LOS VAQUEROS RESERVOIR EXPANSION PROJECT CONSERVATION LANDS

FINAL

HABITAT MANAGEMENT PLAN

PREPARED FOR:
Contra Costa Water District
1331 Concord Avenue
Concord, CA 94520
Contact: Fran Garland
925.688.8312

PREPARED BY:
ICF International
75 East Santa Clara Street
Suite 300
San Jose, CA 95113
Contact: Troy Rahmig
206.801.2823

April 2015
Contents

Chapter 1 Introduction ........................................................................................................... 1-1
  1.1 Introduction and Purpose ............................................................................................ 1-1
  1.2 Organization of Document ......................................................................................... 1-2
  1.3 Summary of Mitigation Requirements ....................................................................... 1-2
  1.4 Geographic Scope of Mitigation Lands ...................................................................... 1-4
  1.5 Determining Habitat Management Units ..................................................................... 1-4
  1.6 Relationship to the Los Vaqueros Reservoir Resource Management Plan ............... 1-4
  1.7 Definition of Terms ................................................................................................... 1-5
  1.8 Management Periods ................................................................................................. 1-6
    1.8.1 Planning and Inventory Period ............................................................................. 1-6
    1.8.2 Interim Management Period ............................................................................... 1-7
    1.8.3 Long-Term Management Period ......................................................................... 1-8
  1.9 Coordination with Regional Conservation Plans ....................................................... 1-8
    1.9.1 East Contra Costa County HCP/NCCP ................................................................ 1-8
    1.9.2 East Alameda County Conservation Strategy ..................................................... 1-9
    1.9.3 San Joaquin County Multi-Species Habitat Conservation and Open Space Conservation Plan ...................................................................................................... 1-10
    1.9.4 Bird Conservation Plans ..................................................................................... 1-10
  1.10 Responsibilities and Approval Authorities ............................................................... 1-12
    1.10.1 Contra Costa Water District .............................................................................. 1-12
    1.10.2 Wildlife Agencies ............................................................................................. 1-13

Chapter 2 Marsh Creek Habitat Management Unit .............................................................. 2-1
  2.1 Geographic Setting and Location ............................................................................... 2-1
    2.1.1 Parcels and Land Use History .......................................................................... 2-1
  2.2 Physical Factors ......................................................................................................... 2-1
    2.2.1 Topography ........................................................................................................ 2-1
    2.2.2 Climate ............................................................................................................... 2-1
    2.2.3 Soils ................................................................................................................... 2-2
  2.3 Land Cover .................................................................................................................. 2-2
    2.3.1 Grassland .......................................................................................................... 2-3
    2.3.2 Blue Oak Woodland ............................................................................................ 2-4
    2.3.3 Wetlands ............................................................................................................ 2-5
    2.3.4 Riverine and Riparian ......................................................................................... 2-6
    2.3.5 Ruderal .............................................................................................................. 2-7
  2.4 Species Overview ....................................................................................................... 2-7
2.5 San Joaquin Kit Fox ................................................................. 2-7
2.6 California Tiger Salamander .................................................... 2-8
2.7 California Red-Legged Frog ..................................................... 2-8
2.8 Other Special-Status Species .................................................. 2-9
  2.8.1 Special-Status Wildlife Species ........................................... 2-9
  2.8.2 Special-Status Plant Species ............................................. 2-10
2.9 Interim Management Plan ...................................................... 2-10
  2.9.1 Element MC1 – Grasslands and Oak Woodlands .................. 2-11
  2.9.2 Element MC2 – Ponds, Wetlands, and Riparian ................. 2-16
  2.9.3 Element MC3 – San Joaquin Kit Fox ................................. 2-19
  2.9.4 Element MC4 – California Red-Legged Frog ...................... 2-20
  2.9.5 Element MC5 – California Tiger Salamander ..................... 2-22
  2.9.6 Element MC6 – Facility Maintenance ................................ 2-24

Chapter 3 Los Vaqueros Habitat Management Unit .................................. 3-1
  3.1 Geographic Setting and Location ........................................... 3-1
    3.1.1 Parcels and Land Use History ....................................... 3-1
  3.2 Physical Factors ................................................................. 3-1
    3.2.1 Topography .................................................................. 3-1
    3.2.2 Climate ....................................................................... 3-1
    3.2.3 Soils ......................................................................... 3-1
  3.3 Land Cover ........................................................................ 3-2
    3.3.1 Grassland ................................................................... 3-2
    3.3.2 Upland Scrub .................................................................. 3-3
    3.3.3 Wetlands ..................................................................... 3-4
    3.3.4 Riverine and Riparian ................................................... 3-4
    3.3.5 Ruderal ....................................................................... 3-4
  3.4 Species Overview ................................................................. 3-5
  3.5 San Joaquin Kit Fox ............................................................... 3-5
  3.6 California Tiger Salamander .................................................. 3-5
  3.7 California Red-Legged Frog ................................................... 3-6
  3.8 Other Special-Status Species ................................................ 3-6
    3.8.1 Special-Status Wildlife Species ...................................... 3-7
    3.8.2 Special-Status Plant Species ......................................... 3-7
  3.9 Interim Management Plan ...................................................... 3-7
    3.9.1 Element LV1 – Grasslands ............................................. 3-8
    3.9.2 Element LV2 – San Joaquin Kit Fox ............................... 3-12
    3.9.3 Element LV3 – California Red-Legged Frog .................... 3-13
3.9.4 Element LV4 – California Tiger Salamander .................................................. 3-13
3.9.5 Element LV5 – Facility Maintenance ......................................................... 3-13

Chapter 4 Morgan Territory Habitat Management Unit ......................................... 4-1
4.1 Geographic Setting and Location .................................................................. 4-1
  4.1.1 Parcels and Land Use History ............................................................... 4-1
4.2 Physical Factors ......................................................................................... 4-1
  4.2.1 Topography ......................................................................................... 4-1
  4.2.2 Climate ................................................................................................. 4-1
  4.2.3 Soils ..................................................................................................... 4-1
4.3 Land Cover ................................................................................................. 4-2
  4.3.1 Grassland ............................................................................................. 4-3
  4.3.2 Upland Scrub ....................................................................................... 4-4
  4.3.3 Woodland ............................................................................................ 4-4
  4.3.4 Wetlands .............................................................................................. 4-5
  4.3.5 Riverine and Riparian ........................................................................... 4-6
  4.3.6 Developed ............................................................................................ 4-7
4.4 Species Overview ....................................................................................... 4-8
  4.5 San Joaquin Kit Fox .......
Chapter 7 Long-Term Management Programs .............................................. 7-1
 7.1 Marsh Creek Watershed HMU Long-Term Management Program .............. 7-1
    7.1.1 Element MC-LM1 – Threatened and Endangered Species ................. 7-1
    7.1.2 Element MC-LM2 – Infrastructure and Facilities ............................ 7-3
 7.2 Los Vaqueros HMU Long-Term Management Program ................................ 7-4
    7.2.1 Element LV-LM1 – Threatened and Endangered Species .................. 7-4
    7.2.2 Element LV-LM2 – Infrastructure and Facilities ............................ 7-5
 7.3 Morgan Territory HMU Long-Term Management Program .......................... 7-5
    7.3.1 Element MT-LM1 – Threatened and Endangered Species .................. 7-5
    7.3.2 Element MT-LM2 – Infrastructure and Facilities ............................ 7-7
    7.3.3 Element MT-LM3 – Security, Safety, and Public Access ................... 7-8
 7.4 Altamont HMU Long-Term Management Program ..................................... 7-8
    7.4.1 Element AL-LM1 – Threatened and Endangered Species .................. 7-8
    7.4.2 Element AL-LM2 – Infrastructure and Facilities ............................ 7-10
    7.4.3 Element AL-LM3 – Security, Safety, and Public Access ................... 7-10
 7.5 Corral Hollow HMU Long-Term Management Program ................................ 7-11
    7.5.1 Element CH-LM1 – Threatened and Endangered Species .................. 7-11
    7.5.2 Element CH-LM2 – Infrastructure and Facilities ............................ 7-12
    7.5.3 Element CH-LM3 – Security, Safety, and Public Access ................... 7-13

Chapter 8 Routine Maintenance and Property Management Activities .................. 8-1
 8.1 Research, Monitoring, and Educational Activities .................................... 8-1
8.1.1 Regulatory Compliance Monitoring and Surveying .................................................. 8-1
8.1.2 Research and Educational Activities ................................................................. 8-1
8.2 Property Management.......................................................................................... 8-2
  8.2.1 Fire Management............................................................................................ 8-2
  8.2.2 Erosion and Sediment Control ................................................................. 8-3
  8.2.3 Invasive Plant Control ................................................................................ 8-3
  8.2.4 Nonnative Wildlife Control ........................................................................ 8-4
  8.2.5 Pond and Wetland Maintenance ............................................................... 8-5
8.3 Property Maintenance......................................................................................... 8-6
  8.3.1 Infrastructure and Facility Maintenance and Improvements ....................... 8-6
8.4 Third Party Easement Holders ........................................................................... 8-7
  8.4.1 Utilities Maintenance and Improvements ............................................... 8-7
Chapter 9 Prohibited Activities on Easement Lands ............................................ 9-1
Chapter 10 Reporting Requirements ....................................................................... 10-1
  10.1 Annual Reporting ............................................................................................ 10-1
Chapter 11 References Cited .................................................................................. 11-1
  11.1 Printed Literature ............................................................................................. 11-1
  11.2 Personal Communications ............................................................................... 11-3

Appendix A HMU Land Cover Maps
Appendix B Conceptual Wetland Restoration Design for Marsh Creek Watershed
Habitat Management Unit
# List of Tables and Figures

## Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1</td>
<td>Habitat Requirements as Outlined in Permit Documents for the Los Vaqueros Reservoir Expansion Project</td>
<td>1-3</td>
</tr>
<tr>
<td>1-2</td>
<td>Habitat Management Acreage by County</td>
<td>1-4</td>
</tr>
<tr>
<td>2-1</td>
<td>Soil Types within the Marsh Creek Watershed Habitat Management Unit</td>
<td>2-2</td>
</tr>
<tr>
<td>2-2</td>
<td>Land Cover Acreages and Linear Feet of Drainages in the Marsh Creek Watershed Habitat Management Unit</td>
<td>2-3</td>
</tr>
<tr>
<td>3-1</td>
<td>Soil Types within the Los Vaqueros Habitat Management Unit</td>
<td>3-2</td>
</tr>
<tr>
<td>3-2</td>
<td>Land Cover Acreages and Linear Feet of Drainages on the Los Vaqueros Habitat Management Unit</td>
<td>3-2</td>
</tr>
<tr>
<td>4-1</td>
<td>Soil Types within the Morgan Territory Habitat Management Unit</td>
<td>4-2</td>
</tr>
<tr>
<td>4-2</td>
<td>Land Cover Acreages and Linear Feet of Drainages in the Morgan Territory Habitat Management Unit</td>
<td>4-3</td>
</tr>
<tr>
<td>5-1</td>
<td>Soil Types within the Altamont Habitat Management Unit</td>
<td>5-2</td>
</tr>
<tr>
<td>5-2</td>
<td>Land Cover Acreages and Linear Feet of Drainages in the Altamont Habitat Management Unit</td>
<td>5-2</td>
</tr>
<tr>
<td>6-1</td>
<td>Soil Types within the Corral Hollow Habitat Management Unit</td>
<td>6-2</td>
</tr>
<tr>
<td>6-2</td>
<td>Land Cover Acreages and Linear Feet of Drainages in the Corral Hollow Habitat Management Unit</td>
<td>6-3</td>
</tr>
</tbody>
</table>

## Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Follows Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1</td>
<td>Los Vaqueros Expansion Project Habitat Management Units</td>
<td>1-4</td>
</tr>
<tr>
<td>2-1</td>
<td>Los Vaqueros Expansion Project Marsh Creek HMU</td>
<td>2-2</td>
</tr>
<tr>
<td>3-1</td>
<td>Los Vaqueros Expansion Project Los Vaqueros HMU</td>
<td>3-2</td>
</tr>
<tr>
<td>4-1</td>
<td>Los Vaqueros Expansion Project Morgan Territory HMU</td>
<td>4-2</td>
</tr>
<tr>
<td>5-1</td>
<td>Los Vaqueros Expansion Project Altamont HMU</td>
<td>5-2</td>
</tr>
<tr>
<td>6-1</td>
<td>Los Vaqueros Expansion Project Corral Hollow HMU</td>
<td>6-2</td>
</tr>
</tbody>
</table>
## List of Acronyms and Abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BO</td>
<td>Biological Opinion</td>
</tr>
<tr>
<td>Cal-IPC</td>
<td>California Invasive Plant Council</td>
</tr>
<tr>
<td>CDFW</td>
<td>California Department of Fish and Wildlife</td>
</tr>
<tr>
<td>CESA ITP</td>
<td>California Endangered Species Act Incidental Take Permit</td>
</tr>
<tr>
<td>CNDDDB</td>
<td>California Natural Diversity Database</td>
</tr>
<tr>
<td>CNPS</td>
<td>California Native Plant Society</td>
</tr>
<tr>
<td>Delta</td>
<td>Sacramento—San Joaquin Delta</td>
</tr>
<tr>
<td>District</td>
<td>Contra Costa Water District</td>
</tr>
<tr>
<td>EACCS</td>
<td>East Alameda County Conservation Strategy</td>
</tr>
<tr>
<td>ECCC HCP/NCCP</td>
<td>East Contra Costa County Habitat Conservation Plan/</td>
</tr>
<tr>
<td></td>
<td>Natural Communities Conservation Plan</td>
</tr>
<tr>
<td>GPS</td>
<td>global positioning system</td>
</tr>
<tr>
<td>HMP</td>
<td>habitat management plan</td>
</tr>
<tr>
<td>HMU</td>
<td>Habitat Management Unit</td>
</tr>
<tr>
<td>I-</td>
<td>Interstate</td>
</tr>
<tr>
<td>ITP</td>
<td>Incidental Take Permit</td>
</tr>
<tr>
<td>linear feet</td>
<td>If</td>
</tr>
<tr>
<td>Mitigation Lands</td>
<td>Lands acquired by the District to mitigate the impacts from the Los Vaqueros Reservoir Expansion Project. Lands are located in Contra Costa, Alameda, and San Joaquin counties, California.</td>
</tr>
<tr>
<td>Msl</td>
<td>mean sea level</td>
</tr>
<tr>
<td>PBO</td>
<td>Programmatic Biological Opinion</td>
</tr>
<tr>
<td>PG&amp;E</td>
<td>Pacific Gas and Electric Company</td>
</tr>
<tr>
<td>RDM</td>
<td>residual dry matter</td>
</tr>
<tr>
<td>RHJV</td>
<td>Riparian Habitat Joint Venture</td>
</tr>
<tr>
<td>RMP</td>
<td>Resource Management Plan</td>
</tr>
<tr>
<td>SJMSCP</td>
<td>San Joaquin County Multi-Species Habitat Conservation and Open Space Plan</td>
</tr>
<tr>
<td>USACE</td>
<td>U.S. Army Corps of Engineers</td>
</tr>
<tr>
<td>USACE 404 Permit</td>
<td>U.S. Army Corps of Engineers, Clean Water Act Section 404 Permit</td>
</tr>
<tr>
<td>USFWS</td>
<td>U.S. Fish and Wildlife Service</td>
</tr>
<tr>
<td>USFWS BO</td>
<td>U.S. Fish and Wildlife Biological Opinion</td>
</tr>
<tr>
<td>USGS</td>
<td>U.S. Geological Survey</td>
</tr>
<tr>
<td>Wildlife Agencies</td>
<td>USFWS and CDFW</td>
</tr>
</tbody>
</table>
Chapter 1
Introduction

1.1 Introduction and Purpose

This habitat management plan (HMP) provides a detailed description of interim and long-term management of ten properties, which collectively comprise 5,079 acres of mitigation land purchased by Contra Costa Water District (District) in Contra Costa, Alameda, and San Joaquin Counties, California (hereafter, Mitigation Lands). This land was purchased as mitigation to offset project effects on state and federal threatened and endangered species from the expansion of the Los Vaqueros Reservoir in Contra Costa County, California and ongoing operations and maintenance activities associated with reservoir operation. This HMP has been prepared as required by the Biological Opinion (BO) issued by the U.S. Fish and Wildlife Service (USFWS) [Permit # 81420-2009-F-0201-1] and the Incidental Take Permit (ITP) [Permit# 2081-2011-002-03] issued by the California Department of Fish and Wildlife (CDFW).

The USFWS permit was issued for the endangered California red-legged frog (*Rana draytonii*), threatened California tiger salamander (*Ambystoma californiense*) (Central California DPS), threatened Alameda whipsnake (*Masticophis lateralis euryxanthus*), threatened San Joaquin kit fox (*Vulpes macrotis mutica*), and threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*). The CDFW ITP was issued for the threatened San Joaquin kit fox, threatened Alameda whipsnake, and threatened California tiger salamander. In addition, this HMP is intended to satisfy the requirements outlined in the U.S. Army Corps of Engineers (USACE) Individual Permit #SPL-1990-00070. This HMP will be used by the District or their contractors, collectively referred to as “Preserve Managers,” to best manage the Mitigation Lands consistent with the requirements of all permitting documents. This HMP was also developed to be consistent with approved regional conservation plans operating in all three counties. The relationship between this HMP and other District resource planning documents is discussed below, as is the relationship between the Mitigation Lands and regional conservation plans.

The mitigation properties were acquired because of their ecological resources and as such, there may be other special-status species present under baseline conditions. Further, new species may appear in the future as the result of management actions outlined in this HMP. The properties were acquired and are being managed specifically to offset impacts realized from the Los Vaqueros Reservoir expansion project and dictated by the associated permits. Management for other species, not addressed in those permits, is not included or contemplated in this HMP. Management actions will be executed according to state and federal law and will therefore not result in adverse effects on any special-status species, including state and federally listed species.
1.2 Organization of Document

This document is organized by Habitat Management Units (HMUs) as described in Section 1.4, Geographic Scope of Mitigation Lands. Chapters 2–6 each serve as the background and interim management plan for each of the five HMUs that comprise the Mitigation Lands addressed in this document. In addition, a Long-Term Management Program is provided separately for the Mitigation Lands in their entirety in Chapter 7. Chapter 8 describes standard District maintenance and monitoring activities and Chapter 9 describes prohibited activities in the HMUs. The document is organized into the following chapters.

- Chapter 1 – Introduction
- Chapter 2 – Marsh Creek Watershed Habitat Management Unit
- Chapter 3 – Los Vaqueros Habitat Management Unit
- Chapter 4 – Morgan Territory Habitat Management Unit
- Chapter 5 – Altamont Habitat Management Unit
- Chapter 6 – Corral Hollow Habitat Management Unit
- Chapter 7 – Long-Term Management Programs
- Chapter 8 – Routine Maintenance and Property Management Activities
- Chapter 9 – Prohibited Activities on Easement Lands
- Chapter 10 – Reporting Requirements
- Chapter 11 – References Cited

1.3 Summary of Mitigation Requirements

The mitigation requirements outlined in the above-mentioned permits are shown in Table 1-1. The mitigation requirement for San Joaquin kit fox resulted in a large grassland requirement. While many of the mitigation properties were purchased to meet that San Joaquin kit fox requirement they also provide habitat for the other three species addressed in this management plan.
Table 1-1. Habitat Requirements as Outlined in Permit Documents for the Los Vaqueros Reservoir Expansion Project

<table>
<thead>
<tr>
<th>Permit/Document</th>
<th>Habitat</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>CESA ITP</td>
<td>Covered Species Habitat</td>
<td>• 5,079 acres</td>
</tr>
<tr>
<td>USFWS BO</td>
<td>Covered Species Habitat</td>
<td>• Minimum 4,890 acres (with at least 1,388 acres in Contra Costa County; specific habitat-type requirements described in text below)</td>
</tr>
<tr>
<td>CESA ITP</td>
<td>Valley Foothill Riparian</td>
<td>• 10.87 acres (part of 5,079 acres)</td>
</tr>
<tr>
<td>CESA ITP</td>
<td>Wetland</td>
<td>• 14.73 acres of wetland preservation and enhancement</td>
</tr>
<tr>
<td>CDFW SAA</td>
<td></td>
<td>• 4.0 acres seasonal wetland creation on site(^{b})</td>
</tr>
<tr>
<td>USFWS BO</td>
<td></td>
<td>• 0.68 acre seasonal wetland restoration</td>
</tr>
<tr>
<td>USACE 404 Permit</td>
<td></td>
<td>• 0.60 acre freshwater permanent emergent wetland restoration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 3,000 linear feet of Kellogg Creek restored or enhanced</td>
</tr>
<tr>
<td>USFWS BO</td>
<td>Grassland</td>
<td>• 4,700 acres(^{c})</td>
</tr>
<tr>
<td>USFWS BO</td>
<td>Oak Woodland</td>
<td>• 89.85 acres</td>
</tr>
<tr>
<td>USFWS BO</td>
<td>Scrub</td>
<td>• 6.24 acres(^{d})</td>
</tr>
<tr>
<td>USFWS BO</td>
<td>Drainages</td>
<td>• 118,518 linear feet preserved or enhanced</td>
</tr>
<tr>
<td>CESA ITP</td>
<td>California Endangered Species Act Incidental Take Permit [Permit# 2081-2011-002-03] issued by the California Department of Wildlife.</td>
<td></td>
</tr>
<tr>
<td>USFAC 404 Permit</td>
<td>U.S. Fish and Wildlife Biological Opinion [Permit # 81420-2009-F-0201-1].</td>
<td></td>
</tr>
</tbody>
</table>
\(^{a}\) Of these, 6.54 acres must provide California red-legged frog and California tiger salamander habitat with an adjacent 1,380 acres of upland habitat.
\(^{b}\) A seasonal wetland was constructed in the core borrow area in December 2011 to meet this requirement.
\(^{c}\) Strategically located to protect and enhance regional movement opportunities for San Joaquin kit fox.
\(^{d}\) 147.4 acres of grassland and oak woodland will be located within 2,500 feet of scrub habitat to enhance Alameda whipsnake habitat.

Background data collection and identification of mitigation opportunities on the Mitigation Lands centered on meeting the habitat requirements set forth in permit documents. The background data collected comes largely from three key documents.

- **Compensatory Mitigation Plan for the Los Vaqueros Expansion Project** (ESA 2011a).
- **Draft Wetland Compensatory Mitigation Plan for the Los Vaqueros Expansion Project** (ESA 2011b).

Information from these reports was utilized when preparing this HMP as were individual habitat assessment reports which were written for each parcel during the acquisition of the Mitigation Lands. These reports are referenced as appropriate in Chapters 2–6 describing the HMUs.
1.4 Geographic Scope of Mitigation Lands

The ten mitigation properties are spread over three counties in the northern Diablo Range in California: Contra Costa, Alameda, and San Joaquin (Figure 1-1). The Mitigation Lands are divided into five management units: Marsh Creek, Los Vaqueros, Morgan Territory, Altamont, and Corral Hollow (Table 1-2). The Marsh Creek HMU consists of 998 acres just south of Antioch, California. The Los Vaqueros HMU is comprised of one 80-acre parcel that abuts the Los Vaqueros watershed to the east. The Morgan Territory HMU consists of 328.8 acres just west of Morgan Territory Road about 1 mile north of the Alameda–Contra Costa county line. The Altamont HMU is in Alameda County. This HMU is bisected by Interstate (I)-580 and is located at Grant Line Road. The Corral Hollow HMU is in San Joaquin County south of Tracy, California, just west of I-580.

Table 1-2. Habitat Management Acreage by County

<table>
<thead>
<tr>
<th>Habitat Management Unit</th>
<th>County</th>
<th>Total Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marsh Creek</td>
<td>Contra Costa</td>
<td>998.0</td>
</tr>
<tr>
<td>Los Vaqueros</td>
<td>Contra Costa</td>
<td>80.0</td>
</tr>
<tr>
<td>Morgan Territory</td>
<td>Contra Costa</td>
<td>328.8</td>
</tr>
<tr>
<td>Altamont</td>
<td>Alameda</td>
<td>651.2</td>
</tr>
<tr>
<td>Corral Hollow</td>
<td>San Joaquin</td>
<td>3,021.0</td>
</tr>
</tbody>
</table>

1.5 Determining Habitat Management Units

The Mitigation Lands support similar land cover types and species’ habitat. As a result, management of these lands will be very similar, particularly on adjacent sites and sites within close proximity. Recognizing these similarities, the District has chosen to manage groups of properties as HMUs to realize efficiencies from managing larger areas in the same way, and possibly using the same personnel (or contractors) and means of management in a unified timeframe. For simplicity, the HMUs were chosen based on geographic location and similarities in land cover, topography, and species’ habitat.

1.6 Relationship to the Los Vaqueros Reservoir Resource Management Plan

The Los Vaqueros Reservoir Resource Management Plan (RMP) guides how natural and cultural resources are managed on the watershed lands surrounding the reservoir. The RMP was first approved in 1999 following the completion of the Los Vaqueros Reservoir in 1997. The RMP is being updated currently to account for the expanded reservoir and to update District practices on watershed lands. The HMP has been developed to be consistent with the Los Vaqueros Reservoir RMP where appropriate. However, the Mitigation Lands will be monitored more intensively and managed differently from the Los Vaqueros watershed lands if needed, in order to meet the
Figure 1-1
Los Vaqueros Expansion Project
Habitat Management Units
mitigation requirements outlined in this document. The primary goal on watershed lands is to provide high quality drinking water and increased reliability of water supply to District customers while balancing the needs of environmental resources protection, access, recreation, education, and research and meeting regulatory requirements. The primary goal on Mitigation Lands is to manage habitat for state- or federally listed species that were affected by the expansion of the Los Vaqueros Reservoir. Because of these different purposes, separate management plans are appropriate. However, the plans are consistent in their approach to species protection, habitat enhancement, monitoring, and maintenance.

1.7 Definition of Terms

**Element** – An element refers to any biological unit or facility maintenance program as defined below for which goals have been prepared and presented within this plan.

**Biological Element** – These elements consist of species, habitats, or natural communities for which specific management goals have been developed within the plan.

**Facility Maintenance Element** – This is a general purpose element describing the maintenance and administrative program which helps maintain orderly and beneficial management of the area.

**Biological Goal** – A biological goal is the statement of intended long-range results of management based on the feasibility of maintaining, enhancing, or restoring species populations or habitat.

**Management Action** – The individual projects or work elements which implement the goal and are useful in planning operation and maintenance budgets.

**Baseline Condition** – Established during either the Inventory Period or the Interim Management Period as the point in time that conditions will be recorded. The intent of all future management actions will be to maintain or modify that baseline condition to benefit the species. All future monitoring actions will measure the effectiveness of management actions against this baseline condition to determine whether goals and objectives are being achieved.

**Performance Monitoring** – Monitoring to determine if biological resources are meeting the success criteria established for restoration, enhancement activities, or adaptive management (e.g., vegetation cover, grass height, presence/absence of species).

**Compliance Monitoring** – Monitoring to determine if the management plan is being adhered to as agreed. For example, is grazing being used as a management tool as described in this document, and is a monitoring program in place.

**Annual Grazing Plan** – This is the annual plan for how a property or properties will be grazed, including the number of animals and expected timing of grazing. The annual grazing plan will be an agreement between the District and the grazing tenant and will be based on the current condition of the grassland versus the expected condition under this HMP and the amount of rain expected and received and how that will influence the amount of forage available. The annual grazing plan is the “best guess” for how grazing management will occur on the property during the next year.
Adjustments to the grazing plan will be made during the year to ensure adherence to the habitat metrics in the HMP.

**Annual Notification Packet** – Each year the District assesses the infrastructure (e.g., roads, culverts, fences) on their conservation lands and compiles a list of operations and maintenance activities that occurred during the previous year and a list of activities that are scheduled to occur in the coming year. Those activities are described and permitted through the Programmatic Biological Opinion (PBO) for Long-Term Operations and Maintenance and CESA ITP for operations and maintenance activities.

### 1.8 Management Periods

The timeline for development and implementation of the HMP has been divided into a set of management periods: the Planning and Inventory Period, the Interim Management Period, and the Long-Term Management Period. Differentiating these three distinct management periods provides a clear framework on which to base planning and management decisions. Actions taken during the Planning and Inventory Period will be directed at developing a baseline to inform plans and goals and against which future results will be measured. Actions taken during the Interim Management Period will be directed at initial improvements and implementation of management activities. Actions taken during the Long-Term Management Period will be based on data gathered during the Planning and Inventory and Interim Management Periods and will provide a guide for long-term adaptive management of the HMUs.

#### 1.8.1 Planning and Inventory Period

The Planning and Inventory Period began in 2010 when the District initially started searching for properties with the proper attributes to serve as Mitigation Lands for the Los Vaqueros Reservoir Expansion Project. Initial habitat assessments were performed for all Mitigation Lands prior to the District acquiring the properties to ensure that biological resources affected by the reservoir expansion were present (ESA 2010a, 2010b, 2010c, 2010d, 2010e, 2010f, 2010g, 2010h, 2010i, 2010j). The background information presented in this HMP is largely based on that initial work, though follow up field assessments occurred during fall 2011 and winter 2011–2012.

The data collected between 2010 and 2012 was used to establish the baseline ecological condition of each HMU, as described in this plan. Gaps in the baseline data, such as presence/absence of California red-legged frog and California tiger salamander, will be addressed through additional surveys conducted during the Interim Management Period. The goal of the data collection effort was to determine the site potential of each HMU and then prioritize management actions such that the units provide suitable compensatory habitat for the covered species, as required in the permits. The data collection effort was started during the Inventory Period and will continue into the early stages of the Interim Management Period. Management actions were recommended in the initial inventories that emphasized the four species (Alameda whipsnake, California red-legged frog,
California tiger salamander, and San Joaquin kit fox)\(^1\) for which mitigation was outlined in the USFWS BO and the three species (Alameda whipsnake, California tiger salamander and San Joaquin kit fox) for which mitigation was outlined in the CDFW ITP, although additional conservation benefits will be realized. The site potential assessment will identify areas that are already functioning well as habitat for these species. It will also identify areas where the most improvement in habitat condition could be realized. This information will allow the District to develop management priorities, enhancing the Mitigation Lands for these and other native species.

Field investigations conducted immediately before and after acquisition consisted primarily of ground-truthing existing habitat assessments and identifying management opportunities and constraints in each HMU. Site-specific analysis was conducted in areas where very specific resource restoration or enhancement efforts are planned. For example, in areas where wetland restoration is planned, a watershed analysis (i.e., review of watershed size, hydrological data, precipitation, soil infiltration rates) was conducted to determine the appropriate size for restored features and the physical feasibility of their restoration. General rangeland condition and existing grazing infrastructure on the HMUs were assessed during the Planning and Inventory Period. Stands of invasive plant infestations were mapped in the field, as were stands of native grasses, to the extent possible. For some resources the baseline condition could be identified during the Planning and Inventory Period. For example, the extent of invasive plant infestations was determined following field mapping. In this example, goals and objectives were set to reduce the size and density of heavy infestations based on field observation during the Planning and Inventory Period. If resources could not be surveyed due to seasonality, annual fluctuation in precipitation, or other time-sensitive factors, the process for setting the baseline condition is described and will be completed during the Interim Management Period.

**1.8.2 Interim Management Period**

The Interim Management Period is set for a period of 5 years. During this time, management actions will be initiated and monitoring will begin. Baseline conditions for resources will be identified during the Interim Management Period if the baseline conditions were not already determined during the Planning and Inventory Period. Because the Mitigation Lands already provide habitat for the four species addressed in the permits, most of the management actions described in Chapters 2–6 and implemented during this period are low-intensity activities, such as managed grazing and removal of invasive plants, which will allow the land cover and aquatic habitats to respond to a defined management program. The response of vegetation, and thus habitat quality, to these activities will be monitored during the Interim Management Period to inform the Long-Term Management Program.

Some of the more active restoration and enhancement activities will be initiated during the interim management period (e.g., restoration of wetlands in the Marsh Creek HMU and stream enhancement activities in the Altamont HMU). The need for active enhancement will be determined

---

\(^1\) Valley elderberry longhorn beetle was listed in the Incidental Take Statement issued by the USFWS. Mitigation for that species is to be completed on Los Vaqueros watershed lands and is not accommodated on the Mitigation Lands discussed in this HMP.
by monitoring the response of vegetation or natural communities to management under this HMP, and such enhancement will only occur if low-intensity management activities are not successful in meeting performance standards. Instances where active enhancement will be substituted for low-intensity management are described for each HMU. Modifications to the management program will be made through adaptive management according to strategies described for each HMU and in collaboration with the USFWS and CDFW (the Wildlife Agencies).

### 1.8.3 Long-Term Management Period

Following the 5-year Interim Management Period the Long-Term Management Period will commence. Some resources will continue to be monitored frequently from Years 6–10, depending on the likelihood that performance standards will be met and/or based on performance issues identified during the interim period. For example, if an enhancement action is not meeting performance criteria in Year 5 and management modifications are made through adaptive management, those resources will continue to be monitored on an annual basis until it can be established that the action is meeting the performance standard, at which point, monitoring frequency would be reduced. For those resources where performance criteria are met during the Interim Management Period, monitoring would be reduced to compliance monitoring, with performance monitoring occurring less frequently (e.g., every 5 years). It is assumed for the purpose of calculating the long-term management endowment that the frequency of all performance monitoring will be reduced by Year 10 of the program and that all management activities will have been modified such that they meet the criteria specified in this document. Through an adaptive management program, the type of management actions and the frequency of monitoring will be modified as needed over time to ensure management goals are being met.

### 1.9 Coordination with Regional Conservation Plans

The Mitigation Lands addressed in this HMP are located within the planning areas for three existing regional conservation planning efforts; the East Contra Costa County Habitat Conservation Plan/Natural Communities Conservation Plan (ECCC HCP/NCCP), the East Alameda County Conservation Strategy (EACCS), and the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP) (Figure 1-1). The species protected on the HMP lands are protected by one or more of these regional plans and the conservation goals developed for the HMP are consistent with those goals guiding implementation of the regional plans. Each plan and its relationship to the HMP is described below.

#### 1.9.1 East Contra Costa County HCP/NCCP

The ECCC HCP/NCCP (Jones & Stokes 2006) covers the eastern portion of Contra Costa County, California. Contra Costa County has a land area of more than 435,000 acres; the ECCC HCP/NCCP inventory area covers approximately one-third of the county, or 174,018 acres. Inventory-area boundaries were based on a combination of political, ecological, and hydrologic factors. Watershed boundaries were used to define the inventory area wherever possible. The purpose of the ECCC HCP/NCCP is to protect and enhance ecological diversity and function and preserve endangered
species and their habitats within the urbanizing region of eastern Contra Costa County. The ECCC HCP/NCCP also describes the responsibilities associated with operating and maintaining the new preserves that will be created to mitigate for the anticipated impacts from activities covered by that plan. As an NCCP, the ECCC HCP/NCCP is charged with contributing to the recovery of listed species and helping to preclude the need to list additional species in the future. The plan is implemented by the East Contra Costa County Habitat Conservancy, a joint powers authority of the County and the cities of Clayton, Brentwood, Pittsburg, and Oakley in collaboration with the East Bay Regional Park District, CDFW, and USFWS.

The Marsh Creek and Los Vaqueros HMUs are within the inventory area of the ECCC HCP/NCCP. The Marsh Creek HMU is located in an area of high conservation priority in the ECCC HCP/NCCP and connects several existing protected areas to complete an important linkage for the San Joaquin kit fox. The Los Vaqueros HMU consists of highly suitable San Joaquin kit fox habitat and extends the protected Los Vaqueros watershed lands to the east. The Morgan Territory HMU is just outside the ECCC HCP/NCCP inventory area but supports very similar biological resources as those on the Los Vaqueros watershed lands. One important feature of the Morgan Territory HMU is the Alameda whipsnake habitat located in the northernmost parcel, a key species of the ECCC HCP/NCCP.

1.9.2 East Alameda County Conservation Strategy

The EACCS provides a framework to protect, enhance, and restore natural resources in eastern Alameda County, while improving and streamlining the environmental permitting process for impacts resulting from infrastructure and development projects. The EACCS provides a blueprint for project-by-project mitigation and provides a mechanism for streamlined USFWS permitting. The conservation strategy was prepared by a coalition of Alameda County; the cities of Dublin, Livermore, and Pleasanton; Zone 7 Water Agency; Alameda County Waste Management Authority; Alameda County Congestion Management Agency; Alameda County Resource Conservation District; East Bay Regional Park District; Natural Resources Conservation Service; USFWS; CDFW; and the San Francisco Regional Water Quality Control Board. The conservation strategy currently has no formal implementing entity. However, each participating agency is applying the plan to its public and private projects within its jurisdiction.

The EACCS focuses on mitigating the impacts of development and other capital projects on biological resources such as endangered and other special-status species as well as sensitive habitat types (e.g., wetlands, riparian corridors, rare upland communities) (ICF International 2010). The EACCS includes identification of important conservation priorities in the county that are supported by local stakeholders and resource agencies and emphasizes the importance, not just of protection of those resources, but management as well.

The Altamont HMU is located entirely within the EACCS study area. The portion of the HMU that is north of I-580 is in EACCS Conservation Zone 6, while the portion south of I-580 is in EACCS Conservation Zone 10. The protection of the Altamont HMU contributes to the protection of seasonal wetlands in this part of the EACCS study area, a conservation priority listed in the EACCS (ICF International 2010). The Mitigation Lands south of I-580 more than double the total acres of annual grassland protected in EACCS Conservation Zone 10. The Altamont HMU has two large (8-
foot diameter) undercrossings under I-580, a structure that is an assumed movement barrier to many species including the San Joaquin kit fox. Undercrossings like the two that are located in the Altamont HMU provide important linkages for species in the region. These undercrossings represent two of only four known crossing points under I-580 between Livermore and the Alameda–San Joaquin county line. Management goals for the Altamont HMU will focus on wildlife connectivity.

