.

Caltrans also moved forward with wetland delineations of sites on properties that would provide rehabilitation and preservation opportunities. Included in this effort were formal delineations of Brooke, Niesen, Lusher, Huff, Watson, and Benbow parcels. Delineations of the Taylor Ranch were conducted for portions on the floor of Little Lake Valley; however, because of existing easements on much of the property, Caltrans is not proposing these protected areas as part of the mitigation package.

Also in 2009, Frost West (108-070-03) and the eastern portion of Nance became unavailable because of owner unwillingness to sell.

The final suite of parcels is a result of right-of-way discussions within Caltrans and the feasibility studies and wetland delineations discussed above, considered in concert with existing data for the Ford Ranch and Wildlands parcels. Wetland rehabilitation will occur throughout Little Lake Valley on the Goss, Arkelian, MGC Plasma North and Middle, Frost, Nance, Brooke, Niesen, Lusher, Ford, Wildlands, Watson East, and Benbow parcels. Wetland establishment opportunities have been identified on the Benbow, Lusher, Niesen, Ford, Watson East, Goss, Wildlands, and MGC Plasma North and Middle parcels.

## 3.5 Other Waters Mitigation Site Selection

Preliminary discussions with NCRWQCB determined that implementation of instream improvements in anadromous streams would be acceptable as mitigation for impacts on other waters in lieu of establishment of new other waters. Fish passage improvements are incorporated into the project design at Haehl and Upp Creeks (Appendix E). Fish passage design for the bypass project was developed in consultation with CDFG. These creek crossings contain obstacles or barriers to fish passage and also offer opportunities for improvement of instream habitat. Culvert improvements for fish passage on Ryan Creek (Figure 3-3) also have been accepted as mitigation for impacts on other waters.

Details of these two mitigation components are discussed below.