1.9.3 San Joaquin County Multi-Species Habitat Conservation and Open Space Conservation Plan

The SJMSCP (San Joaquin County 2000) was approved in 2001 to authorize the incidental take of covered species, from urban development and other covered activities in San Joaquin County, in exchange for habitat protection that would result in the long-term conservation of those species. The SJMSCP covers all of San Joaquin County (912,640 acres) except for state and federal lands. The plan was prepared by the County and all eight cities within the county. It is being implemented by the San Joaquin County Council of Governments.

The Corral Hollow HMU is located in the Southwestern Zone of the SJMSCP area, just west of I-580. Habitat protection goals for this zone are to protect grassland habitat for San Joaquin kit fox and to support land uses that allow for kit fox to persist in, and move through, the plan area. The SJMSCP has already protected kit fox habitat in this zone including the McDonald/Bogetti Preserve and the Rustan Preserve. The Corral Hollow HMU has many of the same attributes as these and other preserve lands in this zone; it adds to an important habitat corridor for San Joaquin kit fox on the eastern shoulder of the Altamont Hills.

1.9.4 Bird Conservation Plans

The purpose and intent of the conservation goals, objectives, and management actions contained in this HMP were designed to protect, and enhance, and where appropriate, restore native habitats for native species. The overarching principles of protection and enhancement are consistent with the objectives outlined in several regional, statewide, and global initiatives for migratory birds. California Partners in Flight, PRBO Conservation Science, and the Riparian Habitat Joint Venture (RHJV) have written several bird conservation plans since 2000. Those that are applicable to the habitats on the District’s Mitigation Lands were consulted when drafting this document and will be referenced as appropriate in describing enhancement activities for each HMU. Consulting these bird conservation plans was a recommendation under the Fish and Wildlife Coordination Act Report for the Los Vaqueros Reservoir Expansion Project which the District agreed to implement. Under each of the relevant bird conservation plans a few key items are listed to demonstrate the consistency between District activities and the recommendations offered in those documents.

  - The District would cooperate with partners who were interested in research and monitoring initiatives described under the Monitoring and Research section of Chapter 5, Conservation Action Recommendations.
The District will avoid mowing, disking, or burning during breeding season (unless proper monitoring and clearance is implemented).

The District has protected large pieces of land that are dominated by California annual grasslands. The management and monitoring described in this HMP focuses on shifting those grasslands away from nonnative invasive grasses and other plants toward a grassland ecosystem with a higher percentage of native grass species (>10%). This is consistent with the objectives listed under the Habitat Protection section of the Grassland Bird Conservation Plan.

  - The District will limit restoration activities and disturbance events to the non-breeding season (unless proper monitoring and clearance is implemented).
  - The District will control and eradicate nonnative plant species. The Coastal Scrub and Chaparral Bird Conservation Plan states that control is best implemented on a watershed scale, which is the current approach by the District.
  - The District will control and eradicate nonnative animal species.
  - The District has distinguished and will manage for grassland mosaics from non-productive weedlands.

  - Maintain a diversity of oak species that are bioregionally appropriate.
  - The District will time restoration, and enhancement activities to occur outside of the breeding season (unless proper monitoring and clearance is implemented).
  - The District plans to manage oak stands to increase recruitment and age-class diversity.
  - District plans for enhancement include removing nonnative tree species (e.g., eucalyptus).
  - The District will retain large, old oak trees, including those that provide natural cavities for cavity nesting species.

  - The District will manage and restore (where appropriate) riparian and adjacent habitats to maintain a diverse and vigorous understory and herbaceous layer. This includes monitoring and managing grazing activities to maximize riparian productivity.
  - The District manages at the watershed level as recommended in the Riparian Bird Conservation Plan.
The District will time restoration and enhancement activities to occur outside the breeding season (unless the proper monitoring and clearance is implemented).

The District will avoid impacts on the natural hydrology of aquatic habitats as much as possible and where possible manage flow to allow near natural hydrograph whenever possible.

The HMP includes management activities to shift species composition toward native plants and animals.

### 1.10 Responsibilities and Approval Authorities

This section describes the responsibilities of the District with respect to the Mitigation Lands. This section also describes the Wildlife Agencies’ approval authority over the HMP and future HMP amendments.

#### 1.10.1 Contra Costa Water District

The District is the land manager and has the primary responsibility for ensuring that the day-to-day management of the Mitigation Lands is implemented in accordance with this HMP and is consistent with the permits issued by the Wildlife Agencies.

The District is responsible for ensuring the following management activities are performed.

- Implementing the Interim and Long-Term Management Programs, including monitoring and adaptive management sufficient to detect the effectiveness of the management strategy and to require management changes, when needed, to meet management goals.
- Implementing field studies, maintaining monitoring equipment, collecting field data, and analyzing monitoring data to evaluate and redirect management actions, if needed.
- Developing habitat restoration designs and construction drawings, or overseeing contractors conducting these tasks.
- Submitting annual reports to the Wildlife Agencies during the Interim Management Period and Long-Term Management Period describing management activities and monitoring results from the previous year. This includes reporting on the use of adaptive management to modify the agreed upon management program.

Activities on Mitigation Lands will include active and low-intensity habitat and species management and monitoring, habitat restoration, regular patrol, trash removal, fence/gate installation and repair, road maintenance, and other activities necessary to keep the grazing program operational and to ensure site management activities can occur on schedule. Although it will ultimately be the District’s responsibility to ensure these activities are funded and implemented, all of these activities will be conducted in partnership with resident livestock operators. In addition, some of these activities could be conducted by other conservation entities in the region to increase efficiency.
1.10.2 Wildlife Agencies

The Wildlife Agencies are responsible for monitoring the activities of the District and ensuring that this HMP is being implemented consistent with the requirements set forth in the permits and the terms of the conservation easements. The Wildlife Agencies must approve this HMP, and future revisions to this HMP. The Wildlife Agencies are also expected to monitor management, restoration, and monitoring activities on Mitigation Lands through regular technical meetings with the District and annual reports provided to the Wildlife Agencies by the District. These meetings will occur as needed and can be called by either the District or one of the Wildlife Agencies.
Chapter 2
Marsh Creek Habitat Management Unit

2.1 Geographic Setting and Location

The Marsh Creek Watershed HMU is in eastern Contra Costa County, north of the Los Vaqueros Reservoir and west of the city of Brentwood (Figure 1-1, Figure 2-1). The Marsh Creek HMU encompasses approximately 998 acres and consists of two units, Deer Valley East and Deer Valley West. The HMU is on the Antioch South U.S. Geological Survey (USGS) 7.5 minute quadrangle.

2.1.1 Parcels and Land Use History

The Deer Valley East Unit is 340 acres and current land use consists of cattle grazing throughout the unit. No evidence of cultivated agriculture exists. Stock ponds have been constructed on the intermittent drainage to intercept and retain runoff from storm events. Infrastructure for supplying livestock water from groundwater wells exists but is non-functional.

The Deer Valley West Unit is approximately 658 acres. Current land use activities consist of cattle grazing throughout the unit. Dry land farming has been recently conducted on the northern portion of the unit adjacent to Deer Valley Road. Evidence of topographic manipulation on portions of the cultivated land is indicative of more intensive land use methods in the past. Irrigation infrastructure does not exist, limiting cultivation of crops that require supplemental irrigation. Stock ponds were installed on the intermittent drainage in the unit by a previous owner to intercept and retain runoff during storm events. Infrastructure for supplying livestock water from groundwater wells exists but is non-functional.

2.2 Physical Factors

2.2.1 Topography

The Marsh Creek Watershed HMU is just south of Antioch, on the eastern flank of the northern Diablo Range, and west of the Sacramento–San Joaquin Delta (Delta). The steepest topography is found at the western end of the HMU in the center of the Deer Valley West Unit. The Deer Valley East Unit consists of southeasterly running rolling hills throughout much of the unit. Elevations range from approximately 220 feet above mean sea level (msl) near the northeastern end of the Deer Valley East Unit to approximately 840 feet above msl at the center of the Deer Valley West Unit.

2.2.2 Climate

The Marsh Creek Watershed HMU is in a region characterized by a Mediterranean climate. Summers tend to be hot and dry and winters long and cool, with precipitation falling as rain during the late
fall, winter, and early spring months, typically between November and April. Rainfall within the HMU averages 13.2 inches annually and the average annual temperature is 73.3 degrees Fahrenheit.

2.2.3 Soils

There are fifteen soil series found within the HMU (Natural Resources Conservation Service 2010) (Table 2-1). The prominent soil types in the Deer Valley East Unit are Altamont-Fontana complex found along the ridgeline and hillslopes in the center of the unit and the Briones Loamy sand found on the gently rolling slopes in the northern portion of the unit. The broad valley in the southern portion of the Deer Valley East Unit is characterized by Altamont and Capay clay and Pescadero clay loam soils.

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Percentage of HMU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altamont clay (9–15% slopes)</td>
<td>11.5</td>
</tr>
<tr>
<td>Altamont clay (15–30% slopes)</td>
<td>4.9</td>
</tr>
<tr>
<td>Altamont-Fontana complex (30–50% slopes)</td>
<td>16.9</td>
</tr>
<tr>
<td>Altamont-Fontana complex (50–75% slopes)</td>
<td>6.5</td>
</tr>
<tr>
<td>Briones loamy sand (5–30% slopes)</td>
<td>10.6</td>
</tr>
<tr>
<td>Briones loamy sand (30–50% slopes)</td>
<td>2.4</td>
</tr>
<tr>
<td>Capay clay (0–2% slopes)</td>
<td>3.4</td>
</tr>
<tr>
<td>Capay clay (2–9% slopes)</td>
<td>4.9</td>
</tr>
<tr>
<td>Fontana-Altamont complex</td>
<td>3.3</td>
</tr>
<tr>
<td>Los Gatos loam (30–50% slopes)</td>
<td>14.0</td>
</tr>
<tr>
<td>Pescadero clay loam</td>
<td>10.3</td>
</tr>
<tr>
<td>Pescadero clay loam, strongly alkali</td>
<td>1.2</td>
</tr>
<tr>
<td>Rincon clay loam (0–2% slopes)</td>
<td>9.5</td>
</tr>
<tr>
<td>Rincon clay loam (2–9% slopes)</td>
<td>0.2</td>
</tr>
<tr>
<td>Water</td>
<td>0.3</td>
</tr>
</tbody>
</table>

The prominent soil types in the Deer Valley West Unit are Los Gatos loam, found along the ridge that divides the unit, and is associated with blue oak woodland habitat and Altamont clay and Rincon clay loam soils in the hills and valley below the blue oak woodland. Capay clay and Altamont-Fontana complex soils comprise much of the southeastern corner of the Deer Valley West Unit where an intermittent drainage is located.

2.3 Land Cover

Acreages of each land cover type and linear feet of intermittent drainages on each unit in the HMU are provided in Table 2-2. The land cover data used in this HMP are based on the Preliminary Habitat Assessments of the units (ESA 2010a, 2010b; Appendix A). Each land cover type is described in further detail below.
Figure 2-1
Los Vaqueros Expansion Project
Marsh Creek HMU
Table 2-2. Land Cover Acreages and Linear Feet of Drainages in the Marsh Creek Watershed Habitat Management Unit

<table>
<thead>
<tr>
<th>Land Cover</th>
<th>Acres by Unit</th>
<th>Deer Valley East</th>
<th>Deer Valley West</th>
<th>HMU Total (acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual grassland</td>
<td></td>
<td>325.0</td>
<td>530.7</td>
<td>855.7</td>
</tr>
<tr>
<td>Alkali grassland</td>
<td></td>
<td>9.6</td>
<td>9.5</td>
<td>19.1</td>
</tr>
<tr>
<td>Perennial bunchgrass grassland</td>
<td></td>
<td>2.2</td>
<td>–</td>
<td>2.2</td>
</tr>
<tr>
<td>Blue oak woodland</td>
<td></td>
<td>–</td>
<td>110.2</td>
<td>110.2</td>
</tr>
<tr>
<td>Seasonal wetland</td>
<td></td>
<td>0.7</td>
<td>7.4</td>
<td>8.1</td>
</tr>
<tr>
<td>Saltgrass seasonal wetland</td>
<td></td>
<td>0.3</td>
<td>–</td>
<td>0.3</td>
</tr>
<tr>
<td>Northern claypan vernal pool</td>
<td></td>
<td>0.05</td>
<td>–</td>
<td>0.05</td>
</tr>
<tr>
<td>Pond</td>
<td></td>
<td>0.37</td>
<td>0.2</td>
<td>0.57</td>
</tr>
<tr>
<td>Ruderal</td>
<td></td>
<td>1.6</td>
<td>–</td>
<td>1.6</td>
</tr>
<tr>
<td>Intermittent drainages(^a)</td>
<td></td>
<td>1,703.5 (lf)</td>
<td>5,707.3 (lf)</td>
<td>7,410.8 (lf)</td>
</tr>
<tr>
<td><strong>Total acres</strong></td>
<td></td>
<td>340</td>
<td>658</td>
<td>998</td>
</tr>
</tbody>
</table>

\(^a\) Linear feet for drainages are not included in land cover totals.

### 2.3.1 Grassland

There are approximately 877 acres of grasslands mapped on the Marsh Creek Watershed HMU. This includes 855.7 acres of annual grassland, 19.1 acres of alkali grassland, and 2.2 acres of perennial bunchgrass grassland. Grassland types found on the Marsh Creek Watershed HMU are briefly described below.

**Annual Grassland**

Annual grassland is the predominant land cover type on the Marsh Creek Watershed HMU. These grasslands are dominated by nonnative annual species. These species were introduced as early as 1760 by unassisted migration or by transport in the belongings or livestock of travelers from the Spanish settlements outside of California or in ship’s cargo of coastal explorers. These nonnative plant invaders included very aggressive annual grasses and forbs from the grasslands of the Mediterranean region that quickly replaced native species, both with and without the influence of livestock grazing (Hendry 1931; Blumler 1992; Bartolome et al. 2007). Common species found in annual grassland in the HMU include nonnative grasses such as soft brome (*Bromus hordeaceus*), ripgut brome (*Bromus diandrus*), Italian ryegrass (*Lolium multiflorum*), wild oat (*Avena* sp.), barley (*Hordeum* sp.), and rattle fescue (*Vulpia myuros*) and native forbs including pitgland tarweed (*Holocarpha virgata* ssp. *virgata*), and turkey mullein (*Croton [Eremocarpus] setigerus*). Other forbs observed in the HMU include native species such as hayfield tarweed (*Hemizonia congesta* ssp. *luzulifolia*), gumweed (*Grindelia* sp.), and vinegar weed (*Trichostema lanceolatum*) and nonnative species such as milk thistle (*Silybum marinum*), Italian thistle (*Carduus pycnocephalus*), black mustard (*Brassica nigra*), yellow star thistle (*Centaurea solstitialis*), and wild radish (*Raphanus sativus*). Dense populations of yellow star thistle and medusahead (*Taeniatherum caput-medusae*)
occur in annual grassland in both units of the HMU. Scattered blue oak trees (*Quercus douglasii*) and valley oak (*Quercus lobata*) trees also occur in annual grassland in the HMU.

### Alkali Grassland

Alkali grassland in the Deer Valley East Unit is concentrated in the southern portion of the unit and is associated with seasonal wetlands and an intermittent drainage that runs east to west across the unit. Although 9.6 acres of alkali grassland were mapped in the northeastern portion of Deer Valley West by ESA in 2010 (ESA 2010b), the majority of this area was cultivated for safflower production in the winter of 2010/2011. In October 2011, this area consisted of recently disked bare ground. During coordination with the Wildlife Agencies during the Planning and Inventory Period it was determined to leave this disked section fallow during the 2011–2012 winter and to monitor the site for botanical resources in spring 2012.

Alkali grassland is characterized by species able to tolerate alkaline soils and includes a mixture of native and nonnative grasses and forbs. Within the HMU, alkali grasslands are closely associated with the Pescadero clay soil series. Species observed in alkali grassland in the Deer Valley West Unit during preliminary habitat assessments in October 2010, prior to the area being cultivated, included saltgrass (*Distichlis spicata*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), and alkali heath (*Frankenia salina*) (ESA 2010b). Prior to being cultivated, alkali scalds or barren areas with salt-encrusted soil surfaces were observed throughout alkali grassland in the Deer Valley West Unit (ESA 2010b). In addition to the species observed in alkali grassland in the Deer Valley West Unit, species observed in alkali grassland in the Deer Valley East Unit included sickle grass (*Parapholis incurva*), alkali mallow (*Malvella leprosa*), crownscale (*Atriplex coronata* var. *coronata*), and silverscale (*Atriplex argentea* var. *mohavensis*).

### Perennial Bunchgrass Grassland

Native perennial bunchgrass grassland occurs on a steep, north-facing slope on the southern end of the Deer Valley East Unit. Perennial native bunchgrasses, primarily needle grass (*Nassella* sp.) provide greater than 20% cover in this area (ESA 2010a). Other species observed in this area include common hareleaf (*Lagophylla ramosissima*), yarrow (*Achillea millefolium*), and nonnative annual grasses including soft brome, wild oats, and rattail fescue. Additionally, a relatively dense patch of medusahead, a highly invasive grass species, occurs on the east side of the perennial bunchgrass grassland. Smaller patches of native perennial bunchgrasses were also observed on north-facing slopes of the northern portion of the Deer Valley West Unit and on a south-facing slope in the southern portion of the Deer Valley West Unit. However, these areas were relatively small and cover of native bunchgrasses was typically less than 5%.

#### 2.3.2 Blue Oak Woodland

Blue oak woodland covers approximately 110.2 acres along a ridge top in the center of the Deer Valley West Unit. Blue oak woodland is dominated by blue oak trees, although a few buckeye (*Aesculus californica*), valley oak, pine (*Pinus* sp.), and eucalyptus (*Eucalyptus* sp.) trees are found scattered throughout this land cover type. The site potential assessment at the beginning of the Interim Management Period will identify specific areas where an increase in oak recruitment is
Grass species typical of the annual grassland land cover type occur in the understory of blue oak woodland in the HMU. Blue oak woodland is generally associated with shallow, rocky, infertile and well-drained soils. In the Marsh Creek Watershed HMU blue oak woodland is found primarily on the Los Gatos Loam soils (ESA 2010b).

2.3.3 Wetlands

Seasonal Wetland

Not including saltgrass seasonal wetlands (described below), the total seasonal wetland acreage mapped in the HMU is 8.1 acres\(^2\). This includes approximately 0.7 acre in the Deer Valley East Unit and 7.4 acres in the Deer Valley West Unit. Several small seasonal wetlands are located primarily on Pescadero clay soils in alkali grassland along the intermittent drainage in the southern part of the Deer Valley East Unit. Approximately 7.4 acres of shallow seasonal wetlands were mapped in annual grassland in the northwestern portion of the Deer Valley West Unit. During the preliminary habitat assessment conducted by ESA in September and October 2010, seasonal wetlands in the HMU were differentiated from the surrounding grasslands by the sparse vegetative cover and the lack or low cover of nonnative forbs (ESA 2010a, 2010b).

Seasonal wetlands in the intermittent drainage on the Deer Valley East Unit are found in lower elevations suggesting that water ponds in these areas for longer periods than in the rest of the drainage (ESA 2010a). Species observed in seasonal wetland habitat in the HMU include crownscale, toad rush (*Juncus bufonius*), saltgrass, sicklegrass, and rabbitsfoot grass (*Polypogon monspeliensis*).

Ponds

There are six ponds in the HMU ranging in size from approximately 0.04 to 0.3 acre, and totaling approximately 0.57 acre. Pond habitat in the HMU consists of stockponds that have been created or expanded for livestock use. Stock ponds in the HMU were utilized by livestock such that limited emergent vegetation remained.

There are three stock ponds in the Deer Valley East Unit and three stock ponds in the Deer Valley West Unit. The 0.37 acre of pond habitat in Deer Valley East include a 0.2- acre pond in the southern portion of the unit, a 0.04-acre pond in the center of the unit and a 0.13-acre pond in the northeast corner of the unit. The southern pond appears to capture runoff from the intermittent drainage that crosses the Deer Valley East Unit. Both the ponds in the central and northern portion of the unit capture only surface runoff and appear to hold water only seasonally. The approximately 0.2 acre of pond habitat in the Deer Valley West Unit includes a small (<0.1 acre) stock pond in the middle of blue oak woodland at the center of the unit and two ponds associated with the intermittent drainage in the southwest portion of the unit. The two ponds along the drainage on the southern part of the unit have eroded and are likely not functioning as originally intended.

---

\(^2\) A formal wetland delineation has not been conducted for the HMU; therefore acreages of wetland habitats are approximations.
Saltgrass Seasonal Wetland

Two small saltgrass seasonal wetlands, covering approximately 0.3 acre, were mapped on Pescadero clay loam soils in alkali grassland in the Deer Valley East Unit (ESA 2010a). These saltgrass seasonal wetlands are located on the southeastern portion of the unit and appear to have formed due to disruption of hydrology of the intermittent drainage due to construction of a pond along this drainage. These saltgrass seasonal wetlands are essentially linear vegetated swales that are characterized by low to moderate cover of facultative and obligate wetland species including alkali heath, sicklegrass, Mediterranean barley, saltgrass, swamp pricklygrass (Crypsis schoenoides), and rabbitsfoot grass.

Northern Claypan Vernal Pool

Several small areas of northern claypan vernal pool were mapped in the Marsh Creek HMU in the southeast corner of the Deer Valley East Unit (ESA 2010a). These small patches, covering approximately, 0.05 acre, are scattered in alkali grassland in the southeast corner of the unit. These vernal pool areas are similar to the seasonal wetlands found in the Deer Valley East Unit because they have lower vegetative cover than surrounding grasslands; however, they are distinguished from seasonal wetland by their vegetative composition. Plant species found in northern claypan vernal pool habitat in the HMU include vernal pool mousetail (Myosurus sessilis), woolly marbles (Psilocarphus brevissimus var. brevissimus), popcornflower (Plagiobothrys stipitatus and P. greenei), toad rush, and coyote thistle (Eryngium sp.).

2.3.4 Riverine and Riparian

Two intermittent drainages occur in the HMU, one in the southwestern portion of the Deer Valley West Unit and one flowing east to west in the southern portion of the Deer Valley East Unit. Scattered valley oak, buckeye, and willow (Salix sp.) trees are found along the intermittent drainage in the Deer Valley West Unit. Native forb and grass species along the banks of this drainage include saltgrass, common cocklebur (Xanthium strumarium), creeping wildrye (Leymus triticoides), western goldentop (Euthamia occidentalis), mugwort (Artemisia douglasiana), and narrow leaf milkweed (Asclepias fascicularis). Cattail (Typha sp.) and bulrush (Bolboschoenus sp.) also occur in a deep pool near the southeast corner of the drainage. Nonnative invasive species including perennial pepperweed (Lepidium latifolium), yellow star thistle, Italian thistle, medusahead, and artichoke thistle (Cynara cardunculus) also occur, often in dense patches, along the intermittent drainage in the Deer Valley West Unit.

The intermittent drainage in the Deer Valley East Unit appears to have been straightened, presumably in order to supply water to a large excavated stock pond (ESA 2010a). Additionally, upstream hydrology of this drainage has been altered due to construction of residential houses to the west of the unit. Water enters the site through a culvert under Deer Valley Road and exits under Briones Valley Road where it flows into Dry Creek. This drainage is largely unvegetated, but herbaceous species including soft brome, alkali heath, saltgrass, and rabbitsfoot grass occur along the banks.
In some areas of the HMU the drainages are highly incised with erosive banks, especially within the Deer Valley West Unit. This is most likely caused by earthwork that was done at some point in the past to create large embankments near the channel. There was evidence that cattle use has affected the intermittent drainages within the HMU including trails observed through the drainages and slumping banks.

2.3.5 Ruderal

Approximately 1.6 acres of ruderal habitat are mapped in the Marsh Creek Watershed HMU, all located in the Deer Valley East Unit. This patch of ruderal habitat occurs in the northwestern portion of Deer Valley East, east of the northern stock pond and west of a housing development that is adjacent to the unit. Ruderal habitat is dominated by nonnative invasive forbs including yellow star thistle, black mustard, and stinkwort (*Dittrichia graveolens*).

2.4 Species Overview

Habitat for four federally and state-listed wildlife species—California tiger salamander, California red-legged frog, Alameda whipsnake, and San Joaquin kit fox—was affected by the Los Vaqueros Reservoir Expansion Project. Preserving and enhancing habitat for these four species is the primary management goal for the Mitigation Lands. Potential habitat for three of these species is found in the Marsh Creek Watershed HMU.

2.5 San Joaquin Kit Fox

Open, grazed grasslands are the primary habitat for San Joaquin kit fox denning, foraging, and dispersal. All 877 acres of open grassland habitat are suitable for San Joaquin kit fox in the HMU. Kit fox could also potentially use the HMU as a movement corridor. The Marsh Creek Watershed HMU is in an area of high conservation priority in the ECCC HCP/NCCP and connects several existing protected areas to complete an important linkage for the San Joaquin kit fox.

One occurrence of San Joaquin kit fox has been recorded from the vicinity of the HMU, near Deer Valley East (California Department of Fish and Game 2011). This 1975 occurrence was reported from the Briones Valley, which is adjacent to the southern portion of the Deer Valley East Unit. Although no kit fox have been reported in the HMU recently, burrows that could serve as dens and preferred prey were observed during preliminary habitat assessment surveys. The Marsh Creek Watershed HMU is also thought to provide a movement corridor for kit fox from the Byron and Altamont hills into the foothills of the northern Diablo Range (ESA 2010a).
2.6 California Tiger Salamander

Habitat for the federally and state-listed threatened California tiger salamander includes vernal pools and seasonal and perennial ponds, including artificial water bodies such as stock ponds, for breeding habitat and surrounding upland grassland habitat for aestival (Federal Register 69 (149):47212–47248). Burrows of California ground squirrels and Botta’s pocket gophers are commonly used by California tiger salamander as underground refuge sites. Although most of the adult tiger salamander’s life is spent in burrows within upland habitat, ponds and pools of sufficient depth and duration of ponding are required for breeding.

Although the California tiger salamander has not been documented in the Marsh Creek Watershed HMU, the area contains highly suitable upland and breeding habitat for this species. Several occurrences of California tiger salamander have been recorded within the vicinity of the HMU (California Department of Fish and Game 2011). These include observations from 1993 of California tiger salamanders breeding in a pool in Dry Creek just downstream of the Deer Valley East Unit and from a creek just to the south of the Deer Valley East Unit near the intersection of Briones Valley Road and Deer Valley Road.

Annual grassland, alkali grassland, and seasonal wetland habitat in the HMU provide upland refugia habitat during the dry season and during movement periods. Small burrows, suitable for underground refugia are found throughout alkali and annual grassland and blue oak woodland habitat in the HMU though ground squirrel burrows were not widely distributed. All three ponds in the Deer Valley East Unit of the HMU provide suitable breeding habitat. The three ponds in the Deer Valley West Unit may provide breeding habitat, though the two southern ponds along the intermittent drainage do not function properly and the northern pond is small, likely shortening the ponding duration. Pools found in and along the intermittent drainages in the HMU are also deep enough and may retain water for substantial periods to provide potential California tiger salamander breeding habitat.

2.7 California Red-Legged Frog

Breeding habitat for the California red-legged frog, a federally listed threatened species and a California species of concern, includes permanent or semi-permanent water in various aquatic and riparian habitats, including artificial water bodies such as stock ponds (U.S. Fish and Wildlife Service 2002). Although red-legged frogs appear to prefer areas of water with relatively dense woody riparian or emergent vegetation, they have also been observed in areas lacking riparian or emergent vegetation. Upland and riparian areas are used for foraging, dispersal, and refuge. During dry periods red-legged frogs will seek refuge in areas including under boulders, rocks, downed wood, and moist leaf litter and in small mammal burrows (U.S. Fish and Wildlife Service 2002).

California red-legged frogs have not been documented as occurring in the HMU though suitable habitat exists on both units. There are four documented occurrences of red-legged frog within 1 mile of the HMU (California Department of Fish and Game 2011). The closest observation is from 1982 in Marsh Creek approximately 0.7 mile southwest of the Deer Valley West Unit. The most
recent observation is from 2009 in a pond on the Roddy Ranch golf course approximately 0.8 mile north of the Deer Valley West Unit (California Department of Fish and Game 2011).

Pools in the intermittent drainages in the HMU provide red-legged frog breeding habitat. Despite, the lack of emergent vegetation, the large stock pond on the southern portion of the Deer Valley East Unit provides potential California red-legged frog habitat. The two stock ponds associated with the intermittent drainage in the Deer Valley West Unit do not currently provide California red-legged frog breeding habitat due to their disconnection from the stream channel and failing berms. Alkali and annual grassland habitat adjacent to wetland and stream features in the HMU also provide foraging, dispersal, and refugia habitat for red-legged frog during the non-breeding season.

2.8 Other Special-Status Species

The following sections discuss the wildlife and plant species that are not included in the compensatory mitigation program required in the permits for the Los Vaqueros Reservoir Expansion Project and there are no specific enhancement or monitoring requirements associated with them. However, the District will ensure their protection and it is anticipated they will benefit from management actions taken for covered species.

2.8.1 Special-Status Wildlife Species

Three special-status wildlife species, western burrowing owl (*Athene cunicularia hypugea*), Swainson’s hawk (*Buteo swainsoni*), and vernal pool fairy shrimp (*Branchinecta lynchii*), have been observed in the Marsh Creek Watershed HMU.

**Western Burrowing Owl**

Western burrowing owl is a California species of special concern. Burrowing owls are typically found in dry, open, low-growing grasslands and typically nest in burrows created by small mammals such as ground squirrels and pocket gophers. This species is most active at dawn and dusk and preferred prey includes small mammals, insects, and lizards. A single burrowing owl was observed in annual grassland in the northern portion of the Deer Valley West Unit during preliminary habitat assessments in October 2010 (ESA 2010b). The management actions provided below which will enhance habitat for San Joaquin kit fox, California red-legged frog, and California tiger salamander will similarly enhance habitat for western burrowing owl.

**Swainson’s Hawk**

Swainson’s hawk is a state-listed threatened species. Swainson’s hawk is a medium-sized hawk that primarily forages in open grasslands. Although this species often nests in trees adjacent to riparian features, they are also known to use lone trees in agricultural fields, pastures, or grasslands in suitable foraging habitat. A nesting Swainson’s hawk was observed in the Deer Valley West Unit of this HMU in 2012. It was never determined if the nest fledged any young but a nest was built and tended for a period of time. No specific enhancement actions are planned for Swainson’s hawk, but
the District will ensure their protection and they will likely benefit from management actions within the HMUs.

**Vernal Pool Fairy Shrimp**

The vernal pools described in earlier sections of this chapter provide habitat for vernal pool fairy shrimp and vernal pool fairy shrimp have been documented within small pools within the alkali grassland in the Deer Valley West Unit. There are no planned enhancements for these vernal pools except for low-intensity enhancements related to a managed grazing program. There are additional opportunities on both units to increase the value of the vernal pools for vernal pool fairy shrimp through expansion or deepening of the pools.

### 2.8.2 Special-Status Plant Species

One special-status plant species has been observed on the Marsh Creek Watershed HMU. This species is discussed briefly below. It is possible that San Joaquin spearscale (*Atriplex joaquinana*) also occurs in the HMU, though no surveys have been conducted for it to date.

**Crowscale**

Crowscale, a California Native Plant Society (CNPS) California Rare Plant Rank 4.2 species, is an annual herb in the goosefoot (Chenopodiaceae) family. California Rare Plant Rank 4 species are considered uncommon, or of limited distribution in California, but are generally not eligible for state listing.

This species is typically found in chenopod scrub, grassland, and alkaline or clay vernal pools. Several populations of crowscale were observed in alkali grassland habitat in the southeastern portion of the Deer Valley East Unit during preliminary habitat assessment surveys in September 2010 (ESA 2010a). Management actions planned for that portion of the unit will be implemented in a way that will not negatively affect the crowscale populations.

### 2.9 Interim Management Plan

The goals, objectives, and management actions outlined in this chapter will be carried out during the Interim Management Period (i.e., the first 5 years following plan approval). Goals, objectives, and management actions are given unique identifiers within each HMU. For example each goal, objective, and management action within the Marsh Creek Watershed HMU is given a number that includes MC, which stands for Marsh Creek. This is done so that each activity can be easily referenced later in the document. The Long-Term Management Program for all HMUs is presented in Chapter 7.
2.9.1 Element MC1 – Grasslands and Oak Woodlands

**Goal MC1**—Enhance and maintain rangeland health to provide habitat for native plants and animals and minimize invasive plants in all grasslands and oak woodlands in the HMU.

**Objective MC1**—Develop and implement annual grazing plans which consider the timing, duration, and intensity of livestock grazing needed to protect soil, support plant germination, control nonnative species, and provide opportunities for expansion of native plant species, while maintaining upland habitat for California tiger salamander, California red-legged frog, Alameda whipsnake, and San Joaquin kit fox.

**Management Action MC-MA1**—Through controlled grazing, managers will seek to maintain an average residual dry matter (RDM) of between 800 to 1,200 pounds per acre but no less than 500 lbs/acre on level and low slopes, and at least 800 lbs/acre on steep slopes in the fall to protect overall rangeland health. Also maintain herbaceous (grass and forbs) height (measured as obstruction using a Robel pole) below the maximum—no more than 12 inches year-round (measured in both spring and fall), regardless of slope, to retain habitat for native wildlife. Favorable weather conditions often make the herbaceous vegetation grow very rapidly, beyond the control of typical grazing operations. Thus spring herbaceous height may exceed the standard for short periods if average or above average rainfall occurs in the previous rain year. In order to keep grass shorter than 12 inches as often as feasible, the rangeland managers and grazing operators will plan for flexibility and be able to respond quickly to changing conditions, such as designating flexible-use fields to allow more precise grazing management of the designated habitat areas, and developing more watering facilities to better distribute grazing.

**MC-MA1 Monitoring Protocol**

- Conduct visual monitoring of RDM levels across each unit annually to determine trends and areas of variation that may warrant changes in grazing practices.

- Establish at least four RDM monitoring points on each unit (Deer Valley East and Deer Valley West) for a total of eight monitoring points for the HMU, appropriately located to capture a representative subset of the slopes in the unit. Record visual estimates of RDM levels at each location annually, between October 1 and November 15.

- Conduct photo documentation annually for at least four points on each unit during the RDM surveys.

- Conduct springtime grass height assessment during April 1 – May 31 (see MC-MA2 below).

- Visually assess the presence of ground squirrels at each rangeland monitoring location and document presence/absence.

- Establish additional monitoring locations including photo points, if necessary, to capture unique features of the HMU or to specifically investigate grazing levels in a particular location.
**MC-MA1 Performance Standards**

- Maintain RDM levels of at least 500 lbs/acre on low and level slopes and at least 800 lbs/acre on steep slopes.

- Maintain grass height less than 12 inches obstruction height (measured using a Robel pole), regardless of slope, year-round.

**MC-MA1 Adaptive Management**

- If performance standards are not being met the District will work with the grazing tenant to modify grazing management on the site. This could be a combination of changes during the spring and summer, if grass height requirements are not being met, or changes from year to year, if RDM standards are not being met. For example, starting grazing later to allow early forage growth, extending the grazing end date for late season growth, changing the species used for grazing from selective to non-selective grazers, moving water troughs to redistribute grazing pressure.

- In addition to changes in grazing from year to year in response to climate conditions, the District and grazing operators will stay apprised of research on managing grasslands for threatened and endangered species using grazing, and adapt annual grazing plans to always include the best available science in rangeland management.

**MC-MA1 Reporting Requirements**

The following items will be included in the annual report submitted to the Wildlife Agencies.

- Records of visual estimates of RDM and average grass height at each monitoring location.

- Locations where RDM and grass height objectives are unable to be met due to constraints beyond the control of the District or the grazing operator and a brief description of those constraints.

- Photos taken at each monitoring location.

- Presence or absence of ground squirrels in the HMU annually and any noticeable changes in the extent of the population from year to year.

- Any year-to-year changes in annual grazing practices based on visual RDM estimates and grass height monitoring.

**Management Action MC-MA2**—Conduct springtime visual monitoring of available forage to allow for inter-annual adjustments to grazing practices. This will ensure grassland habitat will remain suitable for San Joaquin kit fox, California tiger salamander, and California red-legged frog through the summer months.

**MC-MA2 Monitoring Protocol**

- Conduct visual monitoring annually (April–May) of grass height (obstruction height monitoring using a Robel pole) and forage availability across each unit to determine trends and areas of variation that may warrant changes in grazing practices. Such changes could be seasonal or
temporary, to account for short-term conditions such as drought, or long-term, to account for cumulative vegetation response.

- Establish four visual monitoring stations in each unit, preferably the same four that are used for RDM monitoring, appropriately located to capture a representative subset of the slopes in the HMU. Record visual estimates of grass height at these four locations annually in the spring.
- Conduct photo documentation at these four locations during springtime grass height surveys.
- Establish additional monitoring locations, if necessary, to capture unique features of the HMU or to specifically investigate forage levels in a particular location.

**MC-MA2 Performance Standards**

- Maintain grass height less than 12 inches (obstruction height measures using a Robel pole), regardless of slope.

**MC-MA2 Adaptive Management**

- If performance standards are not being met the District will work with the grazing tenant to modify grazing management on the site. This could be a combination of changes during the spring and summer, if grass height requirements are not being met, or changes from year to year, if RDM standards are not being met.
- In addition to changes in grazing from year to year in response to climate conditions, the District and grazing operators will stay apprised of research on managing grasslands for threatened and endangered species using grazing, and adapt annual grazing plans to always include the best available science in rangeland management.

**MC-MA2 Reporting Requirements**

- Submit records of visual estimates of average grass height at each monitoring location.
- Submit photos taken at each monitoring location.
- Report any inter-annual changes in grazing practices that are observed during visual springtime forage monitoring.

**Management Action MC-MA3**—Utilize Integrated Pest Management strategies for control, containment, and/or prevention of California Invasive Plant Council (Cal-IPC)\(^3\) listed invasive plants with an “Impact” or “Invasiveness” rating of High for the region and those that pose ecological threat to habitat in the HMU. These strategies include but are not limited to the following.

- Containment strategy for stinkwort.
- Control strategy (timing and intensity of grazing) for medusahead.
- Control strategy for yellow star thistle, which may include grazing and/or herbicides.

---

\(^3\) The California Invasive Plant Council (Cal-IPC) maintains an Invasive Plant Inventory (California Invasive Plant Council 2006, 2007) that lists and prioritizes for control of invasive plant species based on an assessment of their ecological impacts. Definitions can be found here: [http://www.cal-ipc.org/ip/inventory/index.php#definitions](http://www.cal-ipc.org/ip/inventory/index.php#definitions).
MC-MA3 Monitoring Protocol

- Document baseline extent of Cal-IPC listed invasive plants with an “Impact” or “Invasiveness” rating of High and those that pose an ecological threat to habitat in the HMU.
- Determine two highest priority areas in each unit where infestations are threatening the ecology of the site (i.e., aggressive species, particularly dense infestations) and use these areas as indicator sites for invasive plant monitoring.
- Regardless of size of infestation, establish a third study plot in the previously cultivated area in the northeast corner of the Deer Valley West Unit, to monitor the recovery of that area.
- Establish photo documentation points in each of these five indicator sites.
- Conduct visual monitoring and photo documentation of these five indicator sites annually.
- At the end of Year 5 conduct another survey of all Cal-IPC listed invasive plant species (as defined above) on each unit to compare against baseline and adjust management activities and monitoring locations accordingly if priorities have changed.

MC-MA3 Performance Standards

- Reduce all Cal-IPC listed plant infestations and infestations of species that pose an ecological threat to habitat in the HMU which are ranked as high density (51–100% of stand) during baseline survey to medium (26–50%) or low density (6–25%)\(^4\).
- Reduce all Cal-IPC listed plant infestations and infestations of species that pose an ecological threat to habitat in the HMU which are ranked as medium density during baseline survey to low density.
- Maintain all Cal-IPC listed plant infestations and infestations of species that pose an ecological threat to habitat in the HMU which are ranked as low density during baseline survey to no greater than low density level.

MC-MA3 Adaptive Management

- Adaptive management is built into the Control, Containment, and Prevention strategy for invasive plant species. Should control techniques fail initially, revised techniques will be implemented until success criteria are met. Changes in control strategy will be discussed with invasive plant species control specialists and other land managers in the region to ensure the best management techniques are being utilized.

MC-MA3 Reporting Requirements

- Submit annual report on methods used to contain and control invasive plants during the prior year, including herbicide application type and rates, specific grazing regimes, etc.
- Include initial assessment of success of all non-grazing invasive species control methods, particularly herbicide application.

---

\(^4\) Density estimates will be calibrated between field staff using a visual aid such as www.birds.cornell.edu/bfl/percentcover.pdf, or a similar publication.
• Submit records of invasive plant density visual estimates at the five monitoring locations.
• Submit photos taken at each monitoring location.

**Objective MC2**—Enhance and expand (where appropriate) existing oak woodland habitat by increasing oak recruitment in oak woodland in the Deer Valley West Unit.

**Management Action MC-MA4**—Modify annual grazing plan as necessary to ensure that oaks can regenerate within existing oak woodland in the Deer Valley West Unit, provide supplemental oak plantings where natural recruitment does not seem feasible by Year 5, remove eucalyptus trees from existing oak stand.

**MC-MA4 Monitoring Protocol**
• Document baseline extent and average age class of oaks in the Deer Valley West Unit and determine limiting factors for lack of recruitment.
• Conduct annual visual monitoring of stand to determine if recruitment is occurring.
• Select two locations within stand where several young oak seedlings or saplings can be flagged and monitored annually for survivorship.
• Conduct annual photo monitoring of young oaks at the site to document plant condition.
• Determine if there are areas where additional planting could occur to increase acres of oak woodland.

**MC-MA4 Performance Standards**
• Realize a net increase in oak recruitment in the Deer Valley West Unit over the life of the permit.
• Remove eucalyptus trees from the existing oak stand by Year 5.

**MC-MA4 Adaptive Management**
• By Year 5, if recruitment of young oaks into the population is not occurring based on annual monitoring or does not seem feasible due to identification of limiting factors, the District will complete and execute a focused oak woodland enhancement plan for the Deer Valley West Unit that could include plantings or other methods to increase oak recruitment at the site.

**MC-MA4 Reporting Requirements**
• Annual summary of natural oak recruitment progress.
• Representative photos of various age classes of oaks observed at the site.
2.9.2 **Element MC2 – Ponds, Wetlands, and Riparian**

**Goal MC2**—Increase acres of wetland habitat and enhance and maintain ponds, wetlands and riparian areas in the HMU.

**Objective MC3**—Restore at least 0.68 acres of seasonal wetland habitat in HMU as shown in Appendix B, *Conceptual Wetland Design for Marsh Creek Watershed HMU*, while retaining and enhancing existing ponds, wetlands, and riparian areas to maximize freshwater permanent emergent wetland habitat.

**Management Action MC-MA5**—Expand the existing seasonal wetland area in the Deer Valley East Unit by excavating an area just off channel that could hold water seasonally and will sustain at least an additional 0.68 acres of seasonal wetland habitat (Appendix B).

**MC-MA5 Monitoring Protocol**
- Delineate baseline extent of seasonal wetland in the Deer Valley East Unit.
- Establish photo documentation points in restoration area.
- For the first year following wetland restoration conduct quarterly inspections of the site to determine whether grazing animals are affecting plant establishment.
- In Years 1 and 2, following completion of restoration, conduct annual photo monitoring to provide visual documentation of site functionality.
- In Years 3–5 conduct annual monitoring program to determine percent cover of plantings installed in the restoration area. Sampling methods should be selected that are most appropriate for species composition of the restoration site (e.g., line transects, quadrats).

**MC-MA5 Performance Standards**
- Establish and retain at least 0.68 acres of seasonal wetland above baseline condition in the Deer Valley East Unit of the HMU by Year 5.
- By Year 5 following restoration, achieve vegetative cover that is similar to that observed in a nearby reference site.

**MC-MA5 Adaptive Management**
- If an additional 0.68 acres of seasonal wetland habitat is not being sustained 5 years after the restoration is complete the District will determine the cause of failure for the restoration site and remedial actions will be completed.
- If remedial actions cannot regain the functionality of the wetland feature the District will coordinate with the Wildlife Agencies on corrective actions.

---

5 The *Los Vaqueros Reservoir Expansion Project – Draft Wetland Compensatory Mitigation Plan* (January 2011) states that 0.60 acre of freshwater permanent emergent wetland restoration will be distributed across HMU lands. This will be accomplished predominantly through grazing management aimed at allowing existing features to expand.
• If at any point it is determined that grazing animals are having a negative effect on wetland function (e.g., the vegetation appears to be overgrazed in comparison to the reference site, substantial erosion is occurring) they will be excluded to let wetlands recover. This may be done annually if the issue persists.

**MC-MA5 Reporting Requirements**

• Submit initial delineation of seasonal wetlands in the Deer Valley East Unit.

• For the first 2 years following restoration, submit annual report that includes photos of restoration site taken from photo monitoring points.

• In Years 3–5, submit annual report that includes results from vegetation cover surveys and photos from monitoring points.

• Submit annual report on methods used to contain and control invasive species during each year if actions were necessary.

• Submit information on any land management modifications that were required (e.g., grazing) during the year based on observations during wetland monitoring.

**Management Action MC-MA6**—Preserve, enhance, and/or restore existing ponds, wetlands, and riparian areas to maximize freshwater permanent emergent wetland habitat that functions as (or has the potential to function as) native amphibian breeding habitat, especially to maximize habitat suitability for California red-legged frog and/or California tiger salamander. Examples include pest plant control and grazing management that will favor native wetland species, allowing them to establish in additional areas, thus expanding the habitat footprint. Some minimal excavation could occur if it will benefit the species by increasing the ponding duration or add needed depth to a pond to allow California tiger salamander to breed. This will be considered on a site-specific basis.

An assessment will take place in Year 1 to determine if any of the ponds, wetlands, or riparian areas on the HMU can be expanded to support more freshwater permanent emergent wetland habitat.

As discussed under Element MC4, Management Action MC-MA8, and Element MC5, Management Action MC-MA9, below, an assessment will be completed to determine which aquatic features currently support California tiger salamander and California red-legged frog in the first 2 years of the Interim Management Period. Following those surveys a determination will be made about how to manage each aquatic feature so that it provides habitat for either California tiger salamander, California red-legged frog, or both species. The ultimate goal is to maximize habitat potential for both species, but characteristics of each location may favor one species over the other.

Please see Element MC4 and Element MC5 below for more detail on the management actions and monitoring requirements for this Management Action.

**MC-MA6 Monitoring Protocol**

• Use a sub-meter global positioning system (GPS) unit to determine and map the extent of aquatic features and wetland plants—the total baseline extent of any freshwater permanent emergent wetlands that are to be restored in the HMU.
• Establish photo documentation points in any freshwater permanent emergent wetland restoration areas.

• For the first year following wetland restoration conduct quarterly inspections of the site to determine whether grazing animals are affecting plant establishment.

• In Years 1 and 2, following completion of wetland restoration, conduct annual photo monitoring to provide visual documentation of site functionality.

• In Year 3, use a sub-meter GPS unit to determine and map the extent of aquatic features and wetland plants the extent of all freshwater permanent emergent wetlands for a second time to compare to baseline.

**MC-MA6 Performance Standards**

• Performance standards for each freshwater emergent permanent wetland restoration site will be established during conceptual design.

• By Year 3 a net increase in wetland acreage will total 0.6 acre across all HMUs.

**MC-MA6 Adaptive Management**

• If additional acreage of freshwater emergent permanent wetland habitat is not being sustained 3 years after restoration activities are complete, the District will determine the cause of failure of the restoration site and corrective action will be taken to either fix the issue at that site or to attempt restoration at another location.

• If at any point it is determined that grazing animals are having a negative effect on wetland function they will be excluded as needed to let wetlands recover. This may be done annually if the issue persists.

**MC-MA6 Reporting Requirements**

• Submit initial acreage of any wetlands in the HMU that are to be expanded and provide conceptual designs and performance standards for any proposed expansions.

• For the first 2 years following restoration, submit annual report that includes photos of expansion site taken from photo monitoring points.

• In Year 3 submit the current wetland acreage to determine whether wetland restoration activities were successful.

• From Year 3–5 submit photo documentation of wetland restoration site to demonstrate habitat function and quality.

• Submit annual report on methods used to contain and control invasive species during each year if actions were necessary.

• Submit information on any land management modifications that were required (e.g., grazing) during the year based on observations during wetland monitoring.
2.9.3  Element MC3 – San Joaquin Kit Fox

Goal MC3—Maintain a habitat condition in grasslands and oak woodlands that is suitable for San Joaquin kit fox.

Objective MC4—Maintain grassland that is less than 12 inches tall (measured as obstruction height) year-round and supports an abundance of prey species for San Joaquin kit fox.

Management Actions MC-MA1, MC-MA2, and MC-MA3, all discussed above, will be implemented to achieve this objective. Monitoring protocols and performance standards discussed in those sections will be utilized to determine whether this objective is being met on an annual basis.

Objective MC5—Maintain or increase abundance of California ground squirrels in the HMU and passively monitor for presence of San Joaquin kit fox using motion-activated cameras.

Management Action MC-MA7—Eliminate any active rodent control programs (poisons, fumigants, shooting) including those implemented by County and private contractors (lessees) in the HMU, except for targeted application to protect infrastructure (i.e., road embankments, stock pond dams) and allow California ground squirrels to passively repopulate grasslands. Establish a motion-activated camera network to monitor animal movements.

MC-MA7 Monitoring Protocol

- Visually assess the presence of ground squirrels at each rangeland monitoring location and document presence/absence.
- Maintain at least two motion-activated cameras with scent stations on each unit within the HMU to detect San Joaquin kit fox.

MC-MA7 Performance Standards

- Realize a net increase in total number of California ground squirrels and the total number of burrows in the HMU over the life of the permit.
- Place each camera in the HMU for at least 6 months of the year and monitor frequently to ensure proper function.

MC-MA7 Adaptive Management

- If ground squirrels and other burrowing mammals are not returning to the area, determine root cause of problem. Modify grazing rotation if it is determined that adjusting the number of animals concentrated in an area could influence ground squirrel populations.
- Continue to move cameras until it is determined that camera placement is maximizing the detections of wildlife movement in the area.

MC-MA7 Reporting Requirements

- Report presence or absence of ground squirrels in the HMU annually and any noticeable changes in the extent of the population from year to year.
- Any photos of rare species will be included in annual monitoring report along with a summary of the number of camera trap nights and maps of camera station locations. Any photos of San Joaquin kit fox will be reported to the Wildlife Agencies immediately upon verification of sighting.

### 2.9.4 Element MC4 – California Red-Legged Frog

**Goal MC4**—Increase and enhance aquatic and upland habitat for California red-legged frog.

**Objective MC6**—Maintain grassland that is less than 12 inches tall year-round (measured as obstruction height) and maintain or increase abundance of California ground squirrels in the HMU as both grassland height and presence of California ground squirrel burrows are key indicators of high habitat quality for this species.

**Management Actions MC-MA1, MC-MA2, MC-MA3, and MC-MA7**, all discussed above, will be implemented to achieve this objective. Monitoring protocols and performance standards discussed in those sections will be utilized to determine whether this objective is being met on an annual basis.

**Objective MC7**—Retain the functionality of existing California red-legged frog breeding sites and expand the number of breeding locations in the HMU where possible.

**Management Action MC-MA8**—Develop target vegetation cover levels and associated management actions for all pond, wetland, and wetted riparian habitat areas that are not occupied by California red-legged frog, but that hold water for a period sufficient to support breeding of this species. Utilize vegetation cover levels and habitat conditions at occupied aquatic sites that support successful breeding in the HMU or in the vicinity as reference sites.

- Following the completion of California red-legged frog surveys in Years 1 and 2, characterize the vegetation type and cover levels (focusing on emergent vegetation in the water and shade from overhanging vegetation), presence of predators, and general condition of all pond, wetland, and wetted riparian habitat areas that are occupied by California red-legged frog and where successful breeding has been documented.

- Utilize information gathered from occupied locations and available California red-legged frog literature to develop habitat targets (vegetation type, percent cover, and general condition) for similar but unoccupied aquatic habitats in the HMU (e.g., ponds for ponds, riparian areas for riparian areas).

- Use individual assessments for each pond, wetland, and riparian area to determine suitability for California red-legged frog.

- Set vegetation target levels and specific management actions (e.g., predator eradication, cattle exclusion, removal of nonnative plants) based on species need and site conditions. In many cases vegetation target levels may favor one species over another, but in general the goal is to optimize habitat for both California tiger salamander and California red-legged frog, particularly in pond and wetland habitat.
MC-MA8 Monitoring Protocol

- A qualified biologist with Section 10 Scientific Collecting permit will conduct dipnet surveys for California red-legged frog larvae at a representative set of locations (up to seven) with suitable aquatic habitats (water depth and ponding duration sufficient to support breeding) in March/April, and dipnet surveys for metamorphs in September, to determine presence of California red-legged frog in the HMU. Monitoring will occur at a combination of ponds, wetlands, and pools along riparian areas.

- Report bullfrogs (Lithobates catesbeianus) that are present during any aquatic surveys. Conduct a daytime and nighttime survey specifically for bullfrogs and other aquatic predators during the September California red-legged frog surveys.

- Assess general condition of pond, wetland, or riparian feature that supports breeding California red-legged frog for vegetation type and percent cover, plant species present in and around the feature, plant species or other features being utilized for egg attachment, depth, turbidity, and pond temperature.

- Take photos of vegetation cover at all breeding sites during the same visit in which species presence surveys are conducted.

MC-MA8 Performance Standards

- Support breeding California red-legged frog in all pond, wetland, and wetted riparian features that have the natural (or designed, in the case of stock ponds) depth and ponding duration to do so.

- Maintain aquatic habitats free of introduced aquatic predators of California red-legged frog and California tiger salamander.

MC-MA8 Adaptive Management

- If all suitable aquatic features do not support breeding California red-legged frog by Year 5 of the Interim Management Period, the District will conduct a focused study to determine the limiting factors for species presence at the site.

- The results of the limiting factors investigation will be presented to the Wildlife Agencies and the District and Wildlife Agencies will decide on future management actions required to attract California red-legged frog.

MC-MA8 Reporting Requirements

- Submit initial survey results of species presence (life stages observed and survey protocol) and vegetative cover and other site characteristics of occupied aquatic habitat that will be utilized to create metrics for unoccupied aquatic habitats.

- Submit a determination of suitability for California red-legged frog at each aquatic feature and a management strategy for each aquatic feature to either retain the species in the aquatic feature or to attract the species to that aquatic feature.

- Submit photos from monitoring points and results from annual vegetation cover surveys.
2.9.5 Element MC5 – California Tiger Salamander

Goal MC5—Increase and enhance aquatic and upland habitat for California tiger salamander.

Objective MC8—Maintain grassland that is less than 12 inches tall (measured as obstruction height) year-round and maintain or increase abundance of California ground squirrels in the HMU as both grassland height and presence of California ground squirrel burrows are key indicators of high habitat quality for this species.

Management Actions MC-MA1, MC-MA2, MC-MA3, and MC-MA7, all discussed above, will be implemented to achieve this objective. Monitoring protocols and performance standards discussed in those sections will be utilized to determine whether this objective is being met on an annual basis.

Objective MC9—Retain the functionality of existing California tiger salamander breeding sites and expand the number of breeding locations in the HMU where possible.

Management Action MC-MA9—Develop target vegetation cover levels and associated management actions for all ponds and wetlands that are not occupied by California tiger salamander, but that hold water for a period sufficient to support breeding this species. Utilize vegetation cover levels and habitat conditions at sites that support successful breeding in the HMU or vicinity as reference sites.

- Following the completion of California tiger salamander surveys in Years 1 and 2, characterize the vegetation type and cover levels (focusing on emergent vegetation in the water and shade from overhanging vegetation), presence of predators, and general condition of all ponds and wetlands that support successful California tiger salamander breeding.

- Utilize information gathered from occupied locations and available California tiger salamander literature to develop habitat targets (vegetation type, percent cover, and general condition) for similar but unoccupied aquatic habitats in the HMU (e.g., ponds for ponds, wetlands for wetlands).

- Use individual assessments for each pond and wetland to determine suitability for California tiger salamander.

- Set vegetation target levels and specific management actions (e.g., predator eradication, cattle exclusion, nonnative vegetation removal) based on species need and site conditions. In many cases vegetation target levels may favor one species over another, but in general the goal is to optimize habitat for both California tiger salamander and California red-legged frog, particularly in pond and wetland habitat.

MC-MA9 Monitoring Protocol

- An agency permitted biologist will conduct dipnet surveys for California tiger salamander larvae at a representative set of locations (up to six) with suitable aquatic habitats (water depth and ponding duration sufficient to support breeding) in March /April to determine presence of
California tiger salamander in the HMU. Monitoring will occur at a combination of ponds and wetlands.

- Report presence of bullfrogs observed during all aquatic surveys. Conduct a daytime and nighttime survey specifically for bullfrogs and other aquatic predators during the September California red-legged frog surveys.

- Assess general condition of pond and wetland that supports breeding California tiger salamanders for vegetation type and percent cover, plant species present in and around the feature, plant species or other features being utilized for egg attachment, depth, turbidity, and pond temperature.

- Take photos of vegetation cover at all breeding sites during the same visit in which species presence surveys are conducted.

**MC-MA9 Performance Standards**

- Support breeding California tiger salamanders in all pond and wetland features that have the natural (or designed, in the case of stock ponds) depth and ponding duration to do so.

- Maintain aquatic habitats free of introduced aquatic predators of California red-legged frog and California tiger salamander.

**MC-MA9 Adaptive Management**

- If all suitable aquatic features do not support breeding California tiger salamanders by Year 5 of the Interim Management Period the District will conduct a focused study to determine the limiting factors for species presence at the site.

- The results of the focused study will be presented to the Wildlife Agencies and the District and the Wildlife Agencies will decide on future management actions required to try and attract species.

**MC-MA9 Reporting Requirements**

- Submit initial survey results of species presence (life stages observed and survey protocol) and vegetative cover and other site characteristics of occupied aquatic habitat that will be utilized to create metrics for unoccupied aquatic habitats.

- Submit a determination of suitability for California tiger salamander at each aquatic feature and a management strategy for each aquatic feature to either retain the species in the aquatic feature or to attract the species to that aquatic feature.

- Submit photos from monitoring points and results from annual vegetation cover surveys.
2.9.6 Element MC6 – Facility Maintenance

Goal MC6—Maintain infrastructure in working condition to allow for implementation of the HMP.

Objective MC10—Maintain fencing and livestock water sources in the units necessary to meet habitat management goals.

Management Action MC-MA10—Conduct monitoring at least twice per year to ensure timely response to fencing and livestock water source issues.

- Conduct twice yearly inspection of all management-related interior fencing and livestock water sources and coordinate with livestock operators to confirm grazing program is being implemented effectively.
- Remove any unnecessary structures that create a hazard to humans or wildlife.

Management Action MC-MA11—Outline and initiate maintenance schedule for ponds including desilting and, if necessary, draining to control predators.

- Conduct annual inspection of all ponds during first 5 years to determine rate at which ponds are collecting silt. This is particularly important following large rain events. Utilize this information to schedule dredging of ponds or draining, if facilities are built to allow draining, as needed to ensure ponds continue to hold water at proper depth and duration for breeding amphibians and so that populations of bullfrogs do not establish.
Chapter 3
Los Vaqueros Habitat Management Unit

3.1 Geographic Setting and Location

The Los Vaqueros HMU is in eastern Contra Costa County, northeast of the Los Vaqueros Reservoir and southwest of the community of Byron (Figure 1-1, Figure 3-1). The HMU encompasses approximately 80 acres. The HMU is on the Byron Hot Springs USGS 7.5 minute quadrangle.

3.1.1 Parcels and Land Use History

The HMU is zoned for agricultural use and is rangeland grazed by cattle. There is an intermittent drainage that runs through the parcel that is influenced by a stock pond upstream and off of the HMU. There are no signs of previous cultivation in the HMU.

3.2 Physical Factors

3.2.1 Topography

The Los Vaqueros HMU is immediately east of Los Vaqueros watershed lands, on the southeastern flank of the northern Diablo Range and southwest of the Delta. A prominent valley crosses the center of the HMU with rolling hills to the north and south of the valley. Elevations range from approximately 200 feet above msl in the valley to 440 feet above msl in the ridges above the valley.

3.2.2 Climate

The Los Vaqueros HMU is in a region characterized by a Mediterranean climate. Summers tend to be hot and dry and winters long and cool, with precipitation falling as rain during the late fall, winter, and early spring months. Rainfall within the HMU averages 13.2 inches annually and the average annual temperature is 73.3 degrees Fahrenheit.

3.2.3 Soils

There are four soil types found within the Los Vaqueros HMU (Natural Resources Conservation Service 2010) (Table 3-1). The most prominent soil types are the Altamont-Fontana complex and Altamont clay found along the ridgelines and hillslopes in the northern and southern portions of the HMU. The valley and ephemeral drainage in the center portion of the HMU is characterized by Pescadero clay loam soils.
### Table 3-1. Soil Types within the Los Vaqueros Habitat Management Unit

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Percentage of HMU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altamont clay (15–30% slopes)</td>
<td>20.6</td>
</tr>
<tr>
<td>Altamont-Fontana complex (30–50% slopes)</td>
<td>68.3</td>
</tr>
<tr>
<td>Pescadero clay loam</td>
<td>9.4</td>
</tr>
<tr>
<td>Pescadero clay loam, strongly alkali</td>
<td>1.7</td>
</tr>
</tbody>
</table>

### 3.3 Land Cover

Acreages of each land cover type and linear feet of drainages in the HMU are provided in Table 3-2. The land cover data used in this HMP are based on the Preliminary Habitat Assessments of the properties (ESA 2010c; Appendix A). Each land cover type is described in further detail below.

### Table 3-2. Land Cover Acreages and Linear Feet of Drainages on the Los Vaqueros Habitat Management Unit

<table>
<thead>
<tr>
<th>Land Cover</th>
<th>HMU Total (acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual grassland</td>
<td>68.5</td>
</tr>
<tr>
<td>Alkali grassland</td>
<td>3.6</td>
</tr>
<tr>
<td>Seasonal wetland(^a)</td>
<td>1.3</td>
</tr>
<tr>
<td>Silver bush lupine scrub</td>
<td>3.3</td>
</tr>
<tr>
<td>Ruderal</td>
<td>3.3</td>
</tr>
<tr>
<td>Ephemeral drainages(^b)</td>
<td>1,814 (lf)</td>
</tr>
<tr>
<td>Total acres</td>
<td>80.0</td>
</tr>
</tbody>
</table>

\(^a\) A formal wetland delineation has not been conducted for the properties in the HMU; therefore acreages of wetland habitats are approximations.

\(^b\) Linear feet for drainages are not included in land cover totals.

### 3.3.1 Grassland

There are approximately 72.1 acres of grasslands mapped in the Los Vaqueros HMU. This includes 68.5 acres of annual grassland and 3.6 acres of alkali grassland. The grasslands, particularly annual grassland, are dominated by nonnative annual species. These species were introduced as early as 1760 by unassisted migration or by transport in the belongings or livestock of travelers from the Spanish settlements outside of California or in ship’s cargo of coastal explorers. These nonnative plant invaders included very aggressive annual grasses and forbs from the grasslands of the Mediterranean region that quickly replaced native species, both with and without the influence of livestock grazing (Hendry 1931; Blumler 1992; Bartolome et al. 2007). Grassland types found on the Los Vaqueros HMU are briefly described below.
Figure 3-1
Los Vaqueros Expansion Project
Los Vaqueros HMU

November 25, 2013
Base: Bing Maps Aerial, 2013

Open Space
Los Vaqueros HMU

±

0 1,000 2,000 N
Feet
Annual Grassland

Approximately 86% of the Los Vaqueros HMU consists of annual grassland habitat. Annual grasslands on the HMU are associated primarily with Altamont-Fontana complex soils found on the hillslopes. The dominant species in annual grasslands are nonnative annual grasses including soft brome, ripgut brome, Italian ryegrass, wild oat, red brome (Bromus madritensis ssp. rubens), barley, and rattlefescue. The most prevalent herbaceous forbs observed in annual grasslands during the preliminary habitat assessments include pitgland tarweed, and turkey mullein (ESA 2010c). Nonnative species including milk thistle, Italian thistle, black mustard, and wild radish were scattered throughout annual grasslands.

Alkali Grassland

Alkali grassland habitat covers approximately 3.6 acres of the HMU. This land cover type is associated with Pescadero clay soils and is found in the ephemeral drainage that runs east to west through the center of the HMU as well as an ephemeral drainage running north to south in the center portion of the HMU.

Alkali grassland is characterized by species able to tolerate alkaline soils and in the HMU includes a mixture of native and nonnative grasses and forbs. Dominant species observed in alkali grassland include saltgrass, Mediterranean barley, sickle grass, alkali mallow, and alkali heath (ESA 2010c). Two special status plant species, crownscale a CNPS California Rare Plant Rank 4.2 species and San Joaquin spear scale (Atriplex joaquiniana) a CNPS California Rare Plant Rank 1B.2 species, were also present in alkali grasslands (ESA 2010c). Alkali scalds or barren areas with salt-encrusted soil surfaces occur occasionally in alkali grassland habitat in the HMU.

3.3.2 Upland Scrub

Silver Bush Lupine Scrub

One area, covering approximately 3.3 acres, of silver bush lupine (Lupinus albifrons) scrub habitat is found in the HMU. Silver bush lupine, the only shrub species, is sparsely distributed through this land cover type. Gumweed also occurs in the overstory of this habitat type. Although wild oats and other nonnative grasses are dominant in the understory, greater cover and diversity of native forbs are found in upland scrub than in annual grasslands in the HMU. Native forbs present in this area include common yarrow, Ithuriel’s spear (Triteleia sp.), narrow leaf milkweed, turkey mullein, and pitgland tarweed (ESA 2010c).
3.3.3  Wetlands

Saltgrass Seasonal Wetland
Saltgrass seasonal wetlands in the Los Vaqueros HMU are confined to the ephemeral drainages running through the HMU. Approximately 1.3 acres\(^6\) of saltgrass seasonal wetland were mapped in the HMU (ESA 2010c). This type of wetland habitat occurs in and adjacent to the ephemeral drainages of the HMU. Vegetation found in saltgrass seasonal wetlands is similar to that found in alkali grasslands described above; however, soils in these areas remain ponded or saturated longer than in the surrounding alkali grassland. Saltgrass is the dominant species in this habitat type; however, popcornflower (*Plagiobothrys* sp.), spearscale, crownscale and the nonnative invasive perennial pepperweed were also observed in areas with sparser cover of saltgrass.

Saltgrass Alkali Seep
Two small areas found within alkali grasslands in the center portion of the HMU were mapped as alkali seep. Covering approximately 0.03 acre, alkali seeps were differentiated from alkali grassland due to their sparse vegetative cover and indications, such as cow hoofprints and cover of facultative wetland species, that these areas stay wetter longer than the surrounding grasslands. In addition to plant species found in alkali grasslands, popcornflower and swamp pricklygrass were also present in alkali seep habitat.

3.3.4  Riverine and Riparian

Two ephemeral drainages occur in the HMU, one traversing the site from east to west across the center of the HMU and one traversing north to south in the central portion of the HMU. Alkali grasslands and saltgrass seasonal wetland habitat, as described above, occur within and adjacent to the ephemeral drainages. Overflow water from a stock pond located just south of the HMU drains into the north-south running drainage.

3.3.5  Ruderal

Approximately 3.3 acres of ruderal habitat are mapped in the Los Vaqueros HMU. Ruderal habitat is found in the western and northcentral portions of the HMU. Although annual grasses are present, areas mapped as ruderal habitat are dominated by nonnative forbs, particularly black mustard. Other smaller patches of Italian and milk thistle are found in the HMU, but were considered too small to be mapped separately as ruderal habitat and are included in the annual grassland land cover type.

\(^6\) A formal wetland delineation has not been conducted for the HMU; therefore acreages of wetland habitats are approximations.
3.4 Species Overview

Habitat for four federally and state-listed wildlife species—California tiger salamander, California red-legged frog, Alameda whipsnake, and San Joaquin kit fox—was affected by the Los Vaqueros Reservoir Expansion Project. Preserving and enhancing habitat for these four species is the primary management goal for the Mitigation Lands. Potential habitat for three of these species is found in the Los Vaqueros HMU and each of these three species is discussed below.

3.5 San Joaquin Kit Fox

The Los Vaqueros HMU consists of highly suitable San Joaquin kit fox habitat and extends the protected Los Vaqueros watershed lands to the east. Open, grazed grasslands are the primary habitat for San Joaquin kit fox denning, foraging, and dispersal. Approximately 72.1 acres of grassland habitat (both annual grassland and alkali grassland) capable of supporting San Joaquin kit fox are found within the HMU. Additionally, the lower Kellogg Creek area of the Los Vaqueros watershed is adjacent to the west side of the Los Vaqueros HMU and other preserved grasslands (including Vaqueros Farms recently acquired by East Bay Regional Park District) are to the east near Byron Hot Springs. These areas provide high quality grasslands habitat. The HMU may serve as a dispersal and movement corridor for kit fox into the Los Vaqueros watershed.

Three occurrences of San Joaquin kit fox have been recorded within a few miles of the HMU. A sighting in 2008 was just outside of the HMU (California Department of Fish and Game 2011). Another sighting was a 1989 observation from less than 1 mile south and the third was a 1973 observation from east of Kellogg Creek in the immediate vicinity of the HMU. Although no kit fox have been reported in the HMU, several burrows that could serve as dens exist on the site as well as evidence of small mammals, preferred kit fox prey, were observed during preliminary habitat assessments surveys in September 2010 (ESA 2010c).

3.6 California Tiger Salamander

Habitat for the federally and state-listed threatened California tiger salamander includes vernal pools and seasonal and perennial ponds, including artificial water bodies such as stock ponds, for breeding habitat and surrounding upland grassland habitat for aestivation (Federal Register 69 (149):47212–47248). Burrows of California ground squirrels and Botta’s pocket gophers are commonly used for California tiger salamander aestivation sites. Although most of the adult tiger salamander’s life is spent in burrows within upland habitat, ponds and pools of sufficient depth and duration of ponding are required for breeding.

Although the California tiger salamander has not been documented in the Los Vaqueros HMU, the property contains suitable upland and breeding habitat for this species. Several occurrences of California tiger salamander have been recorded within the vicinity of the HMU (California Department of Fish and Game 2011). The closest include observations of breeding to the direct west, south, and east of the HMU. The most recent is from 2006 when numerous larvae were
observed in a stock pond just east and upstream of the HMU along the main ephemeral drainage that runs through the HMU.

Annual grassland, alkali grassland, and saltgrass seasonal wetland habitat in the HMU provide upland refugia habitat during the dry season and during movement periods. Small burrows, suitable for underground refugia, are found throughout annual and alkali grassland habitat in the Los Vaqueros HMU. The open, ruderal habitat in the north central portion of the HMU may also facilitate California tiger salamander movement across the HMU. Additionally, the ephemeral drainage crossing the HMU retains substantial water for a duration capable of supporting California tiger salamander breeding in a few locations, including at the eastern edge of the HMU.

3.7 California Red-Legged Frog

Breeding habitat for the California red-legged frog, a federally listed threatened species and a California species of concern, includes permanent or semi-permanent water in various aquatic and riparian habitats, including artificial water bodies such as stock ponds (U.S. Fish and Wildlife Service 2002). Although red-legged frogs appear to prefer areas of water with relatively dense woody riparian or emergent vegetation, they have also been observed in areas lacking riparian or emergent vegetation. Upland and riparian areas are used for foraging, dispersal, and refuge. During dry periods red-legged frogs will seek refuge in areas including under boulders, rocks, downed wood, moist leaf litter, and in small mammal burrows (U.S. Fish and Wildlife Service 2002).

California red-legged frogs had not been previously documented in the Los Vasqueros HMU; however, there are thirteen documented occurrences of red-legged frog from the vicinity of the HMU (California Department of Fish and Game 2011). These include two 2006 observations of red-legged frogs in stock ponds approximately 200 feet south and 1,400 east of the HMU and a 1999 observation approximately 1,000 feet west of the HMU.

The two ephemeral drainages crossing the HMU provide potential breeding habitat for California red-legged frog. Red-legged frogs have been documented breeding along this drainage both upstream and downstream of the HMU boundary. Saltgrass seasonal wetland, and annual and alkali grasslands adjacent to wetland and drainage features in the HMU provide foraging, dispersal, and refuge habitat for red-legged frog during the non-breeding season.

3.8 Other Special-Status Species

The following sections discuss the wildlife and plant species that are not included in the compensatory mitigation program required in the permits for the Los Vaqueros Reservoir Expansion Project and there are no specific enhancement or monitoring requirements associated with them. However, the District will ensure their protection and it is anticipated they will benefit from management actions taken for covered species.
3.8.1 Special-Status Wildlife Species

One special-status wildlife species, western burrowing owl, has been observed at the Los Vaqueros HMU.

Western Burrowing Owl

Western burrowing owl is a California species of special concern. Burrowing owls are typically found in dry, open, low-growing grasslands and typically nest in burrows created by small mammals such as ground squirrels. This species is most active at dawn and dusk and preferred prey includes small mammals, insects, and lizards. Burrowing owls have been documented as occurring on and adjacent to the Los Vaqueros HMU. A single burrowing owl was observed in annual grassland in the northwest portion of the HMU during preliminary habitat assessments in September 2010 (ESA 2010c).

3.8.2 Special-Status Plant Species

Two special-status plant species have been observed in the Los Vaqueros HMU. These two species are discussed briefly below.

Crownscale

Crownscale, a CNPS California Rare Plant Rank 4.2 species, is an annual herb in the goosefoot (Chenopodiaceae) family. California Rare Plant Rank 4 species are considered uncommon, or of limited distribution in California, but are generally not eligible for state listing.

This species is typically found in chenopod scrub, grassland, and alkaline or clay vernal pools. Several populations of crownscale were observed in alkali seeps, wetland, and grassland habitat in the central portion of the HMU during preliminary habitat assessment surveys in September 2010 (ESA 2010c).

San Joaquin Spearscale

San Joaquin spearscale, a CNPS California Rare Plant Rank 1B.1 species, is an annual herb in the goosefoot (Chenopodiaceae) family. This species is found in alkaline soils in chenopod scrub, meadows and seeps, playas, and valley and foothill grassland from mean sea level to 2,740 feet above msl. Several small populations of San Joaquin spearscale were observed in sparsely vegetated areas adjacent to the ephemeral drainage in the northeastern and central portions of the HMU during preliminary habitat assessments in September 2010 (ESA 2010c).

3.9 Interim Management Plan

The goals, objectives, and management actions outlined in this chapter will be carried out during the Interim Management Period (i.e., the first 5 years following plan approval). Goals, objectives, and management actions are given unique identifiers within each HMU. For example each goal, objective, and management action within the Los Vaqueros HMU is given a number that includes LV,
which stands for Los Vaqueros. This is done so that each activity can be easily referenced later in the document. The Long-Term Management Program for all HMUs is provided in Chapter 7.

3.9.1 Element LV1 – Grasslands

Goal LV1—Enhance and maintain rangeland health to provide habitat for native plants and animals and minimize invasive plants in all grasslands in the HMU.