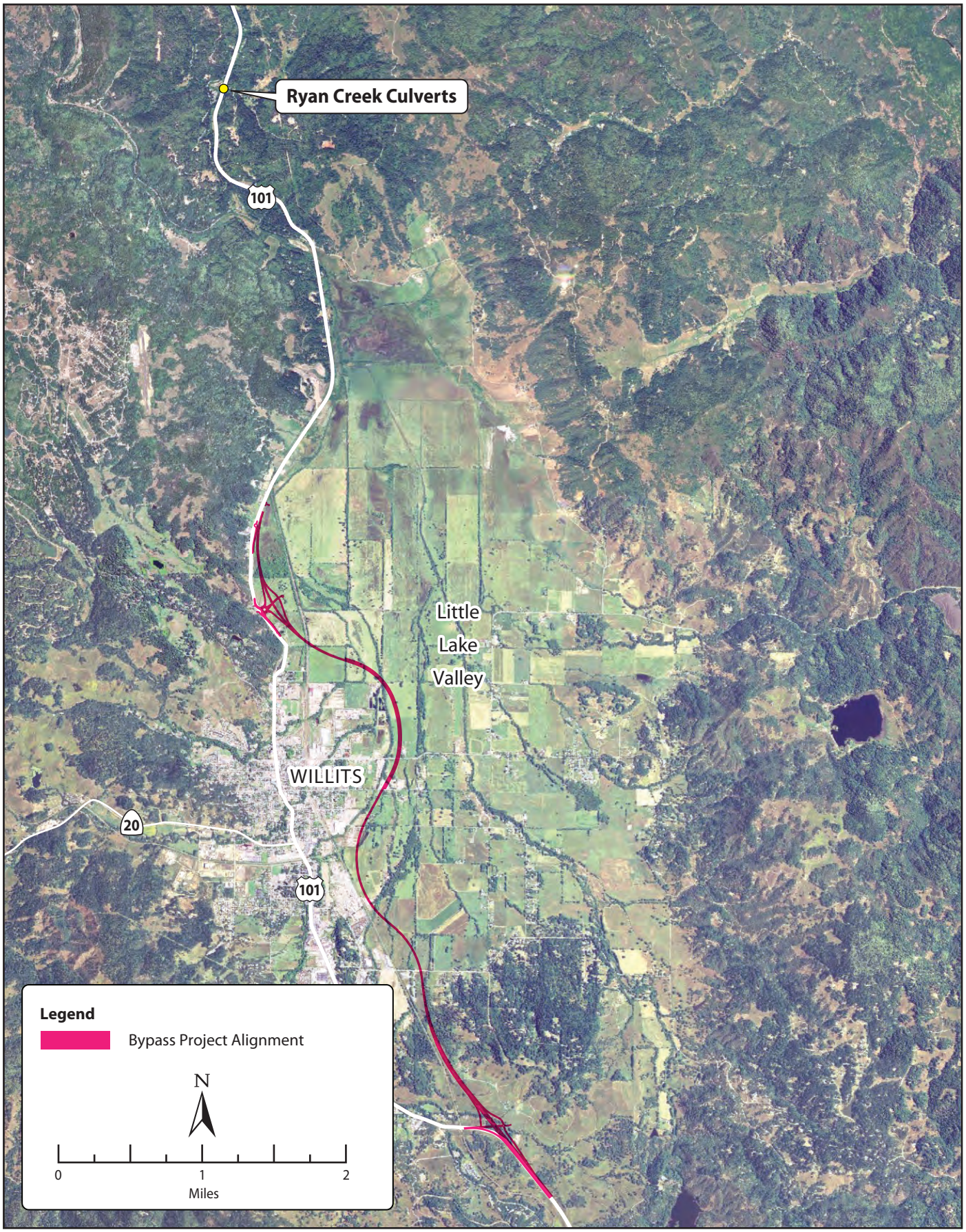


**Figure 3-3**
**Ryan Creek Fish Passage Culvert Locations**

### 3.5.1 Onsite Mitigation for Other Waters

Fish passage improvement increases the amount of available habitat within a stream system. If habitat abundance is the limiting factor for a migratory fish species, its population may rise in response to access to additional habitat. However, the population response to habitat gain is also dependent on numerous other factors, such as the quality and quantity of newly available habitat and the abundance and nature of the predators, competitors, and prey that reside there.

The primary objective for project design on both Haehl and Upp Creeks is to improve fish passage opportunities that are currently constrained or absent because of stream channel alignment or artificial barriers (e.g., culverts). These improvements are incorporated into the project design. Fish passage design elements will comply with guidelines established by CDFG.

Fish passage design addresses one component of a healthy, sustainable, and functioning riparian habitat that supports anadromous fish. The design includes stabilization of streambanks using a variety of biotechnical measures, including rootwad revetment, live siltation, and vegetated RSP (Appendix F). Planting of containerized plants and cuttings from willows, cottonwoods, and alders will be included as part of the overall strategy to fully improve the riparian stream zone (Appendix F).

Obstacles or barriers exist in both creeks within Caltrans right-of-way. At Haehl Creek, the obstacle is a 72-inch corrugated metal pipe culvert with a 4- to 6-foot entryway jump at the downstream end. This culvert will be removed, and grade control structures will be located downstream of the culvert, at appropriate heights and intervals, for the distance necessary to stabilize the natural stream gradient (Appendix F). Also in the Haehl Creek interchange, the northbound onramp has a bridge that does not require any changes to the existing creek alignment but will have grade control structures placed to maintain the natural stream gradient (Appendix F). These structures will allow the existing culvert belonging to the adjacent property owner to be backwatered, if this proves necessary. The barrier along Upp Creek is a 10-by-5-foot box culvert. It appears to be in good condition and is adequately sized for necessary capacity but creates a fish barrier as a result of a combination of low flows and water levels, high velocity, and a slight entryway jump. This RCB culvert will be removed and grade control structures will be located at appropriate heights and intervals for the distance necessary to stabilize the natural stream gradient (Appendix F).

The primary fish passage measures being proposed on both creeks are grade control structures consisting of rock sills and rock weirs. These structures are low-profile, typically constructed of boulders that span the width of the channel, and are keyed into the channel bank. Collectively, the boulders are placed to concentrate the flows toward the center of the channel and away from

streambanks. Weirs typically are arranged to form an upstream-pointing arch in plan view, with the lowest point (as seen in a profile view) at the apex of the arch. They can be used to serve the purposes listed below.

- Redirect the lowest point of the channel.
- Control channel alignment in confined areas or near infrastructure.
- Alter and maintain the width-to-depth ratio of the channel.
- Protect an eroding or sensitive streambank.
- Establish and maintain a scour pool for fish habitat.
- Concentrate low flow into a deeper, narrower channel to improve fish passage in otherwise flat-bottomed channels.
- Backwater the upstream channel to increase riffle water depth.
- Provide fish passage over barrier drops.
- Provide water to diversions or other uses.
- Encourage natural sorting of sediment at the pool outflow.

Although similar to drop structures in appearance, rock structures, which include rock weirs or sills, can withstand small shifts of material and continue to function as intended. They are made of individual rocks stabilized by weight of the material as well as contact with other rocks. Because they can withstand small deformations and continue to provide fish passage, these types of drop structures are better-suited than rigid weirs to withstand downstream channel adjustments. Because of the inherent irregularities in the surface of rock structures, they generally provide increased hydraulic diversity and better passage performance than rigid weirs.

Both Upp Creek and Haehl Creek have unstable banks that increase sediment transport and bed load while reducing biological functions as they pertain to spawning habitat for anadromous fish. Although bank erosion is a natural and important geomorphic process in many disturbed systems, the erosion at both creeks appears to be accelerating, especially at the Haehl Creek interchange. The proposed bank protection at Upp and Haehl Creeks is designed to reestablish natural functions while still enabling long-term natural stream processes to take place.