Objective LV1—Develop and implement annual grazing plans which consider the timing, duration, and intensity of livestock grazing needed to protect soil, support plant germination, control nonnative species, and provide opportunities for expansion of native plant species, while maintaining upland habitat for California tiger salamander, California red-legged frog, Alameda whipsnake, and San Joaquin kit fox.

Management Action LV-MA1 — Through controlled grazing, managers will seek to maintain an average residual dry matter (RDM) of between 800 to 1,200 pounds per acre but no less than 500 lbs/acre on level and low slopes, and at least 800 lbs/acre on steep slopes in the fall to protect overall rangeland health. Also maintain herbaceous (grass and forbs) height (measured as obstruction using a Robel pole) below the maximum—no more than 12 inches year-round (measured in both spring and fall), regardless of slope, to retain habitat for native wildlife. Favorable weather conditions often make the herbaceous vegetation grow very rapidly, beyond the control of typical grazing operations. Thus spring herbaceous height may exceed the standard for short periods if average or above-average rainfall occurs in the previous rain year. In order to keep grass shorter than 12 inches as often as feasible, the rangeland managers and grazing operators will plan for flexibility and be able to respond quickly to changing conditions, such as designating flexible-use fields to allow more precise grazing management of the designated habitat areas, and developing more watering facilities to better distribute grazing.

LV-MA1 Monitoring Protocol

- Conduct visual monitoring of RDM levels across the HMU annually to determine trends and areas of variation that may warrant changes in grazing practices.
- Establish at least four RDM monitoring points, appropriately located to capture a representative subset of the slopes in the unit. Record visual estimates of RDM levels at these two locations annually, between October 1 and November 15.
- Visually assess the presence of ground squirrels at each rangeland monitoring location and document presence/absence.
- Conduct springtime grass height assessment during April 1 – May 31.
- Conduct photo documentation annually for at least four points during the RDM surveys.
- Establish additional monitoring locations including photo points, if necessary, to capture unique features of the HMU or to specifically investigate grazing levels in a particular location.
LV-MA1 Performance Standards

- Maintain RDM levels of at least 500 lbs/acre on low and level slopes and at least 800 lbs/acre on steep slopes.
- Maintain grass height less than 12 inches obstruction height (measured using a Robel pole), regardless of slope, year-round.

LV-MA1 Adaptive Management

- If performance standards are not being met the District will work with the grazing tenant to modify grazing management on the site. This could be a combination of changes during the spring and summer, if grass height requirements are not being met, or changes from year to year, if RDM standards are not being met. For example, starting grazing later to allow early forage growth, extending the grazing end date for late season growth, changing the species used for grazing from selective to non-selective grazers, moving water troughs to redistribute grazing pressure.
- In addition to changes in grazing from year to year in response to climate conditions, the District and grazing operators will stay apprised of research on managing grasslands for threatened and endangered species using grazing, and adapt annual grazing plans to always include the best available science in rangeland management.

LV-MA1 Reporting Requirements

The following items will be included in the annual report submitted to the Wildlife Agencies.

- Records of visual estimates of RDM and average grass height at each monitoring location.
- Locations where RDM and grass height objectives are unable to be met due to constraints beyond the control of the District or the grazing operator and a brief description of those constraints.
- Photos taken at each monitoring location.
- Presence or absence of ground squirrels in the HMU annually and any noticeable changes in the extent of the population from year to year.
- Any year-to-year changes in annual grazing practices based on visual RDM estimates and grass height monitoring.

Management Action LV-MA2—Conduct springtime visual monitoring of available forage to allow for inter-annual adjustments to grazing practices. This will ensure grassland habitat will remain suitable for San Joaquin kit fox, California tiger salamander, and California red-legged frog through the summer months.

LV-MA2 Monitoring Protocol

- Conduct visual monitoring annually (April–May) of grass height (obstruction height monitoring using a Robel pole) and forage availability across each unit to determine trends and areas of variation that may warrant changes in grazing practices. Such changes could be seasonal or
temporary, to account for short-term conditions such as drought, or long-term, to account for cumulative vegetation response.

- Establish four visual monitoring stations, preferably the same four that are used for RDM monitoring, appropriately located to capture a representative subset of the slopes in the HMU. Record visual estimates of grass height at these four locations annually in the spring.
- Conduct photo documentation at these four locations during springtime grass height surveys.
- Establish additional monitoring locations, if necessary, to capture unique features of the HMU or to specifically investigate forage levels in a particular location.

**LV-MA2 Performance Standards**

- Maintain grass height less than 12 inches (obstruction height measures using a Robel pole), regardless of slope.

**LV-MA2 Adaptive Management**

- If performance standards are not being met the District will work with the grazing tenant to modify grazing management on the site. This could be a combination of changes during the spring and summer, if grass height requirements are not being met, or changes from year to year, if RDM standards are not being met.
- In addition to changes in grazing from year to year in response to climate conditions, the District and grazing operators will stay apprised of research on managing grasslands for threatened and endangered species using grazing, and adapt annual grazing plans to always include the best available science in rangeland management.

**LV-MA2 Reporting Requirements**

- Submit records of visual estimates of average grass height at each monitoring location.
- Submit photos taken at each monitoring location.
- Report any inter-annual changes in grazing practices that are observed during visual springtime forage monitoring.

**Management Action LV-MA3**—Utilize Integrated Pest Management strategies for control, containment, and/or prevention of Cal-IPC listed invasive plants with an “Impact” or “Invasiveness” rating of High for the region and those that pose ecological threat to habitat in the HMU. These strategies include but are not limited to the following.

- Containment strategy for perennial pepperweed.
- Control strategy for specific Cal-IPC listed species including black mustard, Italian thistle, and milk thistle. Control strategy may include multiple types of methods such as grazing and/or herbicides.

**LV-MA3 Monitoring Protocol**

- Document baseline extent of Cal-IPC listed invasive plants with an “Impact” or “Invasiveness” rating of High and those that pose an ecological threat to habitat in the HMU.
• Determine the two highest priority areas in the HMU where infestations are threatening the ecology of the site (i.e., aggressive species, particularly dense infestations) and use these areas as indicator sites for invasive plant monitoring.

• Establish photo documentation points in both of these high priority indicator sites.

• Conduct visual monitoring and photo documentation of these high priority indicator sites annually.

• At the end of Year 5 conduct another survey of all Cal-IPC listed invasive plant species (as defined above) in the HMU to compare against baseline and adjust management activities and monitoring locations accordingly if priorities have changed.

**LV-MA3 Performance Standards**

• Reduce all Cal-IPC listed plant infestations and infestations of species that pose an ecological threat to habitat in the HMU which are ranked as high density (51–100% of stand) during baseline survey to medium (26–50%) or low density (6–25%).

• Reduce all Cal-IPC listed plant infestations and infestations of species that pose an ecological threat to habitat in the HMU which are ranked as medium density during baseline survey to low density.

• Maintain all Cal-IPC listed plant infestations and infestations of species that pose an ecological threat to habitat in the HMU which are ranked as low density during baseline survey at no greater than low density level.

**LV-MA3 Adaptive Management**

• Adaptive management is built into the Control, Containment, and Prevention strategy for invasive plant species. Should control techniques fail initially, revised techniques will be implemented until success criteria are met. Changes in control strategy will be discussed with invasive plant species control specialists and other land managers in the region to ensure the best management techniques are being utilized.

**LV-MA3 Reporting Requirements**

• Submit annual report on methods used to contain and control invasive plants during the prior year, including herbicide application, specific grazing regimes, etc.

• Include initial assessment of success of all non-grazing invasive species control methods, particularly herbicide application.

• Submit records of invasive plant density visual estimates at the two high priority monitoring locations.

• Submit photos taken at each high priority monitoring location.
3.9.2 Element LV2 – San Joaquin Kit Fox

Goal LV2—Maintain a habitat condition in grasslands that is suitable for San Joaquin kit fox.

Objective LV2—Maintain grassland that is less than 12 inches tall (measured as obstruction height) year-round and supports an abundance of prey species for San Joaquin kit fox.

Management Actions LV-MA1, LV-MA2, and LV-MA3, all discussed above, will be implemented to achieve this objective. Monitoring protocols and performance standards discussed in those sections will be utilized to determine whether this objective is being met on an annual basis.

Objective LV3—Maintain or increase abundance of California ground squirrels in the HMU and passively monitor for San Joaquin kit fox using motion-activated cameras.

Management Action LV-MA4—Eliminate any active rodent control programs (poisons, fumigants, shooting) including those implemented by County and private contractors (lessees) in the HMU, except for targeted application to protect infrastructure (i.e., road embankments, stock pond dams) and allow California ground squirrels to passively repopulate grasslands. Establish a motion-activated camera network to monitor animal movements.

LV-MA4 Monitoring Protocol

- Visually assess the presence of ground squirrels at each rangeland monitoring location and document presence/absence.
- Maintain at least two motion-activated cameras with scent stations on each unit within the HMU to detect San Joaquin kit fox.

LV-MA4 Performance Standards

- Realize a net increase in total number of California ground squirrels and the total number of burrows in the HMU over the life of the permit.
- Place each camera in the HMU for at least 6 months of the year and monitor frequently to ensure proper function.

LV-MA4 Adaptive Management

- If ground squirrels and other burrowing mammals are not returning to the area, determine root cause of problem. Modify grazing rotation if it is determined that adjusting the number of animals concentrated in an area could influence ground squirrel populations.
- Continue to move cameras until it is determined that camera placement is maximizing the detections of wildlife movement in the area.

LV-MA4 Reporting Requirements

- Report presence or absence of ground squirrels in the HMU annually and any noticeable changes in the extent of the population from year to year.
- Any photos of rare species will be included in annual monitoring report along with a summary of the number of camera trap nights and maps of camera station locations. Any photos of San Joaquin kit fox will be reported to Wildlife Agencies upon verification of the sighting.

### 3.9.3 Element LV3 – California Red-Legged Frog

**Goal LV3**—Enhance upland habitat for California red-legged frog.

**Objective LV4**—Maintain grassland that is less than 12 inches tall (measured as obstruction height) year-round and maintain or increase abundance of California ground squirrels in the HMU as both grassland height and presence of California ground squirrel burrows are key indicators of high habitat quality for this species.

**Management Actions LV-MA1, LV-MA2, LV-MA3, and LV-MA4**, all discussed above, will be implemented to achieve this objective. Monitoring protocols and performance standards discussed in those sections will be utilized to determine whether this objective is being met on an annual basis.

### 3.9.4 Element LV4 – California Tiger Salamander

**Goal LV4**—Enhance upland habitat for California tiger salamander.

**Objective LV5**—Maintain grassland that is less than 12 inches (measured as obstruction height) tall year-round and maintain or increase abundance of California ground squirrels in the HMU as both grassland height and presence of California ground squirrel burrows are key indicators of high habitat quality for this species.

**Management Actions LV-MA1, LV-MA2, LV-MA3, and LV-MA4**, all discussed above, will be implemented to achieve this objective. Monitoring protocols and performance standards discussed in those sections will be utilized to determine whether this objective is being met on an annual basis.

### 3.9.5 Element LV5 – Facility Maintenance

**Goal LV5**—Maintain infrastructure in working condition to allow for implementation of the HMP.

**Objective LV6**—Maintain fencing and livestock water sources in the HMU necessary to meet habitat management goals.

**Management Action LV-MA5**—Conduct monitoring at least twice per year to ensure timely response to fencing and livestock water source issues.

- Conduct twice yearly inspection of all management-related interior fencing and coordinate with livestock operators to confirm grazing program is being implemented effectively.
- Remove any unnecessary structures that create a hazard to humans or wildlife.
4.1 Geographic Setting and Location

The Morgan Territory HMU is west of Morgan Territory Road in eastern Contra Costa County, southwest of the Los Vaqueros Reservoir and northeast of the city of Livermore (Figures 1-1, 4-1). The Morgan Territory HMU encompasses approximately 329 acres and consists of three properties: Storybook Lane, Morgan Territory Road North, and Morgan Territory Road South. The HMU is on the Tassajarra USGS 7.5 minute quadrangle.

4.1.1 Parcels and Land Use History

The three units of the Morgan Territory HMU are zoned for agricultural use and are used for cattle and horse grazing. All three units have steep topography making it unlikely that they have been utilized for any land use other than grazing in the past.

4.2 Physical Factors

4.2.1 Topography

The Morgan Territory HMU is on the eastern flank of the northern Diablo Range and west of the southern Delta. Elevations range from approximately 850 feet above msl near the southern end of the HMU in the Morgan Territory Road South Unit to approximately 2,200 feet above msl at the northern end of the HMU in the Morgan Territory Road North Unit.

4.2.2 Climate

The Morgan Territory HMU is in a region characterized by a Mediterranean climate. Summers tend to be hot and dry and winters long and cool, with precipitation falling as rain during the late fall, winter, and early spring months. Rainfall within the HMU ranges from 10.6 inches annually (Storybook Lane Unit) to 13.2 inches annually (Morgan Territory Road North and Morgan Territory Road South Units) and the average annual temperature is 73–75 degrees Fahrenheit.

4.2.3 Soils

There are nine soil types found within the Morgan Territory HMU (Natural Resources Conservation Service 2010) (Table 4-1). The most prominent soil type is Diablo clay (30–50% slopes). This soil type is found in the southwest portion of the Morgan Territory Road North Unit and western portion of the Morgan Territory Road South Unit. Los Osos clay loam is also prominent in the Morgan Territory Road North Unit and is found along the valley and hills of much of the northern portion of this unit. Milsholm loam (50–75% slopes) is also prominent on the western portion of the Morgan
Territory Road South Unit. The Storybook Lane Unit is characterized by Dibble silty clay loam (30–50% slopes) found associated with annual grassland in the western portion of the unit and the rock outcrop-xerothents association found primarily associated with California sagebrush habitat in the southwestern and southeastern portions of the unit.

Table 4-1. Soil Types within the Morgan Territory Habitat Management Unit

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Percentage of HMU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diablo clay (15–30% slopes)</td>
<td>2.6</td>
</tr>
<tr>
<td>Diablo clay (30–50% slopes)</td>
<td>35.4</td>
</tr>
<tr>
<td>Dibble silty clay loam (15–30% slopes)</td>
<td>1.0</td>
</tr>
<tr>
<td>Dibble silty clay loam (30–50% slopes)</td>
<td>13.6</td>
</tr>
<tr>
<td>Los Osos clay loam (15–30% slopes)</td>
<td>2.6</td>
</tr>
<tr>
<td>Los Osos clay loam (30–50% slopes)</td>
<td>15.3</td>
</tr>
<tr>
<td>Millsholm Loam (30–50% slopes; MeF)</td>
<td>0.5</td>
</tr>
<tr>
<td>Millsholm Loam (50–75% slopes; MeG)</td>
<td>16.0</td>
</tr>
<tr>
<td>Rock Outcrop-Xerothents Association (Re)</td>
<td>13.0</td>
</tr>
</tbody>
</table>

4.3 Land Cover

Acreages of each land cover type and linear feet of drainages in each unit of the HMU are shown in Table 4-2. The land cover data used in this HMP are based on the Preliminary Habitat Assessments of the units (ESA 2010d, 2010e, 2010f; Appendix A). Each land cover type is described in further detail below.
Figure 4-1
Los Vaqueros Expansion Project
Morgan Territory HMU
Table 4-2. Land Cover Acreages and Linear Feet of Drainages in the Morgan Territory Habitat Management Unit

<table>
<thead>
<tr>
<th>Land Cover</th>
<th>Acres by Unit</th>
<th>HMU Total (acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Storybook Lane</td>
<td>Morgan Territory Road North</td>
</tr>
<tr>
<td>Annual grassland</td>
<td>39.7</td>
<td>97.0</td>
</tr>
<tr>
<td>California sagebrush scrub</td>
<td>31.2</td>
<td>0.1</td>
</tr>
<tr>
<td>California bay woodland</td>
<td>10.2</td>
<td>–</td>
</tr>
<tr>
<td>Coast live oak woodland</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Coast live oak/blue oak woodland</td>
<td>–</td>
<td>1.6</td>
</tr>
<tr>
<td>Coast live oak/California bay woodland</td>
<td>–</td>
<td>3.9</td>
</tr>
<tr>
<td>Eucalyptus woodland</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Live oak woodland</td>
<td>3.9</td>
<td>–</td>
</tr>
<tr>
<td>Willow riparian woodland</td>
<td>–</td>
<td>0.2</td>
</tr>
<tr>
<td>Valley oak woodland</td>
<td>2.2</td>
<td>–</td>
</tr>
<tr>
<td>Pond</td>
<td>–</td>
<td>0.04</td>
</tr>
<tr>
<td>Seasonal wetland</td>
<td>–</td>
<td>0.2</td>
</tr>
<tr>
<td>Developed</td>
<td>0.9</td>
<td>–</td>
</tr>
<tr>
<td>Intermittent drainages&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4,359.1 (lf)</td>
<td>7,345.5 (lf)</td>
</tr>
<tr>
<td>Total acres</td>
<td>88.1</td>
<td>103</td>
</tr>
</tbody>
</table>

lf = linear feet.
<sup>a</sup> Linear feet for drainages are not included in land cover totals.

4.3.1 Grassland

Annual Grassland

Approximately 80% of the Morgan Territory HMU consists of annual grassland habitat. These grasslands are dominated by nonnative annual species. These species were introduced as early as 1760 by unassisted migration or by transport in the belongings or livestock of travelers from the Spanish settlements outside of California or in ship’s cargo of coastal explorers. These nonnative plant invaders included very aggressive annual grasses and forbs from the grasslands of the Mediterranean region that quickly replaced native species, both with and without the influence of livestock grazing (Hendry 1931; Blumler 1992; Bartolome et al. 2007). The dominant species in annual grasslands on the HMU include soft brome, ripgut brome, Italian ryegrass, wild oat, red brome, barley, and rattle fescue. Turkey mullein was the most common native species observed in annual grasslands in the HMU and was particularly abundant in areas that have continuous grazing by horses in the northwest portion of the Storybook Lane Unit. The most prevalent non-grass herbaceous species observed in annual grasslands in the HMU during the preliminary habitat assessments, however, are nonnative invasive species including milk thistle, Italian thistle, yellow
star thistle, black mustard, and wild radish (ESA 2010d, 2010e, 2010f). Heavy patches of yellow star thistle and black mustard were observed in annual grasslands in the Morgan Territory HMU.

4.3.2 Upland Scrub

California Sagebrush Scrub

California sagebrush scrub habitat is found in all three units of the Morgan Territory HMU. The vast majority of the 31.5 acres of California sagebrush scrub habitat in the HMU is found in the Storybook Lane Unit. This habitat type is nearly as common as annual grassland in the Storybook Lane Unit and covers almost the entire southern portion of the unit. California sagebrush (*Artemisia californica*) and chamise (*Adenostema fascicularis*) are the most dominant shrubs in this habitat type. Black sage (*Salvia mellifera*) and bush monkey flower (*Mimulus aurantiacus*) are also found in the shrub canopy of California sagebrush scrub in the Storybook Lane Unit. Annual grasses are found in openings of the shrub canopy.

California sagebrush scrub habitat is a minor habitat type in the Morgan Territory Road North and Morgan Territory Road South Units, encompassing approximately 0.1 and 0.2 acre on these units, respectively. In the Morgan Territory Road North Unit this land cover type is found in small areas near the intermittent drainage in the northern and southern portions of the unit. Three small patches of California sagebrush scrub are found in the northwest, northcentral, and northeastern portions of the Morgan Territory Road South Unit. The dominant plant species found in this habitat type is California sagebrush with annual grasses occurring in openings of the shrub canopy. In the Morgan Territory Road North Unit, black sage, poison oak (*Toxicodendron diversilobum*), and California fuschia (*Epilobium canum*) were also observed.

4.3.3 Woodland

Coast Live Oak Woodland

The coast live oak woodland land cover type is found on approximately 1.3 acres in the north central portion of the Morgan Territory Road South Unit. Coast live oak is the one dominant tree species characterizing this habitat type. Nonnative annual grasses similar to those found in annual grasslands are found in the understory of coast live oak woodland habitat.

Coast Live Oak/Blue Oak Woodland

Coast live oak/blue oak woodland covers approximately 9.0 acres in the HMU. Approximately 1.6 acres occur in the Morgan Territory Road North Unit along the intermittent drainage in the southwest corner of the unit and approximately 7.5 acres is found associated with the intermittent and ephemeral drainages in the western portion of the Morgan Territory Road South Unit. Coast live oak (*Quercus agrifolia*) and blue oak trees are the dominant trees in the overstory, although a few buckeye trees are found scattered throughout this land cover type in the Morgan Territory Road South Unit. Grass species typical of the annual grassland habitat are found in the drier portions of coast live oak/blue oak woodlands. Native shrubs including poison oak, toyon (*Heteromeles arbutifolia*), and California rose (*Rosa californica*) are found in the understory of this land cover type.
closer to the drainages. In the Morgan Territory HMU, coast live oak/blue oak woodland is found primarily on Diablo clay (30–50% slopes) soils.

**Coast Live Oak/California Bay Woodland**

Approximately 3.9 acres of coast live oak/California bay woodland is mapped in the HMU, all in the Morgan Territory Road North Unit. Coast live oak and California bay (*Umbellularia californica*) are the two dominant trees in the overstory of this habitat type, although scattered madrone (*Arbutus menziesii*) also occurs. Species found in the sparse understory of this habitat type include poison oak and annual grasses. This land cover type is found along the intermittent drainage in the northwest and southwest portions of the Morgan Territory Road North Unit.

**Eucalyptus Woodland**

A few small areas of eucalyptus woodland, comprising approximately 0.5 acre, are found in the Morgan Territory Road South Unit. One area is found along the intermittent drainage in the southern portion of the unit and the other is in the central-eastern portion of the unit. This habitat type is characterized by the dominance of eucalyptus trees in the overstory. Species found in the understory of eucalyptus woodland are consistent with those found in annual grasslands.

**Live Oak Woodland**

Live oak woodland was mapped on approximately 3.9 acres of the Storybook Lane Unit. Two small patches of live oak woodland are mapped in the southern portion of the unit, one along an ephemeral drainage, and the other adjacent to California sagebrush scrub and California bay woodland. Coast live oak and interior live oak (*Quercus wislizeni*) are the dominant trees in the overstory and annual grassland species comprise the understory of this habitat type.

**Valley Oak Woodland**

Approximately 2.2 acres of valley oak woodland is found in the HMU, all in the Storybook Lane Unit. This land cover type is found just north of California sagebrush in the southwestern portion of the unit. Several large valley oak trees comprise the overstory. Species similar to those found in annual grasslands are found in the understory of valley oak woodland.

### 4.3.4 Wetlands

**Seasonal Wetlands**

Wetland habitat in the Morgan Territory HMU is fairly limited due to the relatively steep terrain of much of the area. No seasonal wetland habitat was observed in the Storybook Lane Unit. In the Morgan Territory Road North Unit, approximately 0.11² acre of seasonal wetland occurs adjacent to the intermittent drainage in the northern portion of the unit. This wetland, associated with Dibble silty clay loam soil, showed heavy cattle use, included well-trodden soil and grazed vegetation.

---

² A formal wetland delineation has not been conducted for the units on the Management Unit; therefore acreages of wetland habitats are approximations.
Dominant plants visible at the time of preliminary habitat assessment included cattail, common rush (*Juncus effusus*), Baltic rush (*Juncus balticus*), and iris-leaved rush (*Juncus xiphiodes*) (ESA 2010d).

A small area, approximately 0.01 acre, of potential seasonal wetland was mapped along an ephemeral drainage in the northeastern portion of the Morgan Territory Road South Unit. Due to heavy grazing impacts, species associated with this wetland were hard to determine during preliminary habitat assessments (ESA 2010d).

**Ponds**

Only one pond is found in the Morgan Territory HMU: a 0.04-acre stock pond in the Morgan Territory Road North Unit. This stock pond, in the central-eastern portion of the unit, appears to hold water for most of the year (ESA 2010d). No aquatic or emergent vegetation was observed in or around the stock pond during preliminary habitat assessments. A former stock pond exists on the northern boundary of the Morgan Territory Road North Unit, although the pond is no longer functional. A combination of a failing berm and high levels of sediment deposition have reduced the capacity of the pond. It currently functions as a wetland and receives most of its water from roadway runoff and from a seasonal drainage flowing from the adjacent property.

**4.3.5 Riverine and Riparian**

**California Bay Woodland**

All of the approximately 10.2 acres of California bay woodland are found in the Storybook Lane Unit. This land cover type lines the intermittent drainage and most of the ephemeral drainages running through the center of the unit. California bay trees form a continuous canopy in this land cover type. Understory species found in this area include madrone, poison oak, California pipevine (*Aristolochia californica*), various fern species, and traces of native grasses including blue wildrye (*Elymus glaucus*) and needle grass.

**Willow Riparian**

Willow riparian woodland is found on 0.6 acre of the HMU—0.2 acre in the Morgan Territory Road North Unit and 0.4 acre in the Morgan Territory Road South Unit. In the Morgan Territory Road North Unit willow riparian woodland habitat is found in two small patches, one intermingled with California sagebrush scrub habitat along the northwestern portion of the intermittent drainage, and one along the intermittent drainage on the eastern portion of the unit. In the Morgan Territory Road South Unit this habitat type is found along the intermittent drainage in the southern portion of the unit. Red willow (*Salix laevigata*) is the dominant species in the overstory of willow riparian woodland; however, several blue elderberry (*Sambucus nigra* ssp. *caerulea*) shrubs are also found in this habitat type in the Morgan Territory Road South Unit.
Intermittent and Ephemeral Drainages

Three intermittent drainages are found in the Morgan Territory HMU, one in each of the three units comprising this HMU. Several ephemeral drainages are found scattered throughout the HMU totaling over 18,600 linear feet.

Cayetano Creek flows through the center of the Morgan Territory Road North Unit. This intermittent section of the creek appears to be fed by various seeps, in addition to runoff from the surrounding hillslopes, which presumably provide this drainage with a year-round water source (ESA 2010d). Although coast live oak/California bay and coast live oak/blue oak woodlands are found along the northern and southern part of the intermittent drainage, the central portion of the drainage is largely unvegetated. Scattered willows, mulefat (Baccharis salicifolia), and rush (Juncus sp.) species are found along the central portion of the drainage, typically in lower-lying areas of the drainage that appeared to retain moist soil for longer periods of time. Several ephemeral drainages that lead into the main intermittent drainage are found scattered throughout the Morgan Territory Road North Unit. There was evidence of accelerated erosion, during the preliminary assessment, along the drainage through this unit which likely contributes to increased sedimentation downstream.

An intermittent drainage primarily fed by a spring/seep in the northern portion of the drainage traverses the Storybook Lane Unit from north to south. Several small ephemeral drainages are also found feeding into the intermittent drainage in the Storybook Lane Unit. There was limited vegetation in the bed and banks of drainages in the Storybook Lane Unit, although California bay woodland habitat provides a riparian corridor along the majority of the drainages on this unit.

A lower section of Cayetano Creek flows through the Morgan Territory Road South Unit. After leaving the Morgan Territory Road North Unit the creek flows through another property before entering the Morgan Territory Road South Unit from the north. This intermittent drainage traverses the western portion of the unit from north to south. Several ephemeral drainages are found throughout the unit, although the majority of these ephemeral drainages feed into the intermittent drainage. The intermittent drainage runs along the low part of the unit between the steep hills and receives runoff from these hills during the rainy season. Standing water and saturated soils were found in a few areas of the intermittent drainage during the preliminary habitat assessment (ESA 2010f). Banks of much of the ephemeral and intermittent drainages in the Morgan Territory Road South Unit are steep and channels are incised with exposed bedrock in many areas.

4.3.6 Developed

The only developed portion of the Morgan Territory HMU is in the Storybook Lane Unit. Approximately 0.9 acre of the northern portion of the unit was developed for residential use. This area includes three houses and associated outbuildings. Vegetation in the developed land cover type consists of planted ornamental vegetation.
4.4 Species Overview

Habitat for four federally and state-listed wildlife species—California tiger salamander, California red-legged frog, Alameda whipsnake, and San Joaquin kit fox—was affected by the Los Vaqueros Reservoir Expansion Project. Preserving and enhancing habitat for these four species is the primary goal for the Mitigation Lands. Potential habitat for all four of these species is found on the Morgan Territory HMU.

4.5 San Joaquin Kit Fox

Open, grazed grasslands are the primary habitat for San Joaquin kit fox denning, foraging, and dispersal. Approximately 264.8 acres of grassland habitat capable of supporting San Joaquin kit fox are found within the Morgan Territory HMU, though much of it is steep with intermittent patches of scrub and oak woodland. These conditions make the grasslands less suitable for San Joaquin kit fox, although the unit remains important as a potential regional connection.

One occurrence of San Joaquin kit fox has been recorded from the vicinity of the HMU less than 1 mile northeast of the Storybook Lane and Morgan Territory Road North Units (California Department of Fish and Game 2011). This 1989 occurrence was reported within a quarter mile of Morgan Territory Road which runs along the northeastern portion of the Morgan Territory Road North Unit. Although no kit fox have been reported in the HMU and no large burrows that could serve as dens were observed in the HMU during preliminary habitat assessments, there is potential for kit fox to intermittently use the area during their movement throughout the region (ESA 2010d, 2010e, 2010f).

4.6 California Tiger Salamander

Habitat for the federally and state-listed threatened California tiger salamander includes vernal pools and seasonal and perennial ponds, including artificial water bodies such as stock ponds, for breeding habitat and surrounding upland grassland habitat for aestivation (Federal Register 69 (149):47212–47248). Burrows of California ground squirrels and Botta’s pocket gophers are commonly used by California tiger salamander as underground refuge sites. Although most of the adult tiger salamander’s life is spent in burrows within upland habitat, ponds and pools of sufficient depth and duration of ponding are required for breeding.

California tiger salamanders have been documented in two locations in the Morgan Territory Road North Unit of the HMU (California Department of Fish and Game 2011). Both observations are from 1981, one from the stock pond in the southeast corner of the unit and the other from the seasonal wetland area in the northwest corner of the unit. Several other occurrences of California tiger salamander have been recorded from the vicinity of the Morgan Territory HMU, primarily east of the Morgan Territory Road North Unit and south of the Morgan Territory Road South Unit (California Department of Fish and Game 2011).
Annual grassland habitat in the Morgan Territory HMU provides upland refugia habitat during the dry season and during movement periods. Few squirrel burrows are present in the Storybook Lane and South units; however, many burrows are found throughout annual grassland and blue oak habitat in the Morgan Territory Road North Unit. Pools in the ephemeral and intermittent drainages in the Morgan Territory Road North Unit and the Morgan Territory Road South Unit provide potential California tiger salamander movement and foraging habitat, though the pools likely do not hold water long enough to support breeding. The stock pond in the Morgan Territory Road North Unit does provide breeding habitat for California tiger salamander.

4.7 California Red-Legged Frog

Breeding habitat for the California red-legged frog, a federally listed threatened species and a California species of concern, includes permanent or semi-permanent water in various aquatic and riparian habitats, including artificial water bodies such as stock ponds (U.S. Fish and Wildlife Service 2002). Although red-legged frogs appear to prefer areas of water with relatively dense woody riparian or emergent vegetation, they have also been observed in areas lacking riparian or emergent vegetation. Upland and riparian areas are used for foraging, dispersal, and refuge. During dry periods red-legged frogs will seek refuge in areas including under boulders, rocks, downed wood, moist leaf litter, and in small mammal burrows (U.S. Fish and Wildlife Service 2002).

California red-legged frogs have been documented as occurring in the Morgan Territory HMU. One adult frog was observed in the southeastern portion of the Morgan Territory Road North Unit in 1981. Two other observations of adult red-legged frogs, from 1981 are located in close proximity to the HMU. Both occurred along Morgan Territory Road, one adjacent to Morgan Territory Road South and 0.2 mile south of the Morgan Territory Road North Unit, and the other approximately 0.2 mile northeast of the Storybook Lane Unit. Additionally, there are 12 additional documented occurrences of red-legged frog within 1 mile of the HMU (California Department of Fish and Game 2011). The most recent of these observations is from 2000. Three tadpoles were observed on the west side of Morgan Territory Road approximately 0.4 mile northwest of the Morgan Territory Road South Unit.

Intermittent drainages on all the properties of the HMU could provide California red-legged frog aquatic refugia and movement habitat. These drainages are likely very flashy (short pulses of water that don not keep the streambed wet for very long) and the pools are not large enough to provide breeding habitat. The stock pond in the southeastern portion of the Morgan Territory Road North Unit provides red-legged frog breeding habitat. Annual grasslands habitat adjacent to wetland and drainage features in the HMU provide foraging, dispersal and refugia habitat for red-legged frog during the non-breeding season.

4.8 Alameda Whipsnake

Primary habitat for the federally and state-listed Alameda whipsnake includes chaparral and scrub communities, specifically coastal sage scrub and northern coastal scrub (U.S. Fish and Wildlife
Service 2003). Alameda whipsnakes also use adjacent grasslands, oak savannah, and oak/bay woodlands. They tend to prefer drier southwest, south, southeast, and northeast facing slopes and preferred habitat often includes rock outcrops and talus (U.S. Fish and Wildlife Service 2003). Rodent burrows and rock crevices are used for refuge; however, whipsnakes will also use brush and debris piles and deep soil crevices.

The Morgan Territory HMU falls within the range of the Mt. Diablo-Black Hills population of Alameda whipsnake (ESA 2010e). Alameda whipsnakes have not been documented as occurring on the HMU; however, they have been recorded seven times in the Tassajara USGS 7.5 minute quadrangle including two road-killed animals on Morgan Territory Road (Swaim pers. comm.). The proximity of these occurrences to the HMU is not known as specific locations are suppressed due to the sensitivity of this species (California Department of Fish and Game 2011). The most recent observation of Alameda whipsnake in the Tassajara quadrangle is from 2005.

Approximately 31.6 acres of sagebrush scrub habitat is present in the HMU. The majority of the scrub habitat is found in the Storybook Lane Unit. Only small amounts of scattered scrub habitat with low cover of shrub species are found in the Morgan Territory Road North and Morgan Territory Road South Units. Annual grassland and woodland habitat adjacent to sagebrush scrub habitat in the HMU, particularly in the Storybook Lane Unit, could also be used by Alameda whipsnake. While no surveys have been performed in the Storybook Lane Unit, it is highly likely that it supports a population of Alameda whipsnake based on adjacent California Natural Diversity Database (CNDDB) records.

### 4.9 Other Special-Status Species

#### 4.9.1 Special-Status Wildlife Species

No other special-status wildlife species have been observed in the Morgan Territory HMU.

#### 4.9.2 Special-Status Plant Species

No other special-status plant species have been observed in the Morgan Territory HMU.

### 4.10 Interim Management Plan

The goals, objectives, and management actions outlined in this chapter will be carried out during the Interim Management Period, proposed to be the first 5 years that follow plan approval. Goals, objectives, and management actions are given unique identifiers within each HMU. For example each goal, objective, and management action within the Morgan Territory HMU is given a number that includes MT, which stands for Morgan Territory. This is done so that each activity can be easily referenced later in the document. The Long-Term Management Program for all HMUs is provided in Chapter 7.
4.10.1 Element MT1 – Grasslands

Goal MT1—Enhance and maintain rangeland health to provide habitat for native plants and animals and minimize invasive plants in all grasslands in the HMU.

Objective MT1—Develop and implement annual grazing plans which consider the timing, duration, and intensity of livestock grazing needed to protect soil, support plant germination, control nonnative species, and provide opportunities for expansion of native plant species, while maintaining upland habitat for California tiger salamander, California red-legged frog, Alameda whipsnake, and San Joaquin kit fox.

Management Action MT-MA1—Through controlled grazing, managers will seek to maintain an average residual dry matter (RDM) of between 800 to 1,200 pounds per acre but no less than 500 lbs/acre on level and low slopes, and at least 800 lbs/acre on steep slopes in the fall to protect overall rangeland health. Also maintain herbaceous (grass and forbs) height (measured as obstruction using a Robel pole) below the maximum—no more than 12 inches year-round (measured in both spring and fall), regardless of slope, to retain habitat for native wildlife. Favorable weather conditions often make the herbaceous vegetation grow very rapidly, beyond the control of typical grazing operations. Thus spring herbaceous height may exceed the standard for short periods if average or above-average rainfall occurs in the previous rain year. In order to keep grass shorter than 12 inches as often as feasible, the rangeland managers and grazing operators will plan for flexibility and be able to respond quickly to changing conditions, such as designating flexible-use fields to allow more precise grazing management of the designated habitat areas, and developing more watering facilities to better distribute grazing.

MT-MA1 Monitoring Protocol

- Conduct visual monitoring of RDM levels across each unit annually to determine trends and areas of variation that may warrant changes in grazing practices.

- Establish at least 4 RDM monitoring points on each unit, for a total of 12 monitoring points for the HMU, appropriately located to capture a representative subset of the slopes in the HMU. Record visual estimates of RDM levels at each location annually, between October 1 and November 15.

- Conduct photo documentation annually for at least four points on each unit during the RDM surveys.

- Conduct springtime grass height assessment during April 1 – May 31.

- Visually assess the presence of ground squirrels at each rangeland monitoring location and document presence/absence.

- Establish additional monitoring locations including photo points, if necessary, to capture unique features of the HMU or to specifically investigate grazing levels in a particular location.
MT-MA1 Performance Standards

- Maintain RDM levels of at least 500 lbs/acre on low and level slopes and at least 800 lbs/acre on steep slopes.
- Maintain grass height less than 12 inches obstruction height (measured using a Robel pole), regardless of slope, year-round.

MT-MA1 Adaptive Management

- If performance standards are not being met, the District will work with the grazing tenant to modify grazing management on the site. This could be a combination of changes during the spring and summer, if grass height requirements are not being met, or changes from year to year, if RDM standards are not being met. For example, starting grazing later to allow early forage growth, extending the grazing end date for late season growth, changing the species used for grazing from selective to non-selective grazers, moving water troughs to redistribute grazing pressure.
- In addition to changes in grazing from year to year in response to climate conditions, the District and grazing operators will stay apprised of research on managing grasslands for threatened and endangered species using grazing, and adapt annual grazing plans to always include the best available science in rangeland management.

MT-MA1 Reporting Requirements

The following items will be included in the annual report submitted to the Wildlife Agencies.

- Records of visual estimates of RDM and average grass height at each monitoring location.
- Photos taken at each monitoring location.
- Presence or absence of ground squirrels in the HMU annually and any noticeable changes in the extent of the population from year to year.
- Any year-to-year changes in annual grazing practices based on visual RDM estimates and grass height monitoring.

Management Action MT-MA2—Conduct springtime visual monitoring of available forage to allow for inter-annual adjustments to grazing practices. This will ensure grassland habitat will remain suitable for San Joaquin kit fox, California tiger salamander, and California red-legged frog through the summer months.

MT-MA2 Monitoring Protocol

- Conduct visual monitoring annually (April–May) of grass height (obstruction height monitoring using a Robel pole) and forage availability across each unit to determine trends and areas of variation that may warrant changes in grazing practices. Such changes could be seasonal or temporary, to account for short-term conditions such as drought, or long-term, to account for cumulative vegetation response.
• Establish four visual monitoring stations in each unit, preferably the same four that are used for RDM monitoring, appropriately located to capture a representative subset of the slopes in the HMU. Record visual estimates of grass height at these four locations annually in the spring.

• Conduct photo documentation at each visual monitoring location during springtime grass height surveys.

• Establish additional monitoring locations, if necessary, to capture unique features of the HMU or to specifically investigate forage levels in a particular location.

**MT-MA2 Performance Standards**

• Maintain grass height less than 12 inches (obstruction height measures using a Robel pole), regardless of slope.

**MT-MA2 Adaptive Management**

• If performance standards are not being met the District will work with the grazing tenant to modify grazing management on the site. This could be a combination of changes during the spring and summer, if grass height requirements are not being met, or changes from year to year, if RDM standards are not being met.

• In addition to changes in grazing from year to year in response to climate conditions, the District and grazing operators will stay apprised of research on managing grasslands for threatened and endangered species using grazing, and adapt annual grazing plans to always include the best available science in rangeland management.

**MT-MA2 Reporting Requirements**

• Submit records of visual estimates of average grass height at each monitoring location.

• Submit photos taken at each monitoring location.

• Report any inter-annual changes in grazing practices that are observed during visual springtime forage monitoring.

**Management Action MT-MA3**—Utilize Integrated Pest Management strategies for control, containment, and/or prevention of Cal-IPC listed invasive plants for this HMU with an “Impact” or “Invasiveness” rating of High for the region and those that pose ecological threat to habitat in the HMU. These strategies include but are not limited to the following.

• Control strategy for yellow star thistle and black mustard which may include grazing and/or herbicides.

**MT-MA3 Monitoring Protocol**

• Document baseline extent of Cal-IPC listed invasive plants with an “Impact” or “Invasiveness” rating of High and those that pose an ecological threat to habitat in the HMU.

• Determine two highest priority areas on each unit where infestations are threatening the ecology of the site (i.e., aggressive species, particularly dense infestations) and use these areas as indicator sites for invasive plant monitoring.
- Establish photo documentation points in each of these six indicator sites.
- Conduct visual monitoring and photo documentation of these six indicator sites annually.
- At the end of Year 5 conduct another survey of all Cal-IPC listed invasive plant species (as defined above) on each unit to compare against baseline and adjust management activities and monitoring locations accordingly if priorities have changed.

**MT-MA3 Performance Standards**
- Reduce all Cal-IPC listed plant infestations and infestations of species that pose an ecological threat to habitat in the HMU which are ranked as high density (51–100% of stand) during baseline survey to medium (26–50%) or low density (6–25%).
- Reduce all Cal-IPC listed plant infestations and infestations of species that pose an ecological threat to habitat in the HMU which are ranked as medium density during baseline survey to low density.
- Maintain all Cal-IPC listed plant infestations and infestations of species that pose an ecological threat to habitat in the HMU which are ranked as low density during baseline survey at no greater than low density level.

**MT-MA3 Adaptive Management**
- Adaptive management is built into the Control, Containment, and Prevention strategy for invasive plant species. Should control techniques fail initially, revised techniques will be implemented until success criteria are met. Changes in control strategy will be discussed with invasive plant species control specialists and other land managers in the region to ensure the best management techniques are being utilized.

**MT-MA3 Reporting Requirements**
- Submit annual report on methods used to contain and control invasive plants during the prior year, including herbicide application, specific grazing regimes, etc.
- Include initial assessment of success of all non-grazing invasive species control methods, particularly herbicide application.
- Submit records of invasive plant density visual estimates at the six monitoring locations.
- Submit photos taken at each monitoring location.

**4.10.2 Element MT2 – Ponds, Wetlands, and Riparian**

**Goal MT2—Enhance and maintain ponds, wetlands, and riparian areas in the HMU.**

**Objective MT2—Retain and enhance existing wetlands, ponds, and riparian areas.**
Management Action MT-MA4—Preserve, enhance, and restore existing ponds, wetlands, and riparian areas to maximize freshwater permanent emergent wetland habitat\(^7\) that functions as (or has the potential to function as) native amphibian breeding habitat, especially to maximize habitat suitability for California red-legged frog and/or California tiger salamander. Examples include pest plant control and grazing management that will favor native wetland species, allowing them to establish in additional areas, thus expanding the habitat footprint. Some minimal excavation could occur if it will benefit the species by increasing the ponding duration or add needed depth to a pond to allow California tiger salamanders to breed. This will be considered on a site-specific basis.

An assessment will take place in Year 1 to determine if any of the ponds, wetlands, or riparian areas in the HMU can be restored to support more freshwater permanent emergent wetland habitat. As part of that assessment all existing aquatic habitats will be delineated to set a baseline. Expansion of ponds will be coordinated with the needs for additional water features identified in annual grazing plans for grazing activities and cost for such activities could be shared with grazing operators.

As discussed under Element MT4, Management Action MT-MA6, and Element MT5, Management Action MT-MA7, below, an assessment will be completed to determine which aquatic features currently support California tiger salamander and California red-legged frog in the first 2 years of the Interim Management Period. Following those surveys determination will be made about how to manage each aquatic feature so that it provides habitat for either California tiger salamander, California red-legged frog, or both species. The ultimate goal is to maximize habitat potential for both species, but characteristics of each location may favor one species over the other.

Please see Element MT4 and Element MT5 below for more detail on the management actions and monitoring requirements for this Management Action.

MT-MA4 Monitoring Protocol

- Use a sub-meter GPS unit to determine and map the extent of aquatic features and wetland plants—the baseline extent of any freshwater permanent emergent wetlands that are to be restored in the HMU.

- Establish photo documentation points in any freshwater permanent emergent wetland restoration areas.

- For the first year following wetland restoration conduct quarterly inspections of the site to determine whether grazing animals are affecting plant establishment.

- In Years 1 and 2, following completion of wetland restoration, conduct annual photo monitoring to provide visual documentation of site functionality.

- In Year 3 use a sub-meter GPS unit to determine and map the extent of wetland features (i.e., aquatic features and wetland plants) for a second time to compare to baseline.

\(^7\) The Los Vaqueros Reservoir Expansion Project – Draft Wetland Compensatory Mitigation Plan (January 2011) states that 0.60 acres of freshwater permanent emergent wetland will be restored on HMU lands. A portion of that 0.60 acres will be restored in the Morgan Territory HMU.
MT-MA4 Performance Standards

- Performance standards for each freshwater emergent permanent wetland restoration site will be established during conceptual design.
- By Year 3 a net increase in wetland acreage will total 0.6 acre across all HMUs.

MT-MA4 Adaptive Management

- If additional acres of freshwater emergent permanent wetland habitat is not being sustained 3 years after restoration activities are complete the District will determine the cause of failure for the restoration site and corrective action will be taken to either fix the issue at that restoration site or to attempt restoration at another location.
- If at any point it is determined that grazing animals are having a negative effect on wetland function they will be excluded as needed to let wetlands recover. This may be done annually if the issue persists.

MT-MA4 Reporting Requirements

- Submit the baseline acreage of any wetlands in the HMU that are to be restored.
- For the first 2 years following restoration, submit annual report that includes photos of expansion site taken from photo monitoring points.
- In Year 3 submit the restored wetland acreage to determine whether wetland restoration activities were successful.
- From Year 3–5 submit photo documentation of wetland restoration site to demonstrate habitat function and quality.
- Submit annual report on methods used to contain and control invasive species during each year if actions were necessary.
- Submit information on any land management modifications that were required (e.g., grazing) during the year based on observations during wetland monitoring.

4.10.3 Element MT3 – San Joaquin Kit Fox

Goal MT3—Maintain a habitat condition in grasslands that is suitable for San Joaquin kit fox.

Objective MT3—Maintain grassland that is less than 12 inches tall (measured as obstruction height) year-round and supports an abundance of prey species for San Joaquin kit fox.

Management Actions MT-MA1, MT-MA2, and MT-MA3, all discussed above, will be implemented to achieve this objective. Monitoring protocols and performance standards discussed in those sections will be utilized to determine whether this objective is being met on an annual basis.

Objective MT4—Maintain or increase abundance of California ground squirrels in the HMU and passively monitor for presence of San Joaquin kit fox using motion-activated cameras.
Management Action MT-MA5—Eliminate any active rodent control programs (poisons, fumigants, shooting) including those implemented by County and private contractors (lessees) in the HMU, except for targeted application to protect infrastructure (i.e., road embankments, stock pond dams) and allow California ground squirrels to passively repopulate grasslands. Establish a motion-activated camera monitoring program.

MT-MA5 Monitoring Protocol

- Visually assess the presence of ground squirrels at each rangeland monitoring location and document presence/absence.
- Maintain at least two motion-activated cameras and scent stations on each unit within the HMU to detect San Joaquin kit fox.

MT-MA5 Performance Standards

- Realize a net increase in total number of California ground squirrels and the total number of burrows in the HMU over the life of the permit.
- Place each camera in the HMU for at least 6 months of the year and monitor frequently to ensure proper function.

MT-MA5 Adaptive Management

- If ground squirrels and other burrowing mammals are not returning to the area, determine root cause of problem. Modify grazing rotation if it is determined that adjusting the number of animals concentrated in an area could influence ground squirrel populations.
- Continue to move cameras until it is determined that camera placement is maximizing the detections of wildlife movement in the area.

MT-MA5 Reporting Requirements

- Report presence or absence of ground squirrels in the HMU annually and any noticeable changes in the extent of the population from year to year.
- Any photos of rare species will be included in annual monitoring report along with a summary of the number of camera trap nights and maps of camera station locations. Any photos of San Joaquin kit fox will be reported to the Wildlife Agencies immediately upon verification of sighting.

4.10.4 Element MT4 – California Red-Legged Frog

Goal MT4—Enhance aquatic and upland habitat for California red-legged frog.

Objective MT5—Maintain grassland that is less than 12 inches tall (measured as obstruction height) year-round and maintain or increase abundance of California ground squirrels in the HMU as both grassland height and presence of California ground squirrel burrows are key indicators of high habitat quality for this species.
Management Actions MT-MA1, MT-MA2, MT-MA3, and MT-MA4, all discussed above, will be implemented to achieve this objective. Monitoring protocols and performance standards discussed in those sections will be utilized to determine whether this objective is being met on an annual basis.

Objective MT6—Retain the functionality of existing California red-legged frog breeding sites and expand the number of breeding locations in the HMU where possible.

Management Action MT-MA6—Develop target vegetation cover levels and associated management actions for all pond, wetland, and wetted riparian habitat areas that are not occupied by California red-legged frog, but that hold water for a period sufficient to support breeding of this species. Utilize vegetation cover levels and habitat conditions at occupied aquatic sites that support successful breeding in the HMU or in the vicinity as reference sites.

- Following the completion of California red-legged frog surveys in Years 1 and 2, characterize the vegetation type and cover levels (focusing on emergent vegetation in the water and shade from overhanging vegetation), presence of predators, and general condition of all pond, wetland, and wetted riparian habitat areas that are occupied by California red-legged frog and where successful breeding has been documented.

- Utilize information gathered from occupied locations to develop habitat targets (vegetation type, percent cover, and general condition) for similar but unoccupied aquatic habitats in the HMU (e.g., ponds for ponds, riparian areas for riparian areas).

- Use individual assessments for each pond, wetland, and riparian area to determine suitability for California red-legged frog.

- Set vegetation target levels and specific management actions (e.g., predator eradication, cattle exclusion, removal of nonnative plants) based on species need and site conditions. In many cases vegetation target levels may favor one species over another, but in general the goal is to optimize habitat for both California tiger salamander and California red-legged frog, particularly in pond and wetland habitat.

MT-MA6 Monitoring Protocol

- A biologist with a Section 10 collecting permit will conduct dipnet surveys for California red-legged frog larvae at a representative set of locations (up to two) with suitable aquatic habitats (water depth and ponding duration sufficient to support breeding) in March/April, and dipnet surveys for metamorphs in September, to determine presence of California red-legged frog in the HMU. Monitoring will occur at a combination of ponds, wetlands, and pools along riparian areas.

- Report bullfrogs that are present during any aquatic surveys. Conduct a daytime and nighttime survey specifically for bullfrogs and other aquatic predators during September California red-legged frog surveys.

- Assess general condition of pond, wetland, or riparian feature that supports breeding California red-legged frog for vegetation type and percent cover, plant species present in and around the
feature, plant species or other features being utilized for egg attachment, depth, turbidity, and pond temperature.

- Take photos of vegetation cover at all breeding sites during the same visit in which species presence surveys are conducted.

**MT-MA6 Performance Standards**

- Support breeding California red-legged frog in all pond, wetland, and wetted riparian features that have the natural (or designed, in the case of stock ponds) depth and ponding duration to do so.

- Maintain aquatic habitats free of introduced aquatic predators of California red-legged frog and California tiger salamander.

**MT-MA6 Adaptive Management**

- If all suitable aquatic features do not support breeding California red-legged frog by Year 5 of the Interim Management Period the District will conduct a focused study to determine the limiting factors for species presence at the site.

- The results of the limiting factors investigation will be presented to the Wildlife Agencies and a decision will be made regarding future management actions required to try and attract California red-legged frog.

**MT-MA6 Reporting Requirements**

- Submit initial survey results of species presence (life stages observed and survey protocol) and vegetative cover and other site characteristics of occupied aquatic habitat that will be utilized to create metrics for unoccupied aquatic habitats.

- Submit a determination of suitability for California red-legged frog at each aquatic feature and a management strategy for each aquatic feature to either retain the species in the aquatic feature or to attract the species to that aquatic feature.

- Submit photos from monitoring points and results from annual vegetation cover surveys.

### 4.10.5 Element MT5 – California Tiger Salamander

**Goal MT5—Enhance aquatic and upland habitat for California tiger salamander.**

**Objective MT7**—Maintain grassland that is less than 12 inches tall (measured as obstruction height) year-round and maintain or increase abundance of California ground squirrels in the HMU as both grassland height and presence of California ground squirrel burrows are key indicators of high habitat quality for this species.

**Management Actions MT-MA1, MT-MA2, MT-MA3, and MT-MA4** all discussed above, will be implemented to achieve this objective. Monitoring protocols and performance standards discussed in those sections will be utilized to determine whether this objective is being met on an annual basis.
Objective MT8—Retain the functionality of existing California tiger salamander breeding sites and expand the number of breeding locations in the HMU where possible.

Management Action MT-MA7—Develop target vegetation cover levels and associated management actions for all ponds and wetlands that are not occupied by California tiger salamanders, but that hold water for a period sufficient to support breeding of this species. Utilize vegetation cover levels and habitat conditions at sites that support successful breeding in the HMU or vicinity as reference sites.

- Following the completion of California tiger salamander surveys in Years 1 and 2, characterize the vegetation type and cover levels (focusing on emergent vegetation in the water and shade from overhanging vegetation), presence of predators, and general condition of all ponds and wetlands that support successful California tiger salamander breeding.

- Utilize information gathered from occupied locations and available California tiger salamander literature to develop habitat targets (vegetation type, percent cover, and general condition) for similar but unoccupied aquatic habitats in the HMU (e.g., ponds for ponds, wetlands for wetlands).

- Use individual assessments for each pond and wetland to determine suitability for California tiger salamander.

- Set vegetation target levels and specific management actions (e.g., predator eradication, cattle exclusion, nonnative vegetation removal) based on species need and site conditions. In many cases vegetation target levels may favor one species over another, but in general the goal is to optimize habitat for both California tiger salamander and California red-legged frog, particularly in pond and wetland habitat.

MT-MA7 Monitoring Protocol

- A biologist with a Sectin 10 collecting permit will conduct dipnet surveys for California tiger salamander larvae at a representative set (up to six) of locations with suitable aquatic habitats (water depth and ponding duration sufficient to support breeding) in March/April to determine presence of California tiger salamanders in the HMU. Monitoring will occur at a combination of ponds and wetlands.

- Report presence of bullfrogs observed during all aquatic surveys. Conduct a daytime and nighttime survey specifically for bullfrogs and other aquatic predators during the September California red-legged frog surveys.

- Assess general condition of pond and wetland that supports breeding California tiger salamanders for vegetation type and percent cover, plant species present in and around the feature, plant species or other features being utilized for egg attachment, depth, turbidity, and pond temperature.

- Take photos of vegetation cover at all breeding sites during the same visit in which species presence surveys are conducted.
MT-MA7 Performance Standards

- Support breeding California tiger salamanders in all pond and wetland features that have the natural (or designed, in the case of stock ponds) depth and ponding duration to do so.
- Maintain aquatic habitats free of introduced aquatic predators of California red-legged frog and California tiger salamander.

MT-MA7 Adaptive Management

- If all suitable aquatic features do not support breeding California tiger salamanders by Year 5 of the Interim Management Period the District will conduct a focused study to determine the limiting factors for species presence at the site.
- The results of that investigation will be presented to the Wildlife Agencies and a decision will be made regarding future management actions required to try and attract species.

MT-MA7 Reporting Requirements

- Submit initial survey results of species presence (life stages observed and survey protocol) and vegetative cover and other site characteristics of occupied aquatic habitat that will be utilized to create metrics for unoccupied aquatic habitats.
- Submit a determination of suitability for California tiger salamanders at each aquatic feature and a management strategy for each aquatic feature to either retain the species in the aquatic feature or to attract the species to that aquatic feature.
- Submit photos from monitoring points and results from annual vegetation cover surveys.

4.10.6 Element MT6 – Alameda Whipsnake

Goal MT6—Enhance habitat for Alameda whipsnake.

Objective MT9—Maintain healthy stands of chaparral in the Storybook Lane Unit to provide mating, basking, and foraging habitat for Alameda whipsnake.

Management Action MT-MA8—During the Interim Management Period maintain chaparral stands by controlling invasive plants, especially coyote bush, which can displace chaparral over time, through managed grazing and mechanical means (if necessary). Protocols for monitoring and managing invasive plants are described in Management Action MT-MA3.

MT-MA8 Monitoring Protocol

- Beginning 1 year after habitat modification occurs establish photo points that are placed to track age-class and structure, including health and vigor of stand of chaparral in the Storybook Lane Unit.
- Conduct annual visual inspection of chaparral stand to identify new infestations of invasive plants that need to be removed.
Repeat photo monitoring in 5-year intervals and apply additional mechanical treatments as needed. It is assumed that additional mechanical treatment will be needed on a 30-year interval.

**MT-MA8 Performance Standards**

- Include strategies in annual grazing plans developed by/for grazing tenants that focus on removal of invasive plants along the edges of chaparral stands.
- Performance standards for invasive plants shall be consistent with those described for Management Action MT-MA3, with respect to invasive plant species.
- Retain the extent and quality of chaparral cover in the Morgan Territory HMU as determined by photo documentation and air photo interpretation during baseline.

**MT-MA8 Adaptive Management**

- Adaptive management is built into the Control, Containment, and Prevention strategy for invasive plant species. Should control techniques fail initially, revised techniques will be implemented until success criteria are met. Changes in control strategy will be discussed with invasive plant species control specialists and other land managers in the region to ensure the best management techniques are being utilized.

**MT-MA8 Reporting Requirements**

- Include initial survey results, including baseline photo at photo points, Year 1 photos at photo points, and all future photo points in annual report to the Wildlife Agencies.
- Report any observations of Alameda whip-snake, or other native species, detected during photo monitoring surveys, to the Wildlife Agencies.

### 4.10.7 Element MT7 – Facility Maintenance

**Goal MT7**—Maintain infrastructure in working condition to allow for implementation of the HMP.

**Objective MT10**—Maintain fencing and livestock water sources in the units necessary to meet habitat management goals.

**Management Action MT-MA9**—Conduct monitoring at least twice a year to ensure timely response to fencing and livestock water source issues.

- Conduct twice yearly inspection of all management-related interior fencing and livestock water sources and coordinate with livestock operators to confirm grazing program is being implemented effectively.
- Remove any unnecessary structures that create a hazard to humans or wildlife.

**Management Action MT-MA9**—Outline and initiate maintenance schedule for ponds including desilting and if necessary, draining to control predators.
• Conduct annual inspection of all ponds during first 5 years to determine rate at which ponds are collecting silt. This is particularly important following large rain events. Utilize this information to schedule dredging of ponds or draining, if facilities are built to allow draining, as needed to ensure ponds continue to hold water at proper depth and duration for breeding amphibians and so that populations of bullfrogs do not establish.
5.1 Geographic Setting and Location

The Altamont HMU is in northeastern Alameda County, south of the Bethany Reservoir and west of the city of Tracy (Figures 1-1, 5-1). The HMU is bisected by I-580 and is located at Grant Line Road. Encompassing approximately 651 acres, the HMU consists of three units, Mountain House, Altamont Pass Road, and Grant Line Road Units. The HMU is on the Clifton Court Forebay and Midway USGS 7.5 minute quadrangles.

5.1.1 Parcels and Land Use History

Zoned for agricultural use, currently the Mountain House and Grant Line Road Units and the majority of the Altamont Pass Road Unit is rangeland grazed by cattle. Additionally prior to spring 2011, an equestrian facility was located on the northeastern portion of the Grant Line Road Unit and the southwestern portion of the unit was being used for bio-solids disposal. The Mountain House Unit was previously the Mountain House Golf Course.

5.2 Physical Factors

5.2.1 Topography

The Altamont HMU is on the eastern flank of the northern Diablo Range, and west of the Delta. The HMU is characterized by gently rolling hills and valleys. Elevations range from approximately 280 feet above msl near the northern portion of the Altamont Pass Road Unit to approximately 600 feet above msl at the southwestern end of the Grant Line Road Unit.

5.2.2 Climate

The Altamont HMU is in a region characterized by a Mediterranean climate. Summers tend to be hot and dry and winters long and cool, with precipitation falling as rain during the late fall, winter, and early spring months. Rainfall within the HMU ranges averages 10.6 inches of annual rainfall and the average annual temperature is 75.2 degrees Fahrenheit.

5.2.3 Soils

There are six soil types found within the Altamont HMU (Natural Resources Conservation Service 2010) (Table 5-1). The most prominent soil type in the HMU is the Altamont rocky clay soil type, which is found on approximately 81% of the HMU. This soil type is typically found on gently rolling to hilly terrains and often has many rock outcrops. This soil type, derived from weathered sandstone and shale, is well drained with slow permeability.
Table 5-1. Soil Types within the Altamont Habitat Management Unit

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Percentage of HMU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altamont clay (3–15% slopes)</td>
<td>4.0</td>
</tr>
<tr>
<td>Altamont clay (15–30% slopes)</td>
<td>7.7</td>
</tr>
<tr>
<td>Altamont rocky clay, moderately deep (7–30% slopes)</td>
<td>80.6</td>
</tr>
<tr>
<td>Diablo clay (7–15% slopes)</td>
<td>0.7</td>
</tr>
<tr>
<td>Linne clay loam (3–15% slopes)</td>
<td>0.5</td>
</tr>
<tr>
<td>Pescadero clay</td>
<td>6.5</td>
</tr>
</tbody>
</table>

5.3 Land Cover

Acreages of each land cover type and linear feet of drainages on each unit in the HMU are provided in Table 5-2. Land cover data used in this HMP are based on the Preliminary Habitat Assessments of the properties (ESA 2010g, 2010h, 2010i; Appendix A). Each land cover type is described in further detail below.

Table 5-2. Land Cover Acreages and Linear Feet of Drainages in the Altamont Habitat Management Unit

<table>
<thead>
<tr>
<th>Land Cover</th>
<th>Altamont Pass Road</th>
<th>Grant Line Road</th>
<th>Mountain House</th>
<th>HMU Total (acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual grassland</td>
<td>61.8</td>
<td>415.5</td>
<td>69.7</td>
<td>547.0</td>
</tr>
<tr>
<td>Alkali grassland</td>
<td>14.2</td>
<td>0.7</td>
<td>3.4</td>
<td>18.3</td>
</tr>
<tr>
<td>Mulefat scrub</td>
<td>–</td>
<td>–</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Seasonal wetland</td>
<td>0.2</td>
<td>–</td>
<td>–</td>
<td>0.2</td>
</tr>
<tr>
<td>Saltgrass seasonal wetland</td>
<td>0.4</td>
<td>1.4</td>
<td>–</td>
<td>1.8</td>
</tr>
<tr>
<td>Pond</td>
<td>0.3</td>
<td>1.2</td>
<td>1.4</td>
<td>2.9</td>
</tr>
<tr>
<td>Ruderal</td>
<td>–</td>
<td>4.8</td>
<td>56.8</td>
<td>61.6</td>
</tr>
<tr>
<td>Developed</td>
<td>0.5</td>
<td>10.2</td>
<td>8.6</td>
<td>19.3</td>
</tr>
<tr>
<td>Intermittent drainages(^a)</td>
<td>3.610.8 lf</td>
<td>6,013.6 lf</td>
<td>1,978.2 lf</td>
<td>11,602.6 lf</td>
</tr>
<tr>
<td>Total acres</td>
<td>77.4</td>
<td>433.8</td>
<td>140.0</td>
<td>651.2</td>
</tr>
</tbody>
</table>

\(^a\) Linear feet for drainages are not included in land cover totals.

5.3.1 Grassland

There are approximately 565 acres of grasslands mapped on the Altamont HMU. This includes 547 acres of annual grassland and 18.3 acres of alkali grassland. The grasslands, particularly annual grassland, are dominated by nonnative annual species. These species were introduced as early as 1760 by unassisted migration or by transport in the belongings or livestock of travelers from the Spanish settlements outside of California or in ship’s cargo of coastal explorers. These nonnative
Figure 5-1
Los Vaqueros Expansion Project
Altamont HMU
plant invaders included very aggressive annual grasses and forbs from the grasslands of the Mediterranean region that quickly replaced native species, both with and without the influence of livestock grazing (Hendry 1931; Blumler 1992; Bartolome et al. 2007). Grassland types found in the Altamont HMU are briefly described below.

**Annual Grassland**

The majority of the Altamont HMU, approximately 97%, consists of annual grassland habitat. This habitat type is dominated by nonnative annual grasses including soft brome, ripgut brome, Italian ryegrass, wild oat, and barley. Several nonnative invasive forb species are also found, sometimes in heavy patches, in annual grasslands on the HMU. These include milk thistle, Italian thistle, yellow star thistle, black mustard, and wild radish (ESA 2010g, 2010h, 2010i). Turkey mullein and pitgland tarweed were the most prevalent native forb species observed in annual grasslands on the HMU. Traces of native perennial bunchgrasses, primarily needle grass, were also observed in annual grasslands throughout the HMU during the Planning and Inventory Period.

**Alkali Grassland**

Alkali grassland habitat is associated with alkaline to saline soils and typically retains moisture for more of the year compared to the adjacent annual grasslands. Approximately 18.3 acres of alkali grassland are found in the Altamont HMU, primarily on Pescadero clay and Altamont rocky clay soils. In the Altamont Pass Road Unit approximately 14.2 acres of alkali grassland occur, primarily associated with the intermittent and ephemeral drainages crossing the unit. The 0.7 acre of alkali grassland habitat in the Grant Line Road Unit and 3.4 acres in the Mountain House Unit are associated with a south-to-north running intermittent drainage on the eastern edge of the unit and a west-to-east running intermittent drainage in the center of the unit, respectively.

Saltgrass is the dominant species in alkali grasslands in the HMU. Other species commonly found in alkali grassland include Mediterranean barley, alkali mallow, and alkali heath. Dense patches of stinkwort and perennial pepperweed were also observed in alkali grasslands in the HMU, especially in the Mountain House Unit.

**5.3.2 Mulefat Scrub**

A small patch, approximately 0.1 acre, of scrub dominated by mulefat is found in the Mountain House Unit. This habitat type is at the northeast end of the eastern pond. Mulefat is a facultative wetland species and this patch of scrub has persisted despite receding water levels around the pond with cessation of groundwater pumping in 2007.
5.3.3 Wetlands

Seasonal Wetland

Approximately 0.2 acre\(^8\) of seasonal wetlands is mapped in the Altamont HMU, all in the Mountain House Unit. Seasonal wetland habitat is found in two areas of this unit, both in close association with Mountain House Creek. The larger seasonal wetland occurs just west of the stock pond found on the unit. This wetland likely retains water due to a water diversion structure that diverts water from Mountain House Creek into the adjacent pond during high flows. The larger seasonal wetland is sparsely vegetated, although alkali heath, alkali mallow, saltgrass, and the nonnative perennial pepperweed were observed in this area. The smaller seasonal wetland occurs in the channel of Mountain House Creek and is dominated by rush species.

Saltgrass Seasonal Wetland

Saltgrass seasonal wetland habitat was mapped in both the Mountain House and Altamont Pass Road Units of the HMU. In the Mountain House Unit, the approximately 1.4 acres of saltgrass seasonal wetland is limited to the intermittent drainages running through the unit. The approximately 0.4 acre of saltgrass seasonal wetland in the Altamont Pass Road Unit occurs in association with Mountain House Creek and the north-south running intermittent drainage in the eastern portion of the unit. This habitat type is associated with Pescadero clay and Altamont clay soil types.

Saltgrass is the dominant species found in this habitat type in the Altamont Pass Road Unit, although alkali mallow, rabbitsfoot grass, and Mediterranean barley occur in areas where the saltgrass isn’t as dense. In the Altamont Pass Road Unit, saltgrass is also the dominant species; however Mexican rush (*Juncus mexicanus*) occurs as a co-dominant in the wettest areas. Other species found in saltgrass seasonal wetland habitat in the Altamont Pass Road Unit include iris-leaved rush, rabbitsfoot grass, perennial pepperweed, saltmarsh bulrush (*Schoenoplectus robustus*), and Mediterranean barley.

Ponds

There are six ponds in the Altamont HMU, one pond in the Altamont Pass Road Unit, two in the Grant Line Road Unit, and three in the Mountain House Unit. Additionally, there are twelve catchment ponds in the Grant Line Road Unit that were developed to capture bio-solid laden runoff. Six of these catchment ponds actively pond water for portions of the year.

The approximately 0.3-acre pond in the Altamont Pass Road Unit occurs in alkali grassland in the northeastern portion of the unit. A water diversion structure diverts water from Mountain House Creek into this pond during high flows. Due to this structure, the pond appears to hold water through much of the year, although it was dry during site visits in September 2011. This pond is sparsely vegetated with saltgrass, alkali heath, and the nonnative invasive perennial pepperweed.

\(^8\) A formal wetland delineation has not been conducted for the Altamont HMU; therefore acreages of wetland habitats are approximations.
along the fringes and traces of seaside heliotrope (*Heliotropium curassavicum*) in the bottom of the pond.

The two stock ponds in the Grant Line Road Unit occur in association with the drainage traversing the eastern edge of the unit. The south pond, which is approximately 0.3 acre, is located within the drainage and the north pond, which is approximately 0.7 acre, is just off-channel in ruderal habitat near the equestrian facility. Both ponds appear to retain water year-round, although water levels appear to fluctuate fairly drastically (ESA 2010h). Due to fluctuating water levels and cattle grazing and trampling, the fringes of both of the ponds were relatively devoid of emergent vegetation. The six small catchment ponds that seasonally pond water are located in the northern portion of the unit and cover approximately 0.2 acre. These catchment ponds are located in annual grassland habitat and are mostly unvegetated or sparsely vegetated with species such as common cocklebur and turkey mullein.

The three ponds in the Mountain House Unit cover approximately 1.4 acres and retain water year-round. The center and east ponds are much larger than the west pond, which is more of a typical stock pond. All three ponds are relatively devoid of emergent vegetation, although a small patch of broad-leaved cattail (*Typha latifolia*) was observed along the fringe of the east pond and a few willow trees are located around the center pond. Two nonnative invasive species—perennial pepperweed and stinkwort—were observed around all three ponds, but they were particularly heavy around the center and east ponds. Vegetation around the west pond consists primarily of saltgrass and alkali heath.

### 5.3.4 Riverine and Riparian

Although a patch of mulefat scrub occurs near the east pond and a few willows were observed around the center pond in the Mountain House Unit, no woody riparian habitat exists in the Altamont HMU. Intermittent drainages are found in the Altamont Pass Road and Mountain House Units and ephemeral drainages are found in the Altamont Pass Road and Grant Line Road Units.

Two intermittent drainages and one ephemeral drainage occur in the Altamont Pass Road Unit. One of the intermittent drainages, Mountain House Creek, generally crosses the unit west-to-east. The other, unnamed, intermittent drainage flows from the adjacent Grant Line Road Unit in a northward direction until it reaches Mountain House Creek at the north end of the unit. The ephemeral drainage in the Altamont Pass Road Unit runs parallel to and just south of Altamont Pass Road along the northwestern edge of the unit. Vegetation along the drainages in the Altamont Pass Road Unit consists of species found in alkali grassland and saltgrass wetland habitat described above.

Scattered pools, ranging from 2 to 3 feet deep also occur along Mountain House Creek (ESA 2010g). Although the majority of Mountain House Creek is an intermittent drainage, a small section at the west end of the unit retains water year-round. Cattail, iris-leaved rush, and perennial pepperweed are found in this area of the drainage. Nonnative mosquitofish (*Gambusia affinis*) were observed in a few of the 4- to 6-inch pools during preliminary habitat assessments. An ephemeral drainage runs north to south on the eastern edge of the Grant Line Road Unit. Vegetation along this drainage consists of species found in saltgrass seasonal wetland habitat described above. The intermittent drainage in the Mountain House Unit runs west–southwest through the unit. This drainage lies in
alkali grassland habitat. In addition to alkali grassland vegetation, two nonnative invasive species, stinkwort and perennial pepperweed, also occur in heavy patches along this drainage.

5.3.5 Ruderal

Approximately 61.6 acres of ruderal habitat is mapped in the Altamont HMU, the majority of which (56.8 acres) occurs in the Mountain House Unit. The approximately 4.8 acres of ruderal habitat in the Grant Line Road Unit consist primarily of bare ground associated with the cattle holding pens, livestock staging area, and the area around the northern stock pond. Ruderal habitat in the Mountain House Unit is generally associated with former golf course tees, fairways, and greens and the area around the center and east ponds (ESA 2010i). Prior to golf course development, ruderal areas generally consisted of annual grassland habitat; however, during construction these areas were graded, contoured, covered with imported soil and sand and planted with turf grass (primarily bluegrass [Poa sp.]). When irrigation of these areas ceased following closure of the golf course, the turf grass died leaving behind large areas of relatively barren ground. Some vegetation is returning to these areas; however, dominant species in ruderal areas consist of nonnative invasive species such as Italian thistle, black mustard, stinkwort, and milk thistle.

5.3.6 Developed

Developed areas, totaling approximately 19.3 acres, are found on all three units of the HMU. Only a small portion of the Altamont Pass Road unit, approximately 0.5 acre, is mapped as developed. This area corresponds with four transmission line towers in the northwestern and south central portions of the unit. In the Grant Line Road Unit, the approximately 10.2 acres of developed land include parking areas, two residences, farm buildings, industrial facilities and associated ornamental landscaping in the northeast portion of the unit. Additionally, small areas consisting of several small buildings that previously housed electrical equipment for an abandoned wind energy generation facility are mapped as developed land on the southwest portion of the unit. The 8.6 acres of developed land in the Mountain House Unit includes paved roads, parking lots, golf course equipment and electric substation pad sites, 10-foot wide paved golf cart paths, the causeway between the east and center ponds, rock riprap in the drainage north of the east pond, and five Pacific Gas and Electric Company (PG&E) transmission towers.

5.4 Species Overview

Habitat for four federally and state-listed wildlife species—California tiger salamander, California red-legged frog, Alameda whipsnake, and San Joaquin kit fox—was affected by the Los Vaqueros Reservoir Expansion Project. Preserving and enhancing habitat for these four species is the primary goal for the Mitigation Lands. Two of these species, California red-legged frog and California tiger salamander, have been observed on the Altamont HMU. Potential habitat for the San Joaquin kit fox is also present on the HMU. Each of these three species is discussed below.
5.5 San Joaquin Kit Fox

Open, grazed grasslands are the primary habitat for San Joaquin kit fox denning, foraging, and dispersal. Approximately 565 acres of open grassland habitat are suitable for San Joaquin kit fox in the HMU. Continuous with high quality grassland habitat to east, north, and west, kit fox could also potentially use the HMU as a movement corridor. Historically, the area around the Altamont HMU was heavily used by San Joaquin kit fox and several kit fox occurrences have been recorded from the vicinity of the HMU (California Department of Fish and Game 2011). Kit foxes have not been observed in the HMU; however, they have been reported at 12 locations within 3 miles of the HMU. The closest occurrence to the HMU is from 1975 when a kit fox was reported on Altamont Pass Road in the immediate vicinity of the Altamont Pass Road Unit.

Despite site development and temporary use as a golf course, the Mountain House Unit still provides high quality habitat for San Joaquin kit fox. USFWS required annual grasslands to be managed to support San Joaquin kit fox during management of the unit as a golf course. Currently, grasslands interspersed with barren areas provide movement and denning opportunities for kit fox (ESA 2010i).