### 3.5.2 Offsite Mitigation for Other Waters

In order to fully mitigate impacts on salmonids, Caltrans proposes to commit resources toward a fish passage improvement project where Ryan Creek (a tributary of Outlet Creek) intersects with US 101 (Figure 3-3).

Currently, four culverts along Ryan Creek prevent coho salmon from reaching suitable spawning and rearing habitat. Two of those culverts are located where the North and South Forks of Ryan Creek pass under US 101, at post miles 52.25 and 52.36. The culverts are located 500 feet from one another and are approximately 0.5 mile from the confluence of Ryan and Outlet Creeks. These culverts currently present velocity and leap barriers to adult and juvenile salmonids. Reconstructing and/or modifying the culverts would remediate these barriers and, in conjunction with the proposed remediation of the other two barriers by Mendocino County and private entities, upstream habitat access will be achieved.

Caltrans proposes to provide the resources to fully fund the design of both the North and South Fork locations and to fund the construction of the South Fork location. Caltrans is not proposing to fund the construction of the North Fork location as mitigation for the bypass project. CDFG required the design of the North Fork project as part of the bypass project mitigation because the agency believes that with a complete design, the North Fork location would have a greater chance of receiving funding from other sources (e.g., grants) in the future.

Caltrans plans to accomplish the design and construction effort by creating a separate project and setting aside sufficient funds under the new project's expenditure authorization (EA) number to cover the design work for both locations and the construction costs of the South Fork location. The environmental clearance and permitting processes for the South Fork construction will be carried out in conjunction with the newly created Ryan Creek project rather than the bypass project. Caltrans plans to complete design work and commence construction on the South Fork location prior to completion of the bypass project construction work.

## 3.6 Category II and Category III Riparian Corridors Mitigation Site Selection

Because of the strict definition of Category II Riparian Corridors (i.e., stream reaches 1,000 feet upstream of an anadromous fish stream), opportunities for Category II riparian plantings are limited. The MPR (California Department of Transportation 2007) identified suitable sites for only 33% of the required mitigation for this particular resource on the available mitigation parcels. Ample mitigation opportunities were, however, identified for Category III Riparian

Corridors. As noted above, resource agency personnel Craig Martz and Scott Harris indicated that mitigation along Category I corridors could be substituted to cover any shortfalls in Category II mitigation. There are adequate Category I mitigation opportunities on the Ford and Wildlands parcels to cover the Category II shortfalls; additionally, Category I opportunities on the Brooke, Benbow, Lusher, and Watson parcels are already identified for the mitigation of other resources.

Category III mitigation sites would be planned on parcels already being used for mitigation of other resources, including the Frost parcel (rehabilitation of unstable headcuts only) and two Wildlands parcels (establishment). Resource agency staff suggested that mitigation along upstream reaches above the valley be considered to address both Categories II and III, as this strategy would offer greater benefit for protected fisheries than plantings along Category II and III streams in the valley. Caltrans investigated upstream mitigation opportunities, but—primarily because of a lack of landowners willing to cooperate, coupled with an increase in cost and potential time delays to the project—this approach was abandoned.

## 3.7 Lowland and Upland Oak Woodlands Mitigation Site Selection

Lowland oak woodlands occur primarily on valley floors in or near riparian habitats with poorly drained soils. Oak community types are valley oak woodland, black oak–valley oak, and the associated grassland habitat.

Upland oak woodlands occur primarily on moderate to steep slopes with well-drained soils. Upland oak woodland types are Oregon white oak, Oregon white oak–Douglas-fir/California fescue, Douglas-fir–canyon live oak, black oak–Douglas-fir, and the associated grassland habitat.

The selection of mitigation sites for lowland oak woodland establishment was based on the suitability of soils, hydrology, and topography for supporting oak woodland populations. Valley oaks are able to exist in well-drained to poorly drained soils on flat terrain, and opportunities to plant valley oaks exist on the available mitigation parcels identified in the MPR (California Department of Transportation 2007). Upland oaks, on the other hand, require well-drained soils on sloped terrain for optimal success. Adequate establishment opportunities meeting these conditions were not identified for impacts on upland oak woodlands, but preservation opportunities do exist. The Taylor parcels north of Reynolds Highway were purchased for upland oak preservation. CDFG and Caltrans agreed that the preservation component of oak woodland mitigation would consist entirely of upland oak species because of the lack of success when trying to establish upland oak habitat and a lack of suitable areas for planting. Further, the

establishment component would consist of the lowland species because those species have a higher likelihood of success when planted, and more suitable habitat is available.