Two large tunnels pass under I-580 and connect the Altamont Pass Road Unit and the Grant Line Road Unit. One of the tunnels, constructed to allow livestock access between, is a box culvert 10 feet across. The other tunnel is a 10-foot diameter corrugated metal pipe that conveys water from the Grant Line Road Unit to Mountain House Creek on the Altamont Pass Road Unit. Evidence of wildlife use of both of these tunnels was observed during preliminary habitat assessments (ESA 2010g, 2010h).

Potential kit fox burrows that could serve as dens were observed in the Altamont Pass Road and Mountain House Units during the preliminary habitat assessments; however, no potential burrows were noted in the Grant Line Road Unit. Bio-solids application and associated disking activities on the Grant Line Road Unit have reduced denning and foraging opportunities for kit fox over much of the unit (ESA 2010h).

5.6 California Tiger Salamander

Habitat for the federally and state-listed threatened California tiger salamander includes vernal pools and seasonal and perennial ponds, including artificial water bodies such as stock ponds, for breeding habitat and surrounding upland grassland habitat for aestivation (Federal Register 69 (149):47212–47248). Burrows of California ground squirrels and Botta’s pocket gophers are commonly used by California tiger salamander as underground refuge sites. Although most of the adult tiger salamander’s life is spent in burrows within upland habitat, ponds and pools of sufficient depth and duration of ponding are required for breeding.

California tiger salamanders have been documented in both the Grant Line Road and Mountain House Units of the Altamont HMU, near the site of the current east pond in the Mountain House Unit and in two of the catchment ponds in the Grant Line Road Unit (California Department of Fish and Game 2011). These observations are from 2003 and 2005, respectively. Approximately 75
California tiger salamander larvae were observed in the Mountain House Unit in the area near where the east pond is currently located. The pond where the larvae were observed in 2005 was drained and enlarged during construction of the Mountain House golf course. Suitable California tiger salamander breeding habitat, however, still exists in the east pond. Although California tiger salamanders have not been documented from the Altamont Pass Road Unit due to a lack of recent surveys, they have been observed between 1987 and 2008 in several locations in the vicinity of the unit, including along Altamont Pass Road (ESA 2010g).

Annual grassland, alkali grassland, and saltgrass seasonal wetland habitat in the HMU provide upland refugia habitat during the dry season and during movement periods. Few small burrows, suitable for underground refugia are present in the Altamont Pass Road Unit and the portion of the Grant Line Road Unit that was subject to bio-solids application and tilling (ESA 2010g, 2010h). Small mammal burrows; however, are found throughout other portions of the Altamont Pass Road and Grant Line Road Units and through the annual grasslands of the Mountain House Unit. Ruderal habitat on the Mountain House Unit is starting to be colonized by small mammals which will provide additional underground refugia opportunities.

All six ponds in the HMU provide suitable breeding habitat. Additionally, six of the catchment ponds in the Grant Line Road Unit appear capable of pooling water to depths of 3 feet or more; however, it is unknown whether these ponds retain water thru the California tiger salamander breeding season (ESA 2010h). The two seasonal wetlands and deeper pools in the drainages in the Altamont Pass Road Unit are also deep enough and retain water for substantial periods to provide potential California tiger salamander breeding habitat during wet years, though they may not provide breeding habitat every year.

5.7 California Red-Legged Frog

Breeding habitat for the California red-legged frog, a federally listed threatened species and a California species of concern, includes permanent or semi-permanent water in various aquatic and riparian habitats, including artificial water bodies such as stock ponds (U.S. Fish and Wildlife Service 2002). Although red-legged frogs appear to prefer areas of water with relatively dense woody riparian or emergent vegetation, they have also been observed in areas lacking riparian or emergent vegetation. Upland and riparian areas are used for foraging, dispersal, and refuge. During dry periods red-legged frogs will seek refuge in areas including under boulders, rocks, downed wood, moist leaf litter, and in small mammal burrows (U.S. Fish and Wildlife Service 2002).

California red-legged frogs have been documented in the Altamont HMU. During preliminary habitat assessments in 2010, many adult frogs were observed, primarily in patches of cattail, in the east and center ponds of the Mountain House Unit (ESA 2010i). Additionally in 2011 in the Grant Line Road Unit, six adults and twenty hatch-year juvenile red-legged frogs were observed in the southern pond and two hatch-year frogs were observed in an area of standing water in the intermittent drainage (DiDonato pers. comm.).

Other documented occurrences in the HMU include a 2005 observation of an adult red-legged frog in the drainage upstream from the southern pond on the Grant Line Road Unit and a 2006
observation of a juvenile frog in the west pond in the Mountain House Unit (California Department of Fish and Game 2011). Although red-legged frogs have not been documented in the Altamont Pass Road Unit, there are documented occurrences located within 1,500 feet both north and east of the site (California Department of Fish and Game 2011). Several other occurrences of red-legged frog have also been documented in the vicinity of the HMU.

Suitable breeding habitat for California red-legged frog is found in all six ponds in the HMU, despite the lack of vegetative cover around most of these ponds. Seasonal wetlands and pools along Mountain House Creek in the HMU provide breeding habitat in wetter years. Year-round water and vegetative cover along the western portion of Mountain House Creek also provide summer habitat for juvenile and adult red-legged frogs. A few of the catchment basins in the Grant Line Road unit may be deep enough to sustain California red-legged frog breeding (DiDonato pers. comm.). Alkali and annual grassland habitat adjacent to wetland and drainages in the HMU also provide foraging, dispersal, and refugia habitat for red-legged frog during the non-breeding season.

5.8 Other Special-Status Species

The following sections discuss the wildlife and plant species that are not included in the compensatory mitigation program required in the permits for the Los Vaqueros Reservoir Expansion Project and there are no specific enhancement or monitoring requirements associated with them. However, the District will ensure their protection and it is anticipated they will benefit from management actions taken for covered species.

5.8.1 Special-Status Wildlife Species

Two other special-status wildlife species, western burrowing owl and western pond turtle (*Emys marmorata*), have been observed on the Altamont HMU. These two species are briefly discussed below.

Western Burrowing Owl

Western burrowing owls, a California species of special concern, are typically found in dry, open, low-growing grasslands and typically nest in burrows created by small mammals such as ground squirrels and pocket gophers. This species is most active at dawn and dusk and preferred prey includes small mammals, insects, and lizards. Several occurrences of burrowing owls have been documented in the HMU (California Department of Fish and Game 2011). Burrowing owls were also observed on all units of the HMU during preliminary habitat assessments in 2010 (ESA 2010g, 2010h, 2010i). Twelve burrowing owls were observed in five different locations, primarily in ruderal habitat, in the Mountain House Unit in July 2010 (ESA 2010i). One burrowing owl was observed in the Altamont Pass Road Unit in an area of annual grasslands containing natural rock outcrops in the eastern portion of the unit in September 2010 (ESA 2010g). An active burrow complex was also observed in this area. One burrowing owl and an active burrow complex were observed in annual grassland habitat in the northwest portion of the Grant Line Road Unit in September 2010 (ESA 2010h).
Western Pond Turtle

Western pond turtle, a California species of special concern, inhabits a wide variety of water bodies, including ponds, marshes, rivers, streams, and irrigation canals. Western pond turtle females migrate away from their water bodies into surrounding uplands, where they construct underground nests and lay eggs from April to August. Two western pond turtles were observed in the east pond in the Mountain House Unit during preliminary habitat assessments in July 2010 (ESA 2010i).

5.8.2 Special-Status Plant Species

No special-status plant species have been observed on the Altamont HMU.

5.9 Interim Management Plan

The goals, objectives, and management actions outlined in this chapter will be carried out during the Interim Management Period, proposed to be the first 5 years that follow plan approval. Goals, objectives, and management actions are given unique identifiers within each HMU. For example each goal, objective, and management action within the Altamont Unit is given a number that includes AL, which stands for Altamont. This is done so that each activity can be easily referenced later in the document. The Long-Term Management Program for all HMUs is provided in Chapter 7.

5.9.1 Element AL1 – Grasslands

Goal AL1—Enhance and maintain rangeland health to provide habitat for native plants and animals and minimize invasive plants in all grasslands in the HMU.

Objective AL1—Develop and implement annual grazing plans which consider the timing, duration, and intensity of livestock grazing needed to protect soil, support plant germination, control nonnative species, and provide opportunities for expansion of native plant species, while maintaining upland habitat for California tiger salamander, California red-legged frog, Alameda whipsnake, and San Joaquin kit fox.

Management Action AL-MA1—Through controlled grazing, managers will seek to maintain an average residual dry matter (RDM) of between 800 to 1,200 pounds per acre but no less than 500 lbs/acre on level and low slopes, and at least 800 lbs/acre on steep slopes in the fall to protect overall rangeland health. Also maintain herbaceous (grass and forbs) height (measured as obstruction using a Robel pole) below the maximum—no more than 12 inches year-round (measured in both spring and fall), regardless of slope, to retain habitat for native wildlife. Favorable weather conditions often make the herbaceous vegetation grow very rapidly, beyond the control of typical grazing operations. Thus spring herbaceous height may exceed the standard for short periods if average or above average rainfall occurs in the previous rain year. In order to keep grass shorter than 12 inches as often as feasible, the rangeland managers and grazing operators will plan for flexibility and be able to respond quickly to changing conditions, such as designating flexible-use fields to allow more precise grazing management of the designated habitat areas, and developing more watering facilities to better distribute grazing.
AL-MA1 Monitoring Protocol

- Conduct visual monitoring of RDM levels across each unit annually to determine trends and areas of variation that may warrant changes in grazing practices.

- Establish at least four RDM monitoring points on each unit for a total of 12 monitoring points for the HMU, appropriately located to capture a representative subset of the slopes on the unit. Record visual estimates of RDM levels at these 12 locations annually, between October 1 and November 15.

- Conduct photo documentation annually at these 12 points during the RDM surveys.

- Visually assess the presence of ground squirrels at each rangeland monitoring location and document presence/absence.

- Conduct springtime grass height assessment during April 1 – May 31.

- Establish additional monitoring locations including photo points, if necessary, to capture unique features of the HMU or to specifically investigate grazing levels in a particular location.

AL-MA1 Performance Standards

- Maintain RDM levels of at least 500 lbs/acre on low and level slopes and at least 800 lbs/acre on steep slopes.

- Maintain grass height less than 12 inches obstruction height (measured using a Robel pole), regardless of slope, year-round.

AL-MA1 Adaptive Management

- If performance standards are not being met the District will work with the grazing tenant to modify grazing management on the site. This could be a combination of changes during the spring and summer, if grass height requirements are not being met, or changes from year to year, if RDM standards are not being met. For example, starting grazing later to allow early forage growth, extending the grazing end date for late season growth, changing the species used for grazing from selective to non-selective grazers, moving water troughs to redistribute grazing pressure.

- In addition to changes in grazing from year to year in response to climate conditions, the District and grazing operators will stay apprised of research on managing grasslands for threatened and endangered species using grazing, and adapt annual grazing plans to always include the best available science in rangeland management.

AL-MA1 Reporting Requirements

The following items will be included in the annual report submitted to the Wildlife Agencies.

- Records of visual estimates of RDM and average grass height at each monitoring location.

- Locations where RDM and grass height objectives are unable to be met due to constraints beyond the control of the District or the grazing operator and a brief description of those constraints.
• Photos taken at each monitoring location.
• Presence or absence of ground squirrels in the HMU annually and any noticeable changes in the extent of the population from year to year.
• Any year-to-year changes in annual grazing practices based on visual RDM estimates and grass height monitoring.

Management Action AL-MA2—Conduct springtime visual monitoring of available forage to allow for inter-annual adjustments to grazing practices. This will ensure grassland habitat will remain suitable for San Joaquin kit fox, California tiger salamander, and California red-legged frog through the summer months.

AL-MA2 Monitoring Protocol
• Conduct visual monitoring annually (April–May) of grass height (obstruction height monitoring using a Robel pole) and forage availability across each unit to determine trends and areas of variation that may warrant changes in grazing practices. Such changes could be seasonal or temporary, to account for short-term conditions such as drought, or long-term, to account for cumulative vegetation response.
• Establish four visual monitoring stations on each unit, preferably the same four that are used for RDM monitoring, appropriately located to capture a representative subset of the slopes in the HMU. Record visual estimates of grass height at these four locations annually in the spring.
• Conduct photo documentation at these six points during springtime grass height surveys.
• Establish additional monitoring locations, if necessary, to capture unique features of the unit or to specifically investigate forage levels in a particular location.

AL-MA2 Performance Standards
• Maintain grass height less than 12 inches (obstruction height measures using a Robel pole), regardless of slope.

AL-MA2 Adaptive Management
• If performance standards are not being met the District will work with the grazing tenant to modify grazing management on the site. This could be a combination of changes during the spring and summer, if grass height requirements are not being met, or changes from year to year, if RDM standards are not being met.
• In addition to changes in grazing from year to year in response to climate conditions, the District and grazing operators will stay apprised of research on managing grasslands for threatened and endangered species using grazing, and adapt annual grazing plans to always include the best available science in rangeland management.

AL-MA2 Reporting Requirements
• Submit records of visual estimates of average grass height at each monitoring location.
• Submit photos taken at each monitoring location.
• Report any inter-annual changes in grazing practices that are observed during visual springtime forage monitoring.

**Management Action AL-MA3**—Utilize Integrated Pest Management strategies for control, containment, and/or prevention of Cal-IPC listed invasive plants with an “Impact” or “Invasiveness” rating of High for the region and those that pose ecological threat to habitat in the HMU. These include but are not limited to the following:

• Containment strategy for stinkwort and perennial pepperweed.
• Control strategy for yellow star thistle, black mustard, and milk thistle which may include grazing and/or herbicides.

**AL-MA3 Monitoring Protocol**

• Document baseline extent of Cal-IPC listed invasive plants with an “Impact” or “Invasiveness” rating of High and those that pose an ecological threat to habitat in the HMU.
• Determine two highest priority areas on each unit where infestations are threatening the ecology of the site (i.e., aggressive species, particularly dense infestations) and use these areas as indicator sites for invasive plant monitoring.
• Establish photo documentation points in each of these six indicator sites.
• Conduct visual monitoring and photo documentation of these six indicator sites annually.
• At the end of Year 5 conduct another survey of all Cal-IPC listed invasive plant species (as defined above) on each unit to compare against baseline and adjust management activities and monitoring locations accordingly if priorities have changed.

**AL-MA3 Performance Standards**

• Reduce all Cal-IPC listed plant infestations and infestations of species that pose an ecological threat to habitat in the HMU which are ranked as high density (51–100% of stand) during baseline survey to medium (26–50%) or low density (6–25%).
• Reduce all Cal-IPC listed plant infestations and infestations of species that pose an ecological threat to habitat in the HMU which are ranked as medium density during baseline survey to low density.
• Maintain all Cal-IPC listed plant infestations and infestations of species that pose an ecological threat to habitat in the HMU which are ranked as low density during baseline survey at no greater than low-density level.

**AL-MA3 Adaptive Management**

• Adaptive management is built into the Control, Containment, and Prevention strategy for invasive plant species. Should control techniques fail initially, revised techniques will be implemented until success criteria are met. Changes in control strategy will be discussed with invasive plant species control specialists and other land managers in the region to ensure the best management techniques are being utilized.
AL-MA3 Reporting Requirements

- Submit annual report on methods used to contain and control invasive plants during the prior year, including herbicide application, specific grazing regimes, etc.
- Include initial assessment of success of all non-grazing invasive species control methods, particularly herbicide application.
- Submit records of invasive plant density visual estimates at the six monitoring locations.
- Submit photos taken at each monitoring location.

5.9.2 Element AL2 – Ponds, Wetlands, and Riparian

Goal AL2—Enhance and maintain ponds, wetlands, and riparian areas in the HMU.

Objective AL2—Retain and enhance all existing ponds, wetlands, and riparian areas.

Management Action AL-MA4—Preserve, enhance, and restore existing ponds, wetlands, and riparian areas for native species, to maximize freshwater permanent emergent wetland habitat\(^9\), and especially to maximize their habitat suitability for California red-legged frog and/or California tiger salamander. Examples include pest plant control and grazing management that will favor native wetland species, allowing them to establish in additional areas, thus expanding the habitat footprint. Some minimal excavation could occur if it will benefit the species by increasing the ponding duration or add needed depth to a pond to allow California tiger salamanders to breed. This will be considered on a site-specific basis.

An assessment will take place in Year 1 to determine if any of the ponds, wetlands, or riparian areas in the HMU can be restored to support more freshwater permanent emergent wetland habitat. As part of that assessment all existing aquatic habitats will be delineated to set a baseline. Expansion of ponds will be coordinated with the needs for additional water features identified in annual grazing plans for grazing activities and cost for such activities could be shared with grazing operators.

As discussed under Element AL4, Management Action AL-MA7, and Element AL5, Management Action AL-MA8, below, an assessment will be completed to determine which aquatic features currently support California tiger salamander and California red-legged frog in the first 2 years of the Interim Management Period. Following those surveys a determination will be made about how to manage each aquatic feature so that it provides habitat for either California tiger salamander, California red-legged frog, or both species. The ultimate goal is to maximize habitat potential for both species, but characteristics of each location may favor one species over the other.

Please see Element AL4 and Element AL5 below for more detail on the management actions and monitoring requirements for this Management Action.

---

\(^9\) The Los Vaqueros Reservoir Expansion Project – Draft Wetland Compensatory Mitigation Plan (January 2011) states that 0.60 acre of freshwater permanent emergent wetland will be restored on HMU lands. A portion of that 0.60 acre will be restored in this HMU.
AL-MA4 Monitoring Protocol

- Use a sub-meter GPS unit to determine and map the extent of aquatic features and wetland plants—the total baseline acreage of any freshwater permanent emergent wetlands that are to be expanded in the HMU.
- Establish photo documentation points in any freshwater permanent emergent wetland restoration areas.
- For the first year following wetland restoration, conduct quarterly inspections of the site to determine whether grazing animals are affecting plant establishment.
- In Years 1 and 2, following completion of wetland restoration, conduct annual photo monitoring to provide visual documentation of site functionality.
- In Year 3 use a sub-meter GPS unit to determine and map the extent of wetland features (i.e., aquatic features and wetland plants) for a second time to compare to baseline.

AL-MA4 Performance Standards

- Performance standards for each freshwater emergent permanent wetland restoration site will be established during conceptual design.
- By Year 3 a net increase in wetland acreage will total 0.6 acre across all HMUs.

AL-MA4 Adaptive Management

- If additional acres of freshwater emergent permanent wetland habitat are not being sustained 3 years after restoration activities are complete, the District will determine the cause of failure at the restoration site and corrective action will be taken to either fix the issue at that restoration site or to attempt restoration at another location.
- If at any point it is determined that grazing animals are having a negative effect on wetland function they will be excluded as needed to let wetlands recover. This may be done annually if the issue persists.

AL-MA4 Reporting Requirements

- Submit baseline wetland acreage of any wetlands in the HMU that are to be restored.
- For the first 2 years following restoration, submit annual report that includes photos of restoration site taken from photo monitoring points.
- In Year 3 submit the second wetland acreage to determine whether wetland restoration activities were successful.
- From Year 3–5 submit photo documentation of wetland restoration site to demonstrate habitat function and quality.
- Submit annual report on methods used to contain and control invasive species during each year if actions were necessary.
- Submit information on any land management modifications that were required (e.g., grazing) during the year based on observations during wetland monitoring.
5.9.3 Element AL3 – San Joaquin Kit Fox

Goal AL3—Maintain a habitat condition in grasslands and oak woodlands that is suitable for San Joaquin kit fox.

Objective AL3—Maintain grassland that is less than 12 inches tall (measured as obstruction height) year-round and supports an abundance of prey species for San Joaquin kit fox, considering rainfall totals from the previous rain year.

Management Actions AL-MA1, AL-MA2, and AL-MA3, all discussed above, will be implemented to achieve this objective. Monitoring protocols and performance standards discussed in those sections will be utilized to determine whether this objective is being met on an annual basis.

Objective AL4—Maintain or increase abundance of California ground squirrels in the HMU and passively monitor for presence of San Joaquin kit fox using motion-activated cameras.

Management Action AL-MA5—Eliminate any active rodent control programs (poisons, fumigants, shooting) including those implemented by County and private contractors (lessees) in the HMU, except for targeted application to protect infrastructure (i.e., road embankments, stock pond dams) and allow California ground squirrels to passively repopulate grasslands. Establish a motion-activated camera monitoring program.

AL-MA5 Monitoring Protocol
- Visually assess the presence of ground squirrels at each rangeland monitoring location and document presence/absence.
- Maintain at least two motion-activated cameras and scent stations on each unit within the HMU to detect San Joaquin kit fox.

AL-MA5 Performance Standards
- Realize a net increase in total number of California ground squirrels and the total number of burrows in the HMU over the life of the permit.
- Place each camera in the HMU for at least 6 months of the year and monitor frequently to ensure proper function.

AL-MA5 Adaptive Management
- If ground squirrels and other burrowing mammals are not returning to the area, determine root cause of problem. Modify grazing rotation if it is determined that adjusting the number of animals concentrated in an area could influence ground squirrel populations.
- Continue to move cameras until it is determined that camera placement is maximizing the detections of wildlife movement in the area.

AL-MA5 Reporting Requirements
- Report presence or absence of ground squirrels in the HMU annually and any noticeable changes in the extent of the population from year to year.
Any photos of rare species will be included in annual monitoring report along with a summary of the number of camera trap nights and maps of camera station locations. Any photos of San Joaquin kit fox will be reported to the Wildlife Agencies immediately upon verification of sighting.

**Objective AL5**—Maintain wildlife-friendly entry to any existing passageways under the freeway.

**Management Action AL-MA6**—Maintain tunnel entry ways that are visible to passing wildlife, have wildlife-friendly vegetation around them, and provide adequate fencing to direct wildlife to the entry.

**AL-MA6 Monitoring Protocol**
- During annual inspection of infrastructure ensure that fencing remains viable around tunnel entryways.
- Maintain motion-activated cameras on either side of tunnels to document animal movement through tunnels. Operate cameras for at least 6 months each year. A portion of this monitoring will include monitoring of the tunnels at a distance to determine if wildlife are approaching the tunnel and not entering.

**AL-MA6 Performance Standards**
- Retain viable tunnel entryways under I-580.

**AL-MA6 Adaptive Management**
- Adaptive management options are limited in these locations. If a high wildlife movement repel rate is documented other vegetation enhancement may be tried to attract wildlife through tunnels.
- The District has limited ability to modify the tunnels themselves though should the opportunity arise within a Caltrans project on I-580 the District will enter into discussions with Caltrans at that time.

**AL-MA6 Reporting Requirements**
- Any photos of rare species will be included in annual monitoring report along with a summary of number of camera trap nights and maps of camera station locations.
- Report wildlife passage rates and wildlife repel rates at each tunnel in annual report.

### 5.9.4 Element AL4 – California Red-Legged Frog

**Goal AL4**—Enhance aquatic and upland habitat for California red-legged frog.

**Objective AL6**—Maintain grassland that is less than 12 inches tall (measured as obstruction height) year-round and maintain or increase abundance of California ground squirrels in the HMU as both grassland height and presence of California ground squirrel burrows are key indicators of high habitat quality for this species.
Management Actions AL-MA1, AL-MA2, AL-MA3, and AL-MA4, all discussed above, will be implemented to achieve this objective. Monitoring protocols and performance standards discussed in those sections will be utilized to determine whether this objective is being met on an annual basis.

Objective AL7—Retain the functionality of existing California red-legged frog breeding sites and expand the number of breeding locations in the HMU where possible.

Management Action AL-MA7—Develop target vegetation cover levels and associated management actions for all pond, wetland, and wetted riparian habitat areas that are not occupied by California red-legged frog, but that hold water for a period sufficient to support breeding of this species. Utilize vegetation cover levels and habitat conditions at occupied aquatic sites that support successful breeding in the HMU or in the vicinity as reference sites.

- Following the completion of California red-legged frog surveys in Years 1 and 2, characterize the vegetation type and cover levels (focusing on emergent vegetation in the water and shade from overhanging vegetation), presence of predators, and general condition of all pond, wetland, and wetted riparian habitat areas that are occupied by California red-legged frog and where successful breeding has been documented.

- Utilize information gathered from occupied locations to develop habitat targets (vegetation type, percent cover, and general condition) for similar but unoccupied aquatic habitats in the HMU (e.g., ponds for ponds, riparian areas for riparian areas).

- Use individual assessments for each pond, wetland, and riparian area to determine suitability for California red-legged frog.

- Set vegetation target levels and specific management actions (e.g., predator eradication, cattle exclusion, removal of nonnative plants) based on species need and site conditions. In many cases vegetation target levels may favor one species over another, but in general the goal is to optimize habitat for both California tiger salamander and California red-legged frog, particularly in pond and wetland habitat.

AL-MA7 Monitoring Protocol

- A biologist with a Section 10 collecting permit will conduct dipnet surveys for California red-legged frog larvae at a representative set (up to nine) locations with suitable aquatic habitats (water depth and ponding duration sufficient to support breeding) in March/April, and dipnet surveys for metamorphs in September, to determine presence of California red-legged frog in the HMU. Monitoring will occur at a combination of ponds, wetlands, and pools along riparian areas.

- Report bullfrogs that are present during any aquatic surveys. Conduct a daytime and nighttime survey specifically for bullfrogs and other aquatic predators during the March/April and September California red-legged frog surveys.

- Assess general condition of pond, wetland, or riparian feature that supports breeding California red-legged frog for vegetation type and percent cover, plant species present in and around the
feature, plant species or other features being utilized for egg attachment, depth, turbidity, and pond temperature.

- Take photos of vegetation cover at all breeding sites during the same visit in which species presence surveys are conducted.

**AL-MA7 Performance Standards**

- Support breeding California red-legged frog in all pond, wetland, and wetted riparian features that have the natural (or designed, in the case of stock ponds) depth and ponding duration to do so.
- Maintain aquatic habitats free of introduced aquatic predators of California red-legged frog and California tiger salamander.

**AL-MA7 Adaptive Management**

- If all suitable aquatic features do not support breeding California red-legged frog by Year 5 of the Interim Management Period the District will conduct a focused study to determine the limiting factors for species presence at the site.
- The results of the limiting factors investigation will be presented to the Wildlife Agencies and a decision will be made regarding future management actions required to try and attract California red-legged frog.

**AL-MA7 Reporting Requirements**

- Submit initial survey results of species presence (life stages observed and survey protocol) and vegetative cover and other site characteristics of occupied aquatic habitat that will be utilized to create metrics for unoccupied aquatic habitats.
- Submit a determination of suitability for California red-legged frog at each aquatic feature and a management strategy for each aquatic feature to either retain the species in the aquatic feature or to attract the species to that aquatic feature.
- Submit photos from monitoring points and results from annual vegetation cover surveys.

### 5.9.5 Element AL5 – California Tiger Salamander

**Goal AL5**—Enhance aquatic and upland habitat for California tiger salamander.

**Objective AL8**—Maintain grassland that is less than 12 inches tall (measured as obstruction height) year-round and maintain or increase abundance of California ground squirrels in the HMU as both grassland height and presence of California ground squirrel burrows are key indicators of high habitat quality for this species.

**Management Actions AL-MA1, AL-MA2, AL-MA3, and AL-MA4**, all discussed above, will be implemented to achieve this objective. Monitoring protocols and performance standards discussed in those sections will be utilized to determine whether this objective is being met on an annual basis.
Objective AL9 — Retain the functionality of existing California tiger salamander breeding sites and expand the number of breeding locations in the HMU where possible.

Management Action AL-MA8—Develop target vegetation cover levels and associated management actions for all ponds and wetlands that are not occupied by California tiger salamanders, but that hold water for a period sufficient to support breeding of this species. Utilize vegetation cover levels and habitat conditions at sites that support breeding in the HMU or vicinity as reference sites.

- Following the completion of California tiger salamander surveys in Years 1 and 2, characterize the vegetation type and cover levels (focusing on emergent vegetation in the water and shade from overhanging vegetation), presence of predators, and general condition of all ponds and wetlands that support successful California tiger salamander breeding.

- Utilize information gathered from occupied locations and available California tiger salamander literature to develop habitat targets (vegetation type, percent cover, and general condition) for similar but unoccupied aquatic habitats in the HMU (e.g., ponds for ponds, wetlands for wetlands).

- Use individual assessments for each pond and wetland to determine suitability for California tiger salamander.

- Set vegetation target levels and specific management actions (e.g., predator eradication, cattle exclusion, nonnative vegetation removal) based on species need and site conditions. In many cases vegetation target levels may favor one species over another, but in general the goal is to optimize habitat for both California tiger salamander and California red-legged frog, particularly in pond and wetland habitat.

AL-MA8 Monitoring Protocol

- A biologist with a Section 10 collecting permit will conduct dipnet surveys for California tiger salamander larvae at a representative set (up to nine) of locations (ponds) with suitable aquatic habitats (water depth and ponding duration sufficient to support breeding) in March/April to determine presence of California tiger salamanders in the HMU. Monitoring will occur at a combination of ponds and wetlands.

- Report presence of bullfrogs observed during all aquatic surveys. Conduct a daytime and nighttime survey specifically for bullfrogs and other aquatic predators during the September California red-legged frog surveys.

- Assess general condition of pond and wetland that supports breeding California tiger salamander for vegetation type and percent cover, plant species present in and around the feature, plant species or other features being utilized for egg attachment, depth, turbidity, and pond temperature.

- Take photos of vegetation cover at all breeding sites during the same visit in which species presence surveys are conducted.
**AL-MA8 Performance Standards**

- Support breeding California tiger salamander in all pond and wetland features that have the natural (or designed, in the case of stock ponds) depth and ponding duration to do so.
- Maintain aquatic habitats free of introduced aquatic predators of California red-legged frog and California tiger salamander.

**AL-MA8 Adaptive Management**

- If all suitable aquatic features do not support breeding California tiger salamander by Year 5 of the Interim Management Period the District will conduct a focused study to determine the limiting factors for species presence at the site.
- The results of that investigation will be presented to the Wildlife Agencies and a decision will be made regarding future management actions required to try and attract species.

**AL-MA8 Reporting Requirements**

- Submit initial survey results of species presence (life stages observed and survey protocol) and vegetative cover and other site characteristics of occupied aquatic habitat that will be utilized to create metrics for unoccupied aquatic habitats.
- Submit a determination of suitability for California tiger salamander at each aquatic feature and a management strategy for each aquatic feature to either retain the species in the aquatic feature or to attract the species to that aquatic feature.
- Submit photos from monitoring points and results from annual vegetation cover surveys.

### 5.9.6 Element AL6 – Facility Maintenance

**Goal AL6**—Maintain infrastructure in working condition to allow for implementation of the HMP.

**Objective AL10**—Maintain fencing and livestock water sources in the units necessary to meet habitat management goals.

**Management Action AL-MA9**—Conduct monitoring at least twice a year to ensure timely response to fencing and livestock water source issues.

- Conduct twice yearly inspection of all management-related interior fencing and livestock water sources and coordinate with livestock operators to confirm grazing program is being implemented effectively.
- Remove any unnecessary structures that create a hazard to humans or wildlife.

**Management Action AL-MA9**—Outline and initiate maintenance schedule for ponds including desilting and if necessary, draining to control predators.

- Conduct annual inspection of all ponds during first 5 years to determine rate at which ponds are collecting silt. This is particularly important following large rain events. Utilize this information to schedule dredging of ponds or draining, if facilities are built to allow draining, as needed to
ensure ponds continue to hold water at proper depth and duration for breeding amphibians and so that populations of bullfrogs do not establish.
6.1 Geographic Setting and Location

The Corral Hollow HMU is in southwestern San Joaquin County, south of the city of Tracy, California, and just west of I-580 (Figure 1-1, Figure 6-1). The majority of the HMU is south and east of Corral Hollow Road, although a small portion is north of the road. The Corral Hollow HMU encompasses approximately 3,021 acres and is on the Tracy USGS 7.5 minute quadrangle (Figure 6-1).

6.1.1 Parcels and Land Use History

The Corral Hollow HMU is zoned for agricultural use and is rangeland grazed by cattle. There is minimal road access to the parcel and similarly limited infrastructure (e.g., fences and water sources) which currently limits the size of the cattle operation.

6.2 Physical Factors

6.2.1 Topography

The Corral Hollow HMU is on the eastern slopes of the Diablo Range, southeast of the Livermore Valley, south of Altamont Pass and west of the Delta. The HMU consists of rolling hills with the steepest topography found in the southwestern portion. Elevations range from approximately 300 feet above msl to approximately 1,300 feet above msl.

6.2.2 Climate

The Corral Hollow HMU is in a region characterized by a Mediterranean climate. Summers tend to be hot and dry and winters long and cool, with precipitation falling as rain during the late fall, winter, and early spring months. Rainfall within the HMU averages between 8 and 10 inches annually and the average annual temperature is 75 degrees Fahrenheit.

6.2.3 Soils

There are thirteen soil series found within the Corral Hollow HMU (Natural Resources Conservation Service 2010) (Table 6-1). The most prominent soil types on the HMU are the Calla-Carbona complex (30 to 50% slopes) and the Calla-Pleito complex (8 to 30% slopes) found along the ridges and valleys running northwest to southeast in much of the central portion of the HMU and the Wisflat-Arburua-San Timoteo complex (30 to 50% slopes) found in the western and southwestern portions of the HMU.
Table 6-1. Soil Types within the Corral Hollow Habitat Management Unit

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Percentage of HMU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calla clay loam (2–8% slopes)</td>
<td>2.6</td>
</tr>
<tr>
<td>Calla-Carbona complex (8–30% slopes)</td>
<td>7.9</td>
</tr>
<tr>
<td>Calla-Carbona complex (30–50% slopes)</td>
<td>25.5</td>
</tr>
<tr>
<td>Calla-Pleito complex (8–30% slopes)</td>
<td>19.0</td>
</tr>
<tr>
<td>Carbona clay loam (2–8% slopes)</td>
<td>8.8</td>
</tr>
<tr>
<td>Carbona complex (15–50% slopes)</td>
<td>4.9</td>
</tr>
<tr>
<td>Pleito clay loam (2–8% slopes)</td>
<td>1.5</td>
</tr>
<tr>
<td>Reiff loam (0–2% slopes)</td>
<td>0.8</td>
</tr>
<tr>
<td>Vaquero-Carbona complex (8–30% slopes)</td>
<td>5.0</td>
</tr>
<tr>
<td>Wisflat-Arburua-San Timoteo complex (30–50% slopes)</td>
<td>17.2</td>
</tr>
<tr>
<td>Wisflat-Arburua-San Timoteo complex (30–50% slopes)</td>
<td>1.8</td>
</tr>
<tr>
<td>Xerofluvents-Xerothents complex (1–8% slopes; occasionally flooded)</td>
<td>3.0</td>
</tr>
<tr>
<td>Zacharias gravelly clay loam (0–2% slopes)</td>
<td>1.9</td>
</tr>
</tbody>
</table>

6.3 Land Cover

Acreages of each land cover type and linear feet of drainages on the HMU are provided in Table 6-2. The land cover data used in this HMP are based on the Preliminary Habitat Assessments of the properties (ESA 2010j, Appendix A). Each land cover type is described in further detail below.
Figure 6-1
Los Vaqueros Expansion Project
Corral Hollow HMU
Table 6-2. Land Cover Acreages and Linear Feet of Drainages in the Corral Hollow Habitat Management Unit

<table>
<thead>
<tr>
<th>Land Cover</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual grassland</td>
<td>2,954.0</td>
</tr>
<tr>
<td>Diablan sage scrub – black sage series</td>
<td>9.8</td>
</tr>
<tr>
<td>Diablan sage scrub – California buckwheat series</td>
<td>7.0</td>
</tr>
<tr>
<td>Diablan sage scrub – California sagebrush series</td>
<td>0.4</td>
</tr>
<tr>
<td>Freshwater emergent wetland(^a)</td>
<td>3.4</td>
</tr>
<tr>
<td>Northern claypan vernal pool</td>
<td>0.3</td>
</tr>
<tr>
<td>Saltgrass seasonal wetland</td>
<td>0.5</td>
</tr>
<tr>
<td>Fremont cottonwood riparian woodland</td>
<td>10.2</td>
</tr>
<tr>
<td>Developed</td>
<td>0.8</td>
</tr>
<tr>
<td>Ruderal</td>
<td>34.3</td>
</tr>
<tr>
<td>Drainages(^b)</td>
<td>63,265 (lf)</td>
</tr>
<tr>
<td>Total acres</td>
<td>3,021</td>
</tr>
</tbody>
</table>

\(^a\) A formal wetland delineation has not been conducted for the Corral Hollow HMU; therefore acreages of wetland habitats are approximations.

\(^b\) Linear feet for drainages are not included in land cover totals.

### 6.3.1 Grassland

#### Annual Grassland

The vast majority, approximately 98%, or 2,954 acres, of the Corral Hollow HMU consists of annual grassland habitat. The dominant species in annual grasslands are nonnative annual grasses including soft brome, ripgut brome, Italian ryegrass, wild oat, red brome, barley, and rattail fescue. The most prevalent native non-grass species observed in annual grasslands during the preliminary habitat assessments include pitgland tarweed, turkey mullein, and vinegar weed (ESA 2010). Nonnative species including milk thistle, Italian thistle, black mustard, artichoke thistle, and wild radish were scattered throughout annual grassland habitat in the HMU, but were not found in dense populations.

Small patches (less than 0.1 acre) of needle grass, a native perennial bunchgrass, were found in annual grassland habitat on the HMU. These patches were found primarily on north-facing slopes in the western portion of the HMU. Needle grass contributed approximately 10% cover in these patches and other native species including narrow leaf milkweed, blue dicks (*Dichelostemma capitatum*), and pine bluegrass (*Poa secunda*) were observed growing with needle grass in these patches (ESA 2010).
6.3.2  Upland Scrub

Approximately 17.2 acres of Diablan Sage Scrub habitat occurs in the western portion of the Corral Hollow HMU. Diablan sage scrub habitat usually occurs on shallow, rocky soils, typically on southern exposures. Three types of Diablan sage scrub habitat, based on the dominant shrub species, occur in the HMU and are briefly discussed below.

Diablan Sage Scrub – Black Sage Series

This type of Diablan sage scrub covers approximately 9.8 acres and is associated with a series of rock outcrops on Wisflat-Arburua-San Timoteo complex soils on southwest facing slopes in the northwestern portion of the HMU. Black sage is the dominant shrub species, while California buckwheat (*Eriogonum fasciculatum* var. *foliolosum*) and California matchweed (*Gutierrezia californica*) are minor components of this habitat type. Shrub cover of shrubs in this habitat type is moderately dense. Species similar to those found in the annual grassland habitat type are found in openings in Diablan sage scrub – black sage series habitat.

Diablan Sage Scrub – California Buckwheat Series

This type of Diablan sage scrub, dominated by California buckwheat, covers approximately 7.0 acres primarily in the southwestern portion of the HMU. Found primarily on Wisflat-Arburua-San Timoteo complex soils, shrub cover ranges from sparse to moderate depending on substrate and slope (ESA 2010j). Other shrubs found in this habitat type include California matchweed and the nonnative Russian thistle (*Salsola tragus*). Annual grassland species, as well as blue dicks and a variety of annual buckwheats (*Eriogonum* sp.) are also found in this habitat type.

Diablan Sage Scrub – California Sagebrush Series

A small patch, approximately 0.4 acre, of Diablan sage scrub dominated by California sagebrush, occurs on a rock outcrop in the central-western portion of the HMU. This patch is adjacent to California buckwheat dominated Diablan sage scrub habitat. Other species found in this habitat type include two varieties of California buckwheat (*Eriogonum fasciculatum* var. *foliolosum* and *E. fasciculatum* var. *polifolium*), telegraph weed (*Heterotheca grandiflora*), and gumweed. The understory of this habitat type consists of a sparse cover of nonnative annual grasses.

6.3.3  Wetlands

Wetland types on the HMU include freshwater emergent, northern claypan vernal pool, seasonal wetland, and saltgrass seasonal wetland. Approximately 4.2 acres\(^{10}\) of wetlands occur in the Corral Hollow HMU.

---

\(^{10}\) A formal wetland delineation has not been conducted for the Corral Hollow HMU; therefore acreages of wetland habitats are approximations.
Freshwater Emergent Wetland

Approximately 3.4 acres of freshwater emergent wetland are mapped in the Corral Hollow HMU. These wetlands are associated with Corral Hollow Creek, a perennial stream, which runs through small portions of the western portion of the HMU. A formal wetland delineation has not been conducted for the HMU and some of the areas mapped as freshwater emergent wetland may be more accurately mapped as saltgrass seasonal wetland (ESA 2010j). Dominant vegetation in freshwater emergent wetland habitat varies by location; narrowleaf cattail (Typha angustifolia) is dominant in some areas, whereas saltmarsh bulrush is dominant in other areas. Other species observed in freshwater emergent wetland habitat on the HMU include rabbitsfoot grass, watercress (Nasturtium officinale), stinging nettle (Urtica dioica), and rush species. Scattered patches of nonnative invasive species, including perennial pepperweed, giant reed (Arundo donax) and tamarisk (Tamarix sp.), occur in this habitat type.

Northern Claypan Vernal Pool

Two small, shallow northern claypan vernal pools are mapped on the HMU. These vernal pools, covering approximately 0.3 acre, are found in the central-western portion of the HMU, southwest of an existing communication tower. The sparse vegetation observed in these areas includes hogwallow starfish (Hesperox caulescens), popcornflower and Mediterranean barley. Algal mats, as well as, evidence of heavy cattle use, such as hoofprints and trampling were also observed in these areas during preliminary habitat assessments (ESA 2010j).

Saltgrass Seasonal Wetland

Approximately 0.5 acre of saltgrass seasonal wetland is mapped in the northwestern portion of the Corral Hollow HMU. This habitat type is associated with the floodplain of Corral Hollow Creek and consists, primarily, of a dense cover of saltgrass. Mexican rush also occurs in this habitat type. A formal wetland delineation has not been conducted on the HMU and it is likely that areas mapped as freshwater emergent wetlands during the preliminary habitat assessment are more accurately described as saltgrass seasonal wetland (ESA 2010j).

6.3.4 Riverine and Riparian

Fremont Cottonwood Riparian Woodland

Approximately 10.2 acres of Freemont cottonwood woodland occurs along Corral Hollow Creek in the HMU. The riparian canopy, which is dense along the southern portion of Corral Hollow Creek, becomes sparse along the most northern section of the creek within the HMU. The canopy of this riparian woodland habitat is dominated by Freemont cottonwood (Populus fremontii) and red willow. Scattered sandbar willow (Salix exigua) and valley oak trees also occur in the canopy of Freemont cottonwood riparian woodland. Other species found in this habitat type include mulefat, common cocklebur and nonnative species such as Italian thistle, yellow star thistle, stinkwort and various nonnative annual grasses.
Perennial Stream

One perennial stream, Corral Hollow Creek, runs through small portions of the HMU. Approximately 5,000 linear feet of perennial stream channel associated with Corral Hollow Creek occur in the western and northwestern portions of the HMU. Freshwater emergent wetland, saltgrass seasonal wetland, and Fremont cottonwood riparian habitat are associated with Corral Hollow Creek in the HMU.

Ephemeral Drainages

Ephemeral drainages are found scattered throughout the Corral Hollow HMU. Many of these ephemeral drainages show signs of accelerated erosion and deep gullies are found along many of these drainages, especially on the west side of the HMU.

6.3.5 Ruderal

Ruderal habitat is mapped in areas where nonnative herbaceous species are much more dominant than nonnative annual grasses found in the adjacent annual grassland. Ruderal habitat also occurs in areas of substantial bare ground associated with existing cattle watering troughs in the central portion of the HMU and associated with developed land in the northern portion of the HMU. Approximately 34.3 acres of ruderal habitat occurs in the HMU. Nonnative species observed in ruderal habitat include black mustard, Russian thistle, and milk thistle. Nonnative annual grasses as well as the native turkey mullein and pitgland tarweed are also found in ruderal habitat in the HMU.

6.3.6 Developed

Approximately 0.8 acre of developed land occurs in the Corral Hollow HMU. Developed land occurs in the central-northern portion of the HMU just south of Corral Hollow Road. This area consists of abandoned barns and other outbuildings and a gravel road.

6.4 Species Overview

Habitat for four federally and state-listed wildlife species—California tiger salamander, California red-legged frog, Alameda whipsnake, and San Joaquin kit fox—was affected by the Los Vaqueros Reservoir Expansion Project. Preserving and enhancing habitat for these four species is the primary goal for the Mitigation Lands. Potential habitat for the San Joaquin kit fox, California tiger salamander, and California red-legged frog is found in the Corral Hollow HMU. Each of these species is discussed below. There is potential habitat for whipsnake in Corral Hollow HMU, but it is unclear whether this is Alameda whipsnake, San Joaquin whipsnake, or a zone of intergrade between the two species. While management actions will not reduce habitat quality for whipsnake there are no management actions specifically targeting the species.
6.5 San Joaquin Kit Fox

Open, grazed grasslands are the primary habitat for San Joaquin kit fox denning, foraging, and dispersal. The Corral Hollow HMU is dominated by grassland habitat, approximately 2,954 acres, suitable for San Joaquin kit fox. The proximity of the gently sloping grasslands and broad valleys of the eastern portion of the HMU to open grasslands to the north and south also provides high quality dispersal and migratory opportunities.

Eight occurrences of San Joaquin kit fox have been recorded in the region, including four occurring in the HMU (California Department of Fish and Game 2011). The most recent are three observations from 1991. Two of these observations were in the HMU, one along Corral Hollow Road in the northwest portion of the HMU and one under PG&E power lines in the central-eastern portion of the HMU. While ground squirrels and ground squirrel burrows were prevalent on adjacent properties, there was a noticeable lack of ground squirrels and burrows that could serve as dens in the HMU during surveys in fall 2011. Considerable habitat exists to support other small rodents that constitute a prey base for foraging foxes including kangaroo rats (Dipodomys spp). Kangaroo rat burrows were observed in the HMU during surveys in fall 2011 (DiDonato pers. comm.).

6.6 California Tiger Salamander

Habitat for the federally and state-listed threatened California tiger salamander includes vernal pools and seasonal and perennial ponds, including artificial water bodies such as stock ponds, for breeding habitat and surrounding upland grassland habitat for aestivation (Federal Register 69 (149):47212–47248). Burrows of California ground squirrels and Botta’s pocket gophers are commonly used for California tiger salamander aestivation sites. Although most of the adult tiger salamander’s life is spent in burrows within upland habitat, ponds and pools of sufficient depth and duration of ponding are required for breeding.

Although the California tiger salamander has not been documented in the Corral Hollow HMU, the HMU contains highly suitable upland and breeding habitat for this species. Several occurrences of California tiger salamander have been recorded within the vicinity of the HMU (California Department of Fish and Game 2011). The closest occurrence is a 1992 observation of California tiger salamander adults from just north of the HMU along Corral Hollow Road. Additionally, five adult California tiger salamanders were observed to the west of the HMU along Tesla and Corral Hollow Roads in 2008.

Annual grassland and saltgrass seasonal wetland habitat in the HMU provide upland refugia habitat during the dry season and during movement periods. There are a limited number of small mammal burrows throughout most of the HMU though some burrows are present adjacent to Corral Hollow Creek, the most likely place that California tiger salamander will occur in the HMU. Pools along Corral Hollow Creek on the western side of the HMU provides suitable breeding habitat.
6.7 California Red-Legged Frog

Breeding habitat for the California red-legged frog, a federally listed threatened species and a California species of concern, includes permanent or semi-permanent water in various aquatic and riparian habitats, including artificial water bodies such as stock ponds (U.S. Fish and Wildlife Service 2002). Although red-legged frogs appear to prefer areas of water with relatively dense woody riparian or emergent vegetation, they have also been observed in areas lacking riparian or emergent vegetation. Upland and riparian areas are used for foraging, dispersal, and refuge. During dry periods red-legged frogs will seek refuge in areas including under boulders, rocks, downed wood, moist leaf litter, and in small mammal burrows (U.S. Fish and Wildlife Service 2002).

Corral Hollow Creek along the western edge of the HMU provides high quality breeding habitat for California red-legged frog. Riparian vegetation and freshwater emergent wetlands along the creek provide refuge and foraging habitat. Saltgrass seasonal wetlands, riparian and annual grasslands adjacent to wetland and stream features on the HMU also provide foraging, dispersal and refugia habitat for red-legged frog during the non-breeding season.

Subadult California red-legged frogs were observed in the HMU during preliminary site assessments by ESA in October 2010 (ESA 2010j). Numerous hatch-year juvenile and several adults were observed in Corral Hollow Creek in the HMU during site visits in September 2011 (Didonato pers. comm.). Additionally, there are several documented occurrences of red-legged frog from along Corral Hollow Creek to the immediate north and west of the HMU (California Department of Fish and Game 2011). The most recent of these observations is from 2008 in a pond along Corral Hollow Creek to the immediate west of the HMU.

6.8 Other Special-Status Species

The following sections discuss the wildlife and plant species that are not included in the compensatory mitigation program required in the permits for the Los Vaqueros Reservoir Expansion Project and there are no specific enhancement or monitoring requirements associated with them. However, the District will ensure their protection and it is anticipated they will benefit from management actions taken for covered species.

6.8.1 Special-Status Wildlife Species

In addition to California tiger salamander and California red-legged frog, two other special-status wildlife species have been observed in the Corral Hollow HMU. These two species are briefly discussed below.

Swainson’s Hawk

Swainson’s hawk is a state-listed threatened species. Swainson’s hawk is a medium-sized hawk that primarily forages in open grasslands. Although this species often nests in trees adjacent to riparian features, they are also known to use lone trees in agricultural fields, pastures, or grasslands in
suitable foraging habitat. One Swainson’s hawk was observed flying over the Coral Hollow HMU during preliminary habitat assessments in September and October 2010 (ESA 2010j).

Western Burrowing Owl

Western burrowing owl is a California species of special concern. Burrowing owls are typically found in dry, open, low-growing grasslands and typically nest in burrows created by small mammals such as ground squirrels and pocket gophers. This species is most active at dawn and dusk and preferred prey includes small mammals, insects, and lizards. Burrowing owls were observed in four different locations in the HMU during preliminary habitat assessments in September and October 2010 (ESA 2010j). These observations were primarily in annual grassland habitat.

6.8.2 Special-Status Plant Species

One special-status plant species, big tarplant (*Blepharizonia plumosa*) has been observed on the Corral Hollow HMU. This species is discussed briefly below. Additionally hogwallow starfish, which is on the CNPS watch list (California Rare Plant Rank 4.2), has been observed in the HMU. The only naturally occurring population of large-flowered fiddleneck (*Amsinckia grandiflora*) is located on District-owned property adjacent to the HMU. Because of this plant’s proximity to the HMU, and the ongoing project to re-establish large-flowered fiddleneck in the HMU, it is discussed below as well.

Big Tarplant

Big tarplant, a CNPS California Rare Plant Rank 1B.1 species, is an annual herb in the aster (Asteraceae) family. This species is typically found in valley and foothill grassland habitat from approximately 98 to 1660 feet above msl. Nine populations of big tarplant were observed in the western portion of the HMU during preliminary habitat assessment surveys in September and October 2010 (ESA 2010j). These populations were primarily found on north-facing slopes in annual grassland habitat and were typically associated with deeply eroded ephemeral drainages.

Large-Flowered Fiddleneck

Large-flowered fiddleneck is a federally and state-listed endangered species and is a CNPS California Rare Plant Rank 1B.1 species. This annual herb in the borage (Boraginaceae) family is typically found in cismontane woodland and valley and foothill grassland habitat from approximately 902 to 1805 feet above msl. Property owned by the District adjacent to the Corral Hollow HMU supports the only remaining wild population of large-flowered fiddleneck known. Individuals of large-flowered fiddleneck were observed on the adjacent property to the southwest of the HMU during surveys in 2010 and 2011. Approximately 134 plants were counted in 2010 and approximately 688 individuals were counted in 2011.

The District intends to graze the adjacent property in coordination with the Corral Hollow HMU and under the same grazing operator. Although District is not required to manage for large-flowered fiddleneck, District will make reasonable efforts to conduct management actions (e.g., grazing) so that they do not degrade habitat for the species, so long as this does not entail material cost to
District. Moreover, if the habitat does degrade or the species population declines, District’s responsibility will be limited to cooperating with agency or other private party efforts to ameliorate the situation so long as this does not entail material cost to District.

There is the potential that large-flowered fiddleneck may naturally disperse onto the Corral Hollow HMU. In addition, there is a proposal to reintroduce large-flowered fiddleneck back onto the Corral Hollow HMU. Should reintroduction occur, the District will coordinate management activities with the researchers conducting the reintroduction. The District will not knowingly do anything to harm the species or degrade its habitat.

### 6.9 Interim Management Plan

The goals, objectives, and management actions outlined in this chapter will be carried out during the Interim Management Period, proposed to be the first 5 years that follow plan approval. Goals, objectives, and management actions are given unique identifiers within each HMU. For example each goal, objective, and management action within the Corral Hollow HMU is given a number that includes CH, which stands for Corral Hollow. This is done so that each activity can be easily referenced later in the document. The Long-Term Management Program for all HMUs is provided in Chapter 7.

#### 6.9.1 Element CH1 – Grasslands, Oak Woodlands, and Scrub

**Goal CH1**—Enhance and maintain rangeland health to provide habitat for native plants and animals and minimize invasive plants in all grasslands and oak woodlands in the HMU.

**Objective CH1**—Develop and implement annual grazing plans which consider the timing, duration, and intensity of livestock grazing needed to protect soil, support plant germination, control nonnative species, and provide opportunities for expansion of native plant species, while maintaining upland habitat for California tiger salamander, California red-legged frog, Alameda whipsnake, and San Joaquin kit fox.

**Management Action CH-MA1**—Through controlled grazing, managers will seek to maintain an average residual dry matter (RDM) of between 800 to 1,200 pounds per acre but no less than 500 lbs/acre on level and low slopes, and at least 800 lbs/acre on steep slopes in the fall to protect overall rangeland health. Also maintain herbaceous (grass and forbs) height (measured as obstruction using a Robel pole) below the maximum—no more than 12 inches year-round (measured in both spring and fall), regardless of slope, to retain habitat for native wildlife. Favorable weather conditions often make the herbaceous vegetation grow very rapidly, beyond the control of typical grazing operations. Thus spring herbaceous height may exceed the standard for short periods if average or above average rainfall occurs in the previous rain year. In order to keep grass shorter than 12 inches as often as feasible, the rangeland managers and grazing operators will plan for flexibility and be able to respond quickly to changing conditions, such as designating flexible-use
fields to allow more precise grazing management of the designated habitat areas, and developing more watering facilities to better distribute grazing.

**CH-MA1 Monitoring Protocol**

- Conduct visual monitoring of RDM levels across the HMU annually to determine trends and areas of variation that may warrant changes in grazing practices.
- Establish at least four RDM monitoring points, appropriately located to capture a representative subset of the slopes in the unit. Record visual estimates of RDM levels at these four locations annually, between October 1 and November 15.
- Conduct photo documentation annually at these four points during the RDM surveys.
- Visually assess the presence of ground squirrels and kangaroo rats at each rangeland monitoring location and document presence/absence.
- Conduct springtime grass height assessment during April 1 – May 31.
- Establish additional monitoring locations including photo points, if necessary, to capture unique features of the HMU or to specifically investigate grazing levels in a particular location.

**CH-MA1 Performance Standards**

- Maintain RDM levels of at least 500 lbs/acre on low and level slopes and at least 800 lbs/acre on steep slopes.
- Maintain grass height less than 12 inches obstruction height (measured using a Robel pole), regardless of slope, year-round.

**CH-MA1 Adaptive Management**

- If performance standards are not being met, the District will work with the grazing tenant to modified grazing management on the site. This could be a combination of changes during the spring and summer, if grass height requirements are not being met, or changes from year to year, if RDM standards are not being met. For example, starting grazing later to allow early forage growth, extending the grazing end date for late season growth, changing the species used for grazing from selective to non-selective grazers, moving water troughs to redistribute grazing pressure.
- In addition to changes in grazing from year to year in response to climate conditions, the District and grazing operators will stay apprised of research on managing grasslands for threatened and endangered species using grazing, and adapt annual grazing plans to always include the best available science in rangeland management.

**CH-MA1 Reporting Requirements**

The following items will be included in the annual report submitted to the Wildlife Agencies.

- Records of visual estimates of RDM and average grass height at each monitoring location.
- Photos taken at each monitoring location.
• Presence or absence of ground squirrels in the HMU annually and any noticeable changes in the extent of the population from year to year.

• Any year-to-year changes in annual grazing practices based on visual RDM estimates and grass height monitoring.

• Locations where RDM and grass height objectives are unable to be met due to constraints beyond the control of the District or the grazing operator and a brief description of those constraints.

Management Action CH-MA2—Conduct springtime visual monitoring of available forage to allow for inter-annual adjustments to grazing practices. This will ensure grassland habitat will remain suitable for San Joaquin kit fox, California tiger salamander, and California red-legged frog through the summer months.

CH-MA2 Monitoring Protocol

• Conduct visual monitoring annually (April–May) of grass height (obstruction height monitoring using a Robel pole) and forage availability across each unit to determine trends and areas of variation that may warrant changes in grazing practices. Such changes could be seasonal or temporary, to account for short-term conditions such as drought, or long-term, to account for cumulative vegetation response.

• Establish four visual monitoring stations, preferably the same four that are used for RDM monitoring, appropriately located to capture a representative subset of the slopes in the HMU. Record visual estimates of grass height at these two locations annually in the spring.

• Conduct photo documentation at these four points during springtime grass height surveys.

• Establish additional monitoring locations if necessary to capture unique features of the HMU or to specifically investigate forage levels in a particular location.

CH-MA2 Performance Standards

• Maintain grass height less than 12 inches (obstruction height measures using a Robel pole), regardless of slope.

CH-MA2 Adaptive Management

• If performance standards are not being met the District will work with the grazing tenant to modified grazing management on the site. This could be a combination of changes during the spring and summer, if grass height requirements are not being met, or changes from year to year, if RDM standards are not being met.

• In addition to changes in grazing from year to year in response to climate conditions, the District and grazing operators will stay apprised of research on managing grasslands for threatened and endangered species using grazing, and adapt annual grazing plans to always include the best available science in rangeland management.
CH-MA2 Reporting Requirements

- Submit records of visual estimates of average grass height at each monitoring location.
- Submit photos taken at each monitoring location.
- Report any inter-annual changes in grazing practices that are observed during visual springtime forage monitoring.

Management Action CH-MA3—Utilize Integrated Pest Management strategies for control, containment, and/or prevention of Cal-IPC listed invasive plants with an “Impact” or “Invasiveness” rating of High for the region and those that pose ecological threat to habitat in the HMU. These strategies include but are not limited to the following.

- Containment strategy for stinkwort, perennial pepperweed, and giant reed.
- Control strategy for other Cal-IPC listed species including tamarisk, black mustard, Italian thistle, and yellow star thistle. Strategy may include multiple types of methods such as grazing and/or herbicides.

CH-MA3 Monitoring Protocol

- Document baseline extent of Cal-IPC listed invasive plants with an “Impact” or “Invasiveness” rating of High and those that pose an ecological threat to habitat in the HMU.
- Determine two highest priority areas where infestations are threatening the ecology of the site (i.e., aggressive species, particularly dense infestation) and use these areas as indicator sites for invasive plant monitoring.
- Establish photo documentation points in each of these indicator sites.
- Conduct visual monitoring of these indicator sites annually.
- At the end of Year 5 conduct another survey of all Cal-IPC listed invasive plant species (as defined above) on the unit to compare against baseline and adjust management activities and monitoring locations accordingly if priorities have changed.

CH-MA3 Performance Standards

- Reduce all Cal-IPC listed plant infestations and infestations of species that pose an ecological threat to habitat in the HMU which are ranked as high density (51–100% of stand) during baseline survey to medium (26–50%) or low density (6–25%).
- Reduce all Cal-IPC listed plant infestations and infestations of species that pose an ecological threat to habitat in the HMU which are ranked as medium density during baseline survey to low density.
- Maintain all Cal-IPC listed plant infestations and infestations of species that pose an ecological threat to habitat in the HMU which are ranked as low density during baseline survey at a low density level.
CH-MA3 Adaptive Management

- Adaptive management is built into the Control, Containment, and Prevention strategy for invasive plant species. Should control techniques fail initially, revised techniques will be implemented until success criteria are met. Changes in control strategy will be discussed with invasive plant species control specialists and other land managers in the region to ensure the best management techniques are being utilized.

CH-MA3 Reporting Requirements

- Submit annual report on methods used to contain and control invasive species during the prior year, including herbicide application, specific grazing regimes, etc.
- Include initial assessment of success of all non-grazing invasive species control methods, particularly herbicide application.
- Submit records of invasive plant density visual estimates at each monitoring location.
- Submit photos taken at each monitoring location.

6.9.2 Element CH2 – Wetlands and Riparian

Goal CH2—Enhance seasonal wetlands and riparian habitats in the HMU.

Objective CH2—Enhance vegetative structure of native vegetation along the wetlands\(^{11}\) and riparian habitat associated with Corral Hollow Creek.

Management Action CH-MA4—Preserve, enhance, and restore existing wetlands within the two sections of Corral Hollow Creek that pass through the HMU to maximize habitat suitability for California red-legged frog, and if possible, California tiger salamander. Examples include pest plant control and grazing management that will favor native wetland species, allowing them to establish in additional areas, thus expanding the habitat footprint.

An assessment will take place in Year 1 to determine if any of the riparian areas in the HMU can be restored to support more freshwater permanent emergent wetland habitat. As part of that assessment all existing aquatic habitats will be delineated to set a baseline. Expansion of ponds or wetlands will be coordinated with the needs for additional water features identified in annual grazing plans for grazing activities and cost for such activities could be shared with grazing operators.

As discussed under Element CH4 and Element CH5 below, an assessment will be completed to determine which aquatic features currently support California tiger salamander and California red-legged frog in the first 2 years of the Interim Management Period. Following those surveys determination will be made about how to manage each aquatic feature so that it provides habitat for either California tiger salamander, California red-legged frog, or both species. The ultimate goal

\(^{11}\) The Los Vaqueros Reservoir Expansion Project – Draft Wetland Compensatory Mitigation Plan (January 2011) states that 0.60 acre of freshwater permanent emergent wetland will be restored on HMU lands. A portion of that 0.60 acre will be restored in this HMU.
is to maximize habitat potential for both species, but characteristics of each location may favor one species over the other.

Please see Element CH4 and Element CH5 below for more detail on the management actions and monitoring requirements for this Management Action.

**CH-MA4 Monitoring Protocol**

- Use a sub-meter GPS unit to determine and map the extent of aquatic features and wetland plants—the total baseline extent of any freshwater permanent emergent wetlands that are to be expanded in the HMU.
- Establish photo documentation points in any freshwater permanent emergent wetland restoration areas.
- For the first year following wetland restoration conduct quarterly inspections of the site to determine whether grazing animals are affecting plant establishment.
- In Years 1 and 2, following completion of wetland restoration, conduct annual photo monitoring to provide visual documentation of site functionality.
- In Year 3 use a sub-meter GPS unit to determine and map the extent of wetland features (i.e., aquatic features and wetland plants) for a second time to compare to baseline.

**CH-MA4 Performance Standards**

- Performance standards for each freshwater emergent permanent wetland restoration site will be established during conceptual design.
- By Year 3 a net increase in wetland acreage will total 0.6 acre across all HMUs.

**CH-MA4 Adaptive Management**

- If additional acres of freshwater emergent permanent wetland habitat is not being sustained 3 years after restoration activities are complete the District will determine the cause of failure for the restoration site and corrective action will be taken to either fix the issue at that restoration site or to attempt restoration at another location.
- If at any point it is determined that grazing animals are having a negative effect on wetland function they will be excluded as needed to let wetlands recover. This may be done annually if the issue persists.

**CH-MA4 Reporting Requirements**

- Submit initial wetland acreage determination of any wetlands in the HMU that are to be restored.
- For the first 2 years following restoration, submit annual report that includes photos of restoration site taken from photo monitoring points.
- In Year 3 submit the second wetland acreage determination to determine whether wetland restoration activities were successful.
• From Year 3–5 submit photo documentation of wetland restoration site to demonstrate habitat function and quality.

• Submit annual report on methods used to contain and control invasive species during each year if actions were necessary.

• Submit information on any land management modifications that were required (e.g., grazing) during the year based on observations during wetland monitoring.

6.9.3 Element CH3 – San Joaquin Kit Fox

Goal CH3—Maintain a habitat condition in grasslands and oak woodlands that is suitable for San Joaquin kit fox.

Objective CH3—Maintain grassland that is less than 12 inches tall (measured as obstruction height) year-round and supports an abundance of prey species for San Joaquin kit fox, considering rainfall totals from the previous rain year.

Management Actions CH-MA1, CH-MA2, and CH-MA3, all discussed above, will be implemented to achieve this objective. Monitoring protocols and performance standards discussed in those sections will be utilized to determine whether this objective is being met on an annual basis.

Objective CH4—Increase abundance of California ground squirrels and kangaroo rats in the HMU and passively monitor for presence of San Joaquin kit fox using motion activated cameras.

Management Action CH-MA5—Eliminate any active rodent control programs (poisons, fumigants, shooting) including those implemented by County and private contractors (lessees) in the HMU, except for targeted application to protect infrastructure (i.e., road embankments, stock pond dams) and allow California ground squirrels to passively repopulate grasslands. Establish a motion-activated camera network to monitor animal movements.

CH-MA5 Monitoring Protocol

• Visually assess the presence of ground squirrels and kangaroo rats at each rangeland monitoring location and document presence/absence.

• Maintain at least two motion-activated cameras with scent stations on each unit within the HMU to detect San Joaquin kit fox.

CH-MA5 Performance Standards

• Realize a net increase in total number of California ground squirrels and kangaroo rats and the total number of burrows in the HMU over the life of the permit.

• Place each camera in the HMU for at least 6 months of the year and monitor frequently to ensure proper function.
CH-MA5 Adaptive Management

- If ground squirrels and other burrowing mammals are not returning to the area, determine root cause of problem. Modify grazing rotation if it is determined that adjusting the number of animals concentrated in an area could influence ground squirrel or kangaroo rat populations.

- Continue to move cameras until it is determined that camera placement is maximizing the detections of wildlife movement in the area.

CH-MA5 Reporting Requirements

- Report presence or absence of ground squirrels and kangaroo rats in the HMU annually and any noticeable changes in the extent of the population from year to year.

- Any photos of rare species will be included in annual monitoring report along with a summary of number of camera trap nights and maps of camera station locations. Any photos of San Joaquin kit fox will be reported to the Wildlife Agencies immediately upon verification of sighting.

6.9.4 Element CH4 – California Red-Legged Frog

Goal CH4—Enhance aquatic habitat for California red-legged frog.

Objective CH5—Retain the functionality of existing California red-legged frog breeding sites along Corral Hollow Creek and enhance where possible.

Management Action CH-MA6—Develop target vegetation cover levels for the wetted riparian habitat along Corral Hollow Creek that provide adequate shade and in-stream structure for California red-legged frog following the removal of nonnative plant species.

- Following the completion of California red-legged frog surveys in Years 1 and 2, characterize the vegetation type and cover levels (focusing on emergent vegetation in the water and shade from overhanging vegetation), presence of predators, and general condition of all wetted riparian habitat areas that are occupied by California red-legged frog and where successful breeding has been documented.

- Utilize information gathered from occupied locations to develop habitat targets (vegetation type, percent cover, and general condition) for similar but unoccupied aquatic habitats in other sections of the creek.

- Set vegetation target levels and specific management actions (e.g., predator eradication, cattle exclusion, removal of nonnative plants) based on species need and site conditions. In many cases vegetation target levels may favor one species over another, but in general the goal is to optimize habitat for both California tiger salamander and California red-legged frog, particularly in wetted riparian habitat.

- Create and implement a planting plan for native vegetation on top of bank, which will provide variable structure to the riparian corridor and shade for in-stream California red-legged frog habitat.
**CH-MA6 Monitoring Protocol**

- A qualified biologist with a Section 10 collecting permit will conduct dipnet surveys for California red-legged frog larvae at a representative set (up to three) of locations with suitable aquatic habitat (water depth and ponding duration sufficient to support breeding) in March/April, and dipnet surveys for metamorphs in September, to determine presence of California red-legged frog in the HMU. Monitoring will occur at up to three distinct locations along Corral Hollow Creek, but will generally cover the sections of the creek that pass through the HMU.

- Report bullfrogs that are present during any aquatic surveys. Conduct a daytime and nighttime survey specifically for bullfrogs and other aquatic predators during the September California red-legged frog surveys.

- Assess general condition of the wetlands within the riparian area that supports breeding California red-legged frog for vegetation type and percent cover, plant species present in and around the feature, plant species or other features being utilized for egg attachment, depth, turbidity, and temperature.

- Take photos of vegetation cover at all breeding sites during the same visit in which species presence surveys are conducted.

**CH-MA6 Performance Standards**

- Retain California red-legged frog breeding presence in Corral Hollow Creek.

- Maintain aquatic habitats free of introduced aquatic predators of California red-legged frog and California tiger salamander.

**CH-MA6 Adaptive Management**

- If the breeding population of California red-legged frog trends downward for 3 consecutive years the District will conduct a focused study to determine the factors influencing this change along the creek.

- The results of that investigation will be presented to the Wildlife Agencies and a decision will be made regarding future management actions in the HMU.

**CH-MA6 Reporting Requirements**

- Submit initial survey results of species presence (life stages observed and survey protocol) and vegetative cover and other site characteristics of occupied aquatic habitat that will be utilized to create metrics for unoccupied aquatic habitats.

- Submit a determination of suitability for California red-legged frog at each section of Corral Hollow Creek and a management strategy for each aquatic feature to either retain the species in the aquatic feature or to attract the species to that aquatic feature.

- Submit photos from monitoring points and results from annual vegetation cover surveys.
6.9.5 Element CH5 – California Tiger Salamander

**Goal CH5**—Enhance aquatic habitat for California tiger salamander.

**Objective CH6**—Retain, and if possible, increase the functionality of California tiger salamander breeding sites and expand the number of breeding locations in the HMU where possible.

**Management Action CH-MA7**—Develop target vegetation cover levels for pools along Corral Hollow Creek that either currently support or could support California tiger salamander breeding. Utilize vegetation cover levels and habitat conditions at sites that support successful breeding along Corral Hollow Creek as reference sites.

- Following the completion of California tiger salamander surveys in Years 1 and 2, characterize the vegetation type and cover levels (focusing on emergent vegetation in the water and shade from overhanging vegetation), presence of predators, and general condition of all pools within Corral Hollow Creek that support successful California tiger salamander breeding.

- Utilize information gathered from occupied locations and available California tiger salamander literature to develop habitat targets (vegetation type, percent cover, and general condition) for similar but unoccupied aquatic habitats in the HMU.

- Set vegetation target levels and specific management actions (e.g., predator eradication, cattle exclusion, nonnative vegetation removal) based on species need and site conditions. In many cases along Corral Hollow Creek the vegetation target levels will favor California red-legged frog, but in general the goal is to optimize habitat for both California tiger salamander and California red-legged frog.

**CH-MA7 Monitoring Protocol**

- A biologist with a Section 10 collecting permit will conduct dipnet surveys for California tiger salamander larvae at a representative set of locations (up to three) with suitable aquatic habitats (water depth and ponding duration sufficient to support breeding) in March/April to determine presence of California tiger salamanders along Corral Hollow Creek.

- Report presence of bullfrogs observed during all aquatic surveys. Conduct a daytime and nighttime survey specifically for bullfrogs and other aquatic predators during the September California red-legged frog surveys.

- Assess general condition of pools along Corral Hollow Creek that supports breeding California tiger salamanders for vegetation type and percent cover, plant species present in and around the feature, plant species or other features being utilized for egg attachment, depth, turbidity, and temperature.

- Take photos of vegetation cover at all breeding sites during the same visit in which species presence surveys are conducted.

**CH-MA7 Performance Standards**

- Support instream habitat suitable for breeding California tiger salamanders in Corral Hollow Creek or suitable habitat in adjacent wetlands.
• Maintain aquatic habitats free of introduced aquatic predators of California red-legged frog and California tiger salamander.

CH-MA7 Adaptive Management
• If breeding California tiger salamanders have not established in Corral Hollow Creek by Year 5 of the Interim Management Period the District will conduct a focused study to determine the limiting factors for species presence at the site.
• The results of the focused study will be presented to the Wildlife Agencies for discussion of future management actions that could attract this species. Since the species is not present on the site currently it could be that attracting breeding California tiger salamanders is not possible.

CH-MA7 Reporting Requirements
• Submit initial survey results of species presence (life stages observed and survey protocol) and vegetative cover and other site characteristics of occupied aquatic habitat that will be utilized to create metrics for unoccupied aquatic habitats.
• Submit a determination of suitability for California tiger salamander along Corral Hollow Creek and a management strategy for each aquatic feature to either retain the species in the aquatic feature or to attract the species to that aquatic feature.
• Submit photos from monitoring points and results from annual vegetation cover surveys.

6.9.6 Element CH6 – Facility Maintenance

Goal CH6—Maintain infrastructure in working condition to allow for implementation of the HMP.

Objective CH7—Maintain fencing and livestock water sources on the HMU necessary to meet habitat management goals.

Management Action CH-MA8—Conduct monitoring at least twice a year to ensure timely response to fencing and livestock water source issues.
• Conduct twice yearly inspection of all management-related interior fencing and livestock water sources and coordinate with livestock operators to confirm grazing program is being implemented effectively.
• Remove any unnecessary structures that create a hazard to humans or wildlife.
Chapter 7

Long-Term Management Programs

The approach to the long-term management of biological resources is consistent across all of the HMUs. In general, the District in cooperation with its livestock operators will conduct routine site examinations and monitoring of selected site characteristics to determine overall stability of the habitat and population trends of the covered species including California red-legged frog, California tiger salamander, San Joaquin kit fox, Alameda whipsnake, and their habitats. The intention of the long-term management programs for each of the HMUs is to monitor and maintain habitat conditions that were achieved during the Interim Management Period. While it is not anticipated that major management actions will be needed, an objective of this Long-Term Management Program is to conduct monitoring to identify any issues that may arise, and use adaptive management to determine appropriate actions.

7.1 Marsh Creek Watershed HMU Long-Term Management Program

7.1.1 Element MC-LM1 – Threatened and Endangered Species

Objective MC-LM1—Monitor and maintain habitat for San Joaquin kit fox and upland habitat for California red-legged frog and California tiger salamander.

Management Action MC-LM1—Through controlled grazing, managers will seek to maintain an average residual dry matter (RDM) of between 800 to 1,200 pounds per acre but no less than 500 lbs/acre on level and low slopes, and at least 800 lbs/acre on steep slopes in the fall to protect overall rangeland health. Also maintain herbaceous (grass and forbs) height (measured as obstruction using a Robel pole) below the maximum—no more than 12 inches year-round (measured in both spring and fall), regardless of slope, to retain habitat for native wildlife. Favorable weather conditions often make the herbaceous vegetation grow very rapidly, beyond the control of typical grazing operations. Thus spring herbaceous height may exceed the standard for short periods if average or above-average rainfall occurs in the previous rain year. In order to keep grass shorter than 12 inches as often as feasible, the rangeland managers and grazing operators will plan for flexibility and be able to respond quickly to changing conditions, such as designating flexible-use fields to allow more precise grazing management of the designated habitat areas, and developing more watering facilities to better distribute grazing.

- Monitoring will occur annually and will be consistent with the annual grazing plan described in the Interim Management Plan for RDM levels and grass height in the Marsh Creek Watershed HMU.

- Following the 5-year Interim Management Period, camera monitoring for San Joaquin kit fox, described in the Interim Management Plan – (see Morgan Territory management action MT-
LM1), will occur every 3 years and cameras will be operated for 6 months of the year in monitoring years.

Management Action MC-LM2—Conduct springtime visual monitoring of available forage to allow for inter-annual adjustments to grazing practices. This will ensure grassland habitat will remain suitable for San Joaquin kit fox, California tiger salamander, and California red-legged frog through the summer months.

- Monitoring will occur annually and will be consistent with that described in the Interim Management Plan for springtime grassland surveys in the Marsh Creek Watershed HMU.

Management Action MC-LM3—Continue to utilize Integrated Pest Management strategies for control, containment, and/or prevention of Cal-IPC listed invasive plants with an “Impact” or “Invasiveness” rating of High for the region and those that pose ecological threat to habitat in the HMU, including the appropriate combination of herbicide treatment and grazing management.

- During the Long-Term Management Period, map all infestations of Cal-IPC invasive plants (as defined above) and those that pose ecological threat to habitat in the HMU every 5 years. Mapping should include the extent of each infestation and the density of the infestation (low, medium, high) to determine trends in how these species are responding to control and management activities.

- Adjust focus of invasive plant control based on changes in species presence and density as needed.

Objective MC-LM2—Maintain and monitor habitat conditions at all ponds, wetlands, and riparian areas that function as breeding habitat for California red-legged frog and/or California tiger salamander.

Management Action MC-LM4—Conduct monitoring every 2 years for California tiger salamander and California red-legged frog to determine species presence, population trends over time, and general habitat condition at breeding locations.

- Conduct monitoring every 2 years for California red-legged frog (dipnetting in March/April and metamorph surveys in September), California tiger salamander (dipnetting in March/April), and nonnative aquatic predators (September) as described in the Interim Management Plan for the Marsh Creek Watershed HMU for the life of the permit.

- During dipnet surveys take photographs at predetermined photo points that generally document the habitat condition at the site.

- Continue a pond maintenance program based on information gathered during the Interim Management Period regarding siltation rates and long-term viability of pond function. Desilt ponds on average once every 10 years (more/less frequently as appropriate) to ensure adequate ponding depth and duration for breeding native amphibians.

- Consider presence of California red-legged frog and California tiger salamander at each monitoring location and relative changes in species abundance when changes in management are recommended.
All changes in management of aquatic breeding sites will be discussed with the Wildlife Agencies.

**Management Action MC-LM5**—If documented in the HMU, implement a control program for nonnative wildlife and fish infestations that could negatively affect aquatic habitat for native amphibians.

- If a nonnative wildlife control program is implemented, record visual assessment of benefits during annual monitoring events (e.g., reduced number of bullfrogs, less damage by wild pigs \([Sus\ scrofa]\)).

### 7.1.2 Element MC-LM2 – Infrastructure and Facilities

**Objective MC-LM3**—Maintain fencing, water sources, and other grazing related infrastructure on the interior of the units necessary to meet habitat management goals.

**Management Action MC-LM6**—Continue to work with livestock operators to maintain all facilities necessary to implement the grazing program.

- Conduct HMP administration including twice yearly inspection of all management-related interior fencing and livestock water sources.
- Coordinate with livestock operators to determine a rolling maintenance plan that will ensure grazing operations will not be interrupted as the result of facility issues.

### 7.1.3 Element MC-LM3 – Security, Safety, and Public Access

The HMU will be fenced and shall have no general public access. There will be no regular public or private use unless explicitly approved by the District and within the guidelines of this Long-term Management Program. Research and/or other educational programs or efforts may be allowed in the HMU as deemed appropriate by the District, but are not specifically funded or a part of this Long-Term Management Plan.

**Objective MC-LM4**—Managing Trash and Trespass

**Management Action MC-LM7**—At least twice annually the District will inspect the site for trash dumping or evidence of trespass.

- The District will post and maintain the appropriate ownership/no trespass signs on boundary fences.
- Trash will be removed and vandalism repaired.
7.2 Los Vaqueros HMU Long-Term Management Program

7.2.1 Element LV-LM1 – Threatened and Endangered Species

Objective LV-LM1—Monitor and maintain habitat for San Joaquin kit fox and upland habitat for California red-legged frog and California tiger salamander.

Management Action LV-LM1—Through controlled grazing, managers will seek to maintain an average residual dry matter (RDM) of between 800 to 1,200 pounds per acre but no less than 500 lbs/acre on level and low slopes, and at least 800 lbs/acre on steep slopes in the fall to protect overall rangeland health. Also maintain herbaceous (grass and forbs) height (measured as obstruction using a Robel pole) below the maximum—no more than 12 inches year-round (measured in both spring and fall), regardless of slope, to retain habitat for native wildlife. Favorable weather conditions often make the herbaceous vegetation grow very rapidly, beyond the control of typical grazing operations. Thus spring herbaceous height may exceed the standard for short periods if average or above-average rainfall occurs in the previous rain year. In order to keep grass shorter than 12 inches as often as feasible, the rangeland managers and grazing operators will plan for flexibility and be able to respond quickly to changing conditions, such as designating flexible-use fields to allow more precise grazing management of the designated habitat areas, and developing more watering facilities to better distribute grazing.

- Monitoring will occur annually and will be consistent with that described in the Interim Management Plan for RDM levels and grass height in the Los Vaqueros HMU.

- Following the 5-year Interim Management Period camera monitoring for San Joaquin kit fox, consistent with methods used during the Interim Management Period, will occur every 3 years and cameras will be operated for 6 months out of the year in monitoring years.

Management Action LV-LM2—Conduct springtime visual monitoring of available forage to allow for inter-annual adjustments to grazing practices. This will ensure grassland habitat will remain suitable for San Joaquin kit fox, California tiger salamander, and California red-legged frog through the summer months.

- Monitoring will occur annually and will be consistent with that described in the Interim Management Plan for springtime grassland surveys in the Los Vaqueros HMU.

Management Action LV-LM3—Continue to utilize Integrated Pest Management strategies for control, containment, and/or prevention of Cal-IPC listed invasive plants with an “Impact” or “Invasiveness” rating of High for the region and those that pose ecological threat to habitat in the HMU, including the appropriate combination of herbicide treatment and grazing management.

- During the Long-Term Management Period, map all infestations of Cal-IPC invasive plants (as defined above) and those that pose ecological threat to habitat in the HMU every 5 years. Mapping should include the extent of each infestation and the density of the infestation (low, medium, high) to determine trends in how these species are responding to control and management activities.
• Adjust focus of invasive plant control based on changes in species presence and density as needed.

7.2.2 Element LV-LM2 – Infrastructure and Facilities

Objective LV-LM2—Maintain fencing, water sources, and other grazing related infrastructure on the interior of the units necessary to meet habitat management goals.

Management Action LV-LM4—Continue to work with livestock operators to maintain all facilities necessary to implement the grazing program.

• Conduct HMP administration including twice yearly inspection of all management-related interior fencing and livestock water sources.

• Coordinate with livestock operators to determine a rolling maintenance plan that will ensure grazing operations will not be interrupted as the result of facility issues.

7.2.3 Element LV-LM3 – Security, Safety, and Public Access

The HMU will be fenced and shall have no general public access, nor will there be any regular public or private use unless explicitly approved by the District and within the guidelines of this Long-term Management Program. Research and/or other educational programs or efforts may be allowed in the HMU as deemed appropriate by the District, but are not specifically funded or a part of this Long-Term Management Program.

Objective LV-LM3—Trash and Trespass

Management Action LV-LM5—At least twice annually the District will inspect the site for trash dumping or evidence of trespass.

• The District will post and maintain the appropriate ownership/no trespass signs on boundary fences.

• Trash will be removed and vandalism repaired.

7.3 Morgan Territory HMU Long-Term Management Program

7.3.1 Element MT-LM1 – Threatened and Endangered Species

Objective MT-LM1—Monitor and maintain habitat for San Joaquin kit fox and upland habitat for California red-legged frog, California tiger salamander, and Alameda whipsnake.

Management Action MT-LM1—Through controlled grazing, managers will seek to maintain an average residual dry matter (RDM) of between 800 to 1,200 pounds per acre but no less than 500 lbs/acre on level and low slopes, and at least 800 lbs/acre on steep slopes in the fall to protect overall rangeland health. Also maintain herbaceous (grass and forbs) height (measured as
obstruction using a Robel pole) below the maximum—no more than 12 inches year-round (measured in both spring and fall), regardless of slope, to retain habitat for native wildlife. Favorable weather conditions often make the herbaceous vegetation grow very rapidly, beyond the control of typical grazing operations. Thus spring herbaceous height may exceed the standard for short periods if average or above-average rainfall occurs in the previous rain year. In order to keep grass shorter than 12 inches as often as feasible, the rangeland managers and grazing operators will plan for flexibility and be able to respond quickly to changing conditions, such as designating flexible-use fields to allow more precise grazing management of the designated habitat areas, and developing more watering facilities to better distribute grazing.

- Monitoring will occur annually and will be consistent with that described in the Interim Management Plan for RDM levels and grass height in the Morgan Territory HMU.
- Following the 5-year Interim Management Period, camera monitoring, consistent with that described in the Interim Management Plan, will occur every 3 years and cameras will be operated for 6 months out of the year in monitoring years.

Management Action MT-LM2—Conduct springtime visual monitoring of available forage to allow for inter-annual adjustments to grazing practices. This will ensure grassland habitat will remain suitable for San Joaquin kit fox, California tiger salamander, California red-legged frog, and Alameda whipsnake through the summer months.

- Monitoring will occur annually and will be consistent with that described in the Interim Management Plan for springtime grassland surveys in the Morgan Territory HMU.

Management Action MT-LM3—Continue to utilize Integrated Pest Management strategies for control, containment and/or prevention of Cal-IPC listed invasive plants with an “Impact” or “Invasiveness” rating of High for the region and those that pose ecological threat to habitat in the HMU, including the appropriate combination of herbicide treatment and grazing management.

- During the Long-Term Management Period, map all infestations of Cal-IPC invasive species (as defined above) and those that pose ecological threat to habitat in the HMU every 5 years. Mapping should include the extent of each infestation and the density of the infestation (low, medium, high) to determine trends in how these species are responding to control and management activities.
- Adjust focus of invasive plant control based on changes in species presence and density as needed.

Objective MT-LM2—Maintain and monitor habitat conditions at all ponds, wetlands, and riparian areas that function as breeding habitat for California red-legged frog and/or California tiger salamander.

Management Action MT-LM4—Conduct monitoring every 2 years for California tiger salamander and California red-legged frog to determine species presence, population trends over time, and general habitat condition at breeding locations.

- Conduct monitoring every 2 years for California red-legged frog (dipnetting in March/April and metamorph surveys in September), California tiger salamander (dipnetting in March/April), and
nonnative aquatic predators (September) as described in the Interim Management Plan for the Morgan Territory HMU for the life of the permit.

- During dipnet surveys take photographs at predetermined photo points that generally document the habitat condition at the site.
- Continue a pond maintenance program based on information gathered during the Interim Management Period regarding siltation rates and long-term viability of pond function. Desilt ponds on average once every 10 years (more/less frequently as appropriate) to ensure adequate ponding depth and duration for breeding native amphibians.
- Consider presence of California red-legged frog and California tiger salamander at each monitoring location and relative changes in species abundance when changes in management are recommended.
- All changes in management of aquatic breeding sites will be discussed with the Wildlife Agencies.

**Management Action MT-LM5**—Conduct monitoring every 5 years on chaparral habitat quality for Alameda whipsnake to make sure invasive plants are not compromising habitat quality.

- Conduct photo monitoring at pre-determined photo points once every 5 years to track changes in age-class and habitat heterogeneity in the chaparral stand on the Storybook Lane Unit.
- During surveys also note any changes in chaparral habitat that are likely the result of increased grazing pressure and make recommendations for how the modify the grazing regime on the property to gain better age-class and stand heterogeneity.

**Management Action MT-LM6**—If documented in the HMU, implement a control program for nonnative wildlife and fish infestations that could negatively affect aquatic habitat for native amphibians.

- If nonnative wildlife control program is implemented record visual assessment of benefits during annual monitoring events (e.g., reduced number of bullfrogs, less damage by wild pigs).

### 7.3.2 Element MT-LM2 – Infrastructure and Facilities

**Objective MT-LM3**—Maintain fencing, water sources, and other grazing-related infrastructure on the interior of the units necessary to meet habitat management goals.

**Management Action MT-LM7**—Continue to work with livestock operators to maintain all facilities necessary to implement the grazing program.

- Conduct HMP administration including twice yearly inspection of all management-related interior fencing and livestock water sources.
- Coordinate with livestock operators to determine a rolling maintenance plan that will ensure grazing operations will not be interrupted as the result of facility issues.
7.3.3 Element MT-LM3 – Security, Safety, and Public Access

The HMU will be fenced and shall have no general public access, nor will there be any regular public or private use unless explicitly approved by the District and within the guidelines of this Long-term Management Program. Research and/or other educational programs or efforts may be allowed in the HMU as deemed appropriate by the District, but are not specifically funded or a part of this Long-Term Management Program.

Objective MT-LM4—Trash and Trespass

Management Action MT-LM8—At least twice annually the District will inspect the site for trash dumping or evidence of trespass.

- The District will post and maintain the appropriate ownership/no trespass signs on boundary fences.
- Trash will be removed and vandalism repaired.

7.4 Altamont HMU Long-Term Management Program

7.4.1 Element AL-LM1 – Threatened and Endangered Species

Objective AL-LM1—Monitor and maintain habitat for San Joaquin kit fox and upland habitat for California red-legged frog and California tiger salamander.

Management Action AL-LM1—Through controlled grazing, managers will seek to maintain an average residual dry matter (RDM) of between 800 to 1,200 pounds per acre but no less than 500 lbs/acre on level and low slopes, and at least 800 lbs/acre on steep slopes in the fall to protect overall rangeland health. Also maintain herbaceous (grass and forbs) height (measured as obstruction using a Robel pole) below the maximum—no more than 12 inches year-round (measured in both spring and fall), regardless of slope, to retain habitat for native wildlife. Favorable weather conditions often make the herbaceous vegetation grow very rapidly, beyond the control of typical grazing operations. Thus spring herbaceous height may exceed the standard for short periods if average or above average rainfall occurs in the previous rain year. In order to keep grass shorter than 12 inches as often as feasible, the rangeland managers and grazing operators will plan for flexibility and be able to respond quickly to changing conditions, such as designating flexible-use fields to allow more precise grazing management of the designated habitat areas, and developing more watering facilities to better distribute grazing.

- Monitoring will occur annually and will be consistent with that described in the Interim Management Plan for RDM levels and grass height in the Altamont HMU.

- Following the 5-year Interim Management Period, camera monitoring, consistent with that described in the Interim Monitoring Plan, will occur every 3 years and cameras will be operated for 6 months out of the year in monitoring years.
Management Action AL-LM2—Conduct springtime visual monitoring of available forage to allow for inter-annual adjustments to grazing practices. This will ensure grassland habitat will remain suitable for San Joaquin kit fox, California tiger salamander, and California red-legged frog through the summer months.

- Monitoring will occur annually and will be consistent with that described in the Interim Management Plan for springtime grassland surveys in the Altamont HMU.

Management Action AL-LM3—Maintain entryways to two tunnels under I-580 that are passable to native wildlife. This includes maintaining fencing that will direct wildlife toward tunnels and away from roads where topography allows.

- Monitoring will occur annually and will be consistent with that described in the Interim Management Plan and with infrastructure monitoring described below.

Management Action AL-LM4—Continue to utilize Integrated Pest Management strategies for control, containment, and/or prevention of Cal-IPC listed invasive plants with an “Impact” or “Invasiveness” rating of High for the region and those that pose ecological threat to habitat in the HMU, including the appropriate combination of herbicide treatment and grazing management.

- During the Long-Term Management Period, map all infestations of Cal-IPC invasive species (as defined above) and those that pose ecological threat to habitat in the HMU every 5 years. Mapping should include the extent of each infestation and the density of the infestation (low, medium, high) to determine trends in how these species are responding to control and management activities.

- Adjust focus of invasive plant control based on changes in species presence and density as needed.

Objective AL-LM2—Maintain and monitor habitat conditions at all ponds and riparian areas that function as breeding habitat for California red-legged frog and/or California tiger salamander.

Management Action AL-LM5—Conduct monitoring every 2 years for California tiger salamander and California red-legged frog to determine species presence, population trends over time, and general habitat condition at breeding locations.

- Conduct monitoring every 2 years for California red-legged frog (dipnetting in March/April and metamorph surveys in September), California tiger salamander (dipnetting in March/April), and nonnative aquatic predators (March/April and September) as described in the Interim Management Plan for the Altamont HMU for the life of the permit.

- During dipnet surveys take photographs at predetermined photo points that generally document the habitat condition at the site.

- Continue a pond maintenance program based on information gathered during the Interim Management Period regarding siltation rates and long-term viability of pond function. Desilt ponds on average once every 10 years (more/less frequently as appropriate) to ensure adequate ponding depth and duration for breeding native amphibians.
• Consider presence of California red-legged frog and California tiger salamander at each monitoring location and relative changes in species abundance when changes in management are recommended.

• All changes in management of aquatic breeding sites will be discussed with the Wildlife Agencies.

Management Action AL-LM6—If documented in the HMU, implement a control program for nonnative wildlife and fish infestations that could negatively affect aquatic habitat for native amphibians.

• If nonnative wildlife control program is implemented record visual assessment of benefits during annual monitoring events (e.g., reduced number of bullfrogs, less damage by wild pigs).

7.4.2 Element AL-LM2 – Infrastructure and Facilities

Objective AL-LM3—Maintain fencing, water sources, and other grazing-related infrastructure on the interior of the units necessary to meet habitat management goals.

Management Action AL-LM7—Continue to work with livestock operators to maintain all facilities necessary to implement the grazing program.

• Conduct HMP administration including twice yearly inspection of all management-related interior fencing and livestock water sources.

• Coordinate with livestock operators to determine a rolling maintenance plan that will ensure grazing operations will not be interrupted as the result of facility issues.

7.4.3 Element AL-LM3 – Security, Safety, and Public Access

The HMU will be fenced and shall have no general public access. There will be no regular public or private use unless explicitly approved by the District and within the guidelines of this Long-term Management Program. Research and/or other educational programs or efforts may be allowed in the HMU as deemed appropriate by the District, but are not specifically funded or a part of this Long-Term Management Program.

Objective AL-LM4—Trash and Trespass

Management Action AL-LM8—At least twice annually the District will inspect the site for trash dumping or evidence of trespass.

• The District will post and maintain the appropriate ownership/no trespass signs on boundary fences.

• Trash will be removed and vandalism repaired.
7.5  Corral Hollow HMU Long-Term Management Program

7.5.1  Element CH-LM1 – Threatened and Endangered Species

**Objective CH-LM1**—Monitor and maintain habitat for San Joaquin kit fox and upland habitat for California red-legged frog and California tiger salamander.

**Management Action CH-LM1**—Through controlled grazing, managers will seek to maintain an average residual dry matter (RDM) of between 800 to 1,200 pounds per acre but no less than 500 lbs/acre on level and low slopes, and at least 800 lbs/acre on steep slopes in the fall to protect overall rangeland health. Also maintain herbaceous (grass and forbs) height (measured as obstruction using a Robel pole) below the maximum—no more than 12 inches year-round (measured in both spring and fall), regardless of slope, to retain habitat for native wildlife. Favorable weather conditions often make the herbaceous vegetation grow very rapidly, beyond the control of typical grazing operations. Thus spring herbaceous height may exceed the standard for short periods if average or above average rainfall occurs in the previous rain year. In order to keep grass shorter than 12 inches as often as feasible, the rangeland managers and grazing operators will plan for flexibility and be able to respond quickly to changing conditions, such as designating flexible-use fields to allow more precise grazing management of the designated habitat areas, and developing more watering facilities to better distribute grazing.

- Monitoring will occur annually and will be consistent with that described in the Interim Management Plan for RDM levels and grass height in the Corral Hollow HMU.
- Following the 5-year Interim Management Period camera monitoring, consistent with methods described in the Interim Monitoring Plan, will occur every 3 years and cameras will be operated for 6 months of the year in monitoring years.

**Management Action CH-LM2**—Conduct springtime visual monitoring of available forage to allow for inter-annual adjustments to grazing practices. This will ensure grassland habitat will remain suitable for San Joaquin kit fox, California tiger salamander, and California red-legged frog through the summer months.

- Monitoring will occur annually and will be consistent with that described in the Interim Management Plan for springtime grassland surveys in the Corral Hollow HMU.

**Management Action CH-LM3**—Continue to utilize Integrated Pest Management strategies for control, containment, and/or prevention of Cal-IPC listed invasive plants with an “Impact” or “Invasiveness” rating of High and those that pose an ecological threat to habitat in the HMU, including the appropriate combination of herbicide treatment and grazing management.

- During the Long-Term Management Period, map all infestations of Cal-IPC invasive species (as defined above) and those that pose an ecological threat to habitat in the HMU every 5 years. Mapping should include the extent of each infestation and the density of the infestation (low, medium, high) to determine trends in how these species are responding to control and management activities.
• Adjust focus of invasive plant control based on changes in species presence and density as needed.

Objective CH-LM2— Maintain and monitor habitat conditions at all ponds, wetlands, and riparian areas that function as breeding habitat for California red-legged frog and/or California tiger salamander.

Management Action CH-LM4—Conduct monitoring every 2 years for California tiger salamander and California red-legged frog to determine species presence, population trends over time, and general habitat condition at breeding locations.

• Conduct monitoring every 2 years for California red-legged frog (dipnetting in March/April and metamorph surveys in September), California tiger salamander (dipnetting in March/April), and nonnative aquatic predators (September) as described in the Interim Management Plan for the Corral Hollow HMU for the life of the permit.

• During dipnet surveys take photographs at predetermined photo points that generally document the habitat condition at the site.

• Consider presence of California red-legged frog and California tiger salamander at each monitoring location and relative changes in species abundance when changes in management are recommended.

• All changes in management of aquatic breeding sites will be discussed with the Wildlife Agencies.

Management Action CH-LM5—If documented in the HMU, implement a control program for nonnative wildlife and fish infestations that could negatively affect aquatic habitat for native amphibians.

• If nonnative wildlife control program is implemented, record visual assessment of benefits during annual monitoring events (e.g., reduced number of bullfrogs, less damage by wild pigs).

7.5.2 Element CH-LM2 – Infrastructure and Facilities

Objective CH-LM3— Maintain fencing, water sources, and other grazing-related infrastructure on the interior of the units necessary to meet habitat management goals.

Management Action CH-LM6—Continue to work with livestock operators to maintain all facilities necessary to implement the grazing program.

• Conduct HMP administration including twice yearly inspection of all management-related interior fencing and livestock water sources.

• Coordinate with livestock operators to determine a rolling maintenance plan that will ensure grazing operations will not be interrupted as the result of facility issues.
7.5.3 Element CH-LM3 – Security, Safety, and Public Access

The HMU will be fenced and shall have no general public access. There will be no regular public or private use unless explicitly approved by the District and within the guidelines of this Long-term Management Program. Research and/or other educational programs or efforts may be allowed in the HMU as deemed appropriate by the District, but are not specifically funded or a part of this Long-Term Management Program.

Objective CH-LM4 — Trash and Trespass

Management Action CH-LM7 — At least twice annually the District will inspect the site for trash dumping or evidence of trespass.

- The District will post and maintain the appropriate ownership/no trespass signs on boundary fences.
- Trash will be removed and vandalism repaired.
Chapter 8
Routine Maintenance and Property Management Activities

In addition to the habitat and species management activities for each HMU described in the preceding chapters, the District will be required to engage in certain maintenance and property management activities on all the properties to protect resources and ensure public safety. Maintenance activities include inspection, repair and replacement of roads, fences, gates, grazing infrastructure, and other facilities. Property management activities described here include fire control, and erosion prevention and pest management. This chapter describes these routine maintenance and property management activities and will be the basis for obtaining permits under the state and federal endangered species acts. The District’s process for administering third party easements on the Mitigation Lands is also described.

All activities on Mitigation Lands are governed by this HMP and any maintenance and property management activities that conflict with the management of the properties for habitat and species as described in Chapters 2–7 above, will be approved by the Wildlife Agencies. The language in this section is consistent with that provided in the Programmatic Biological Assessment provided to the USFWS in November 2011 and PBO for Long-Term Operations and Maintenance issued in November 2012. The District intends to engage the USFWS in a process to amend the PBO to account for any take that could occur as the result of these routine maintenance and property management activities. A similar process will be undertaken as necessary with CDFW to amend the March 2011 ITP.

8.1 Research, Monitoring, and Educational Activities

8.1.1 Regulatory Compliance Monitoring and Surveying

Monitoring programs, which involve field surveys and sampling efforts, are conducted by District staff or qualified contractors to ensure compliance with regulatory commitments for the Los Vaqueros Reservoir Expansion Project. Survey and sampling efforts generally involve data collection at mitigation and monitoring sites. Sites are accessed by vehicles and on foot from existing paved and unpaved roads and trails. Survey efforts may occur year-round and are dependent on monitoring schedules established in the existing regulatory commitments.

8.1.2 Research and Educational Activities

The District partners with educational institutions on research projects on various natural resources. For example, surveyors have accessed the Corral Hollow HMU to survey the large-flowered fiddleneck population on occasion in 2011 and 2012. The Wildlife Society led a tracking workshop on the Corral Hollow HMU in the fall of 2012. The District reserves the right to continue these
partnerships provided they add to the District’s and the scientific community’s understanding of natural resources in the region and do not conflict with the conservation easements.

The District maintains an education and outreach program for the Los Vaqueros watershed. If the opportunity arises to extend that program to the lands described in this HMP it would be done consistent with the requirements of the conservation easements and permits. All access related to educational programs would be either the District staff or docent led.

8.2 Property Management

8.2.1 Fire Management

A combination of hazard abatement activities are implemented to reduce potential for wildfires including firebreaks, fuel breaks, prescribed burns, grazing, and manual, mechanical, and chemical removal of vegetation. The most appropriate activity, or combination of activities, is selected based on natural resource management objectives, priorities for land management, and issues related to cost and public safety. In addition to the hazard abatement activities listed above, fire roads are maintained annually and other fire management activities including, but not limited to, fire trail signage and maintenance and installation of and repairs to or replacement of wells, springs, pumping stations, tanks, hydrants, and piping for the distribution and storage of water for fire suppression are conducted.

Prescribed Burns

Prescribed burning is used for habitat enhancement activities, such as to increase the extent of native grasslands and to reduce the extent of invasive plant species. Prescribed burns are also used to reduce fuel loads for wildfire management. Drip torches and propane tanks are used to initiate burns, and graders, dozers, and/or water trucks are used to provide suppression. Firebreaks may be created by scraping soil of vegetation with graders or other heavy equipment to provide containment. Burns are conducted by the District in compliance with federal, state, and local permitting requirements, and where containment can be ensured. Prescribed burns for habitat enhancement are usually conducted during late spring/early summer or late summer/early fall.

Firebreaks and Fuel breaks

Grazing is the District’s preferred method to create fire and fuel breaks. When grazing does not sufficiently reduce the fuel load around structures on adjacent property, mowing would be used. As a last resort, disking or ripping would be used. Any fire breaks that require blading, disking, or ripping outside of existing roads will be approved by the Wildlife Agencies. Firebreaks and fuel breaks are usually created once a year in the late spring. It is the District’s intent to keep the footprint of all firebreaks to a minimum while complying with applicable county guidance. Disking for fire abatement will be limited to a 30-foot wide break over a maximum of 1.5 miles total each year. At a 30-foot width this would result in a maximum of 5.5 acres of disking and ripping. In most years the total would be much less and in many years disking would not be used at all. Disking will
only occur in select locations where homes or other structures are present near the property line on an adjacent property. Those locations include the eastern boundary of the Deer Valley West Unit and northeastern corner of the Deer Valley East Unit in the Marsh Creek HMU, discreet locations in the Morgan Territory HMU where homes are immediately adjacent to shared property boundaries, along shared property boundaries where structures are present north and south of Altamont Pass Road and just south of Jess Ranch Road in the Altamont Pass HMU, and along the private road just southwest of the intersection of South Tracy Boulevard and I-580 in the Corral Hollow HMU. There are also locations along roadways, where fire risk is high, where mowing may be used to reduce fire risk. Roads are a known ignition source for fires, so keeping vegetation low adjacent to roads is imperative. Mowing could occur on a total of 84 acres from a 15 foot buffer on each side of the 23 miles of roads. All mowing for fire and invasive management, including mowing along road shoulders, would be done using a mower height that is a minimum 3 inches above the ground.

8.2.2 Erosion and Sediment Control

Various soil erosion and sedimentation practices will be implemented. Activities include preventative treatments such as planting vegetation; stabilizing disturbed soils with erosion control blankets or mats and installing energy dissipaters; and control treatments such as berms. These treatments are monitored by District staff or qualified contractors and are maintained with the use of basic hand-held tools and heavy equipment. Erosion control measures will not exceed 3 acres per year, including no more than 50 sq. ft. of rip rap. Initially this type of work will be used to dissipate sheet flow to reduce sediment transfer into Corral Hollow Creek, in the Corral Hollow HMU.

8.2.3 Invasive Plant Control

As described throughout this HMP controlling invasive plant species is the primary method proposed for enhancing grassland habitat, which provides movement, foraging, and denning habitat for San Joaquin kit fox, and upland habitat for California tiger salamander and California red-legged frog. Grazing is the principle tool employed under this HMP but other methods may be used in discrete areas to initially control particularly dense infestations of invasive plants. Those methods are employed consistent with District policies and principles and are described briefly below. All application of herbicides will be reported in the annual report under the adaptive management section.

District Policies and Principles

Invasive species will be monitored and controlled to prevent significant adverse effects on native plant communities, mitigation sites, and fish and wildlife habitats. Invasive plant species generally include those species identified in the Cal-IPC Invasive Plant Inventory (California Invasive Plant Council 2006, 2007) or on regional lists. Priority for control usually includes those nonnative invasive plants that are widely distributed, represent large infestations in localized areas, are affecting native plant communities, are found in mitigation sites, and are those known to respond to control treatments. Combinations of various manual, mechanical, and chemical weed treatments are implemented including hand removal, mowing, grazing, prescribed burning, and herbicide application.
Manual Control

Manual treatments, such as hand pulling, digging, and cutting are used to control small infestations where the use of mechanical and chemical treatments is impractical or restricted. Basic hand tools, such as string brush-cutters, loppers, and pole and chain saws, are used to cut and remove vegetation. The frequency of manual control efforts varies by site and may occur year-round. These locations would total approximately 3 acre per year.

Mechanical Control

Mechanical treatments include mowing, diskng, and burning and are used to control larger infestations and to minimize the use of chemical treatments. Tractors with mounted attachments are used for mowing and diskng. Mowing and diskng control activities generally occur in early spring and summer and prescribed burns generally occur in early to late spring or winter. Mowing is routine while diskng and burning are optional methods that will only be used with approval from the Wildlife Agencies. Approximately 400 acres of mowing is expected on the conservation lands to control invasive plants. This amount will be reduced dramatically over time as invasive plant infestations are reduced or removed. This is in addition to the mowing described above for fire breaks. All mowing for fire and invasive management, including mowing along road shoulders, would be done using a mower height that is a minimum 3 inches above the ground.

Chemical Control

Chemical treatments (i.e., herbicide application) are usually combined with the use of mechanical treatments. Herbicides are delivered from pressurized tanks and sprayed from vehicle-mounted booms, from backpack sprayers, or other application rigs, or by manually wicking herbicides directly onto vegetation. Applications are made following herbicide label directions and in compliance with all federal, state, and local regulations. Chemical control typically occurs in the spring through fall and may occur one or more times per year. No more than 200 acres per year will be subject to chemical control of invasive plants. The number is expected to decrease dramatically over time as invasive plant infestations are reduced or removed.

8.2.4 Nonnative Wildlife Control

If detected on Mitigation Lands the District is required to control nonnative wildlife that would reduce habitat quality for native species, particularly San Joaquin kit fox, California tiger salamander, California red-legged frog, or Alameda whipsnake. The methods the District will use to control nonnative wildlife species are described below.

Bullfrog and Nonnative Predatory Fish

Monitoring and control programs for bullfrog and predatory fish species (mostly nonnative) are implemented to reduce predation and ensure populations of California red-legged frog and California tiger salamander are maintained. Control treatments include manual removal of bullfrogs and nonnative fish from water bodies using nets or other direct methods, pond drainage, electroshocking, and chemical treatments. See below for pond draining limits per year.
Wild Pig

Wild pig are monitored and controlled to minimize damage to natural resources, especially drainages, ponds, wetlands, and areas where there are stands of rare plants. Wild pigs are controlled through trapping, shooting, and exclusion fencing. In a given year approximately 0.01 acre will be used for pig traps.

Manual Control

Manual treatments such as netting, trapping, and shooting are used by District staff or qualified contractors to control pest wildlife species. Wild pigs are typically shot following capture. Manual pest control is conducted year-round and control activities are in compliance with all federal, state, and local regulations.

Mechanical Control

Mechanical pest control treatments include pond draining, electroshocking, and fencing. Portable siphons or portable pumps with hoses are used to dewater ponds. All siphons and pumps have screens installed to prevent removal of wildlife during drainage. Standard electroshocking techniques are used to stun bullfrogs and nonnative predatory fish. No more than 4 ponds will be maintained in a given year (see below). Draining to remove fish or bullfrogs will occur concurrently with pond maintenance.

8.2.5 Pond and Wetland Maintenance

Pond and wetland infrastructure is monitored and maintained by District staff or qualified contractors. Eroded earthen dams, berms, and dikes are backfilled and compacted using equipment such as a backhoe and loader. Disturbed soil is then planted for erosion control. Leaking dams may be repaired by lining with bentonite clay soil and grout. If grout is used, a 30-day curing period will be allowed before water is reintroduced and pH will be checked after the pond fills to make sure that it is within safe levels for amphibians. Equipment used may include a loader, compactor, and grout pumper. Eroded spillways may need culverts installed and backfilled by soil and riprap placed by machinery or by hand, when possible. Excess sediment is removed from ponds and wetland areas using a suction pump, excavator, or backhoe. The removed sediment is properly disposed of in designated sites and the area is revegetated. Ponds and wetlands may be lined with a bladder or sealed with a bentonite type material, or alternatively, filled with water from a truck to protect the hydroperiod to provide breeding habitat for California red-legged frog and California tiger salamander. No more than 4 ponds will be maintained in a given year, and temporary impacts will not exceed 2 acres.
8.3 Property Maintenance

8.3.1 Infrastructure and Facility Maintenance and Improvements

The District is required to maintain facilities on Mitigation Lands as described in this HMP. These facilities allow for management of habitat using grazing. The facilities also limit access to Mitigation Lands, provide security, and protect against encroachment from adjacent lands. Standard methods are used to repair, replace, or remove fencing and gates. Degraded fencing will be removed as part of the replacement process.

Livestock Water Trough, Corral, Fencing, and Cattle Guard Maintenance

Water troughs, corrals, and cattle guards are maintained by District staff or qualified contractors. Cracked water troughs or damaged float guards are repaired or replaced to prevent leaks. Wildlife escape ramps are maintained to prevent animals drowning while attempting to drink or bathe. Trough pad surfaces are maintained by repairing cracks or pouring new pads, or placing gravel. Broken or damaged corral rails or posts are replaced and footing is maintained. Damaged cattle guard support frames are replaced and may be dug out by hand or with equipment such as a backhoe. Similarly, new frames are installed by hand or with equipment. Accumulated soil and debris clogging outlet drains is removed by hand or with equipment. There are approximately 30 water troughs on the conservation lands. All will be maintained annually. This will not result in any permanent or temporary impacts. There are approximately 65 miles (343,200 linear feet) of fencing on the conservation properties. All fences will be inspected each year. In a given year 10%, or 34,320 linear feet (~6.5 mile) will be maintained (serviced or replaced).

Road Surface Maintenance

Trails and road surfaces are monitored and maintained by District staff or by qualified contractors to provide continued access. A grader or tractor with a mounted blade is used to scrape unpaved trails and roads. Maintenance generally occurs every 3–5 years, typically in the summer and fall. There are 23 miles of existing public and ranch roads on the conservation lands. These roads will be graded as needed to keep them passable. No more than 10 miles of road will be graded in a given year.

Culvert Maintenance

Culverts are monitored and maintained by District staff or qualified contractors to ensure conveyance of water under roadways. Maintenance includes cleaning debris and sediment from culverts and replacing culvert piping at culvert outlets if needed. Debris and sediment that accumulates in culverts are removed by hand with a shovel or by heavy equipment. If culvert piping is cracked, soils may be excavated using an excavator or backhoe. The removed sediment is properly disposed of in designated sites and the area is revegetated. No more than 15 culverts will be serviced per year.
Water Pipeline Repairs or Replacement

The District also performs maintenance activities to monitor, prevent, repair, and restore water supply for stock ponds and livestock troughs. Repairs and replacement are conducted by District staff or qualified contractors and generally involves exposing the section of damaged pipe and performing the necessary repairs or replacement. Heavy equipment is often used to excavate a trench to expose the pipe and basic hand tools are used to repair or replace the pipe. The trench is backfilled with excavated soils, sand, and/or gravel and is then compacted following completion of repairs or replacement. There are approximately 80,000 linear feet of water lines on the conservation properties. In a given year 10%, or 8,000 linear feet (~1.5 mile) will be maintained (serviced or replaced).

8.4 Third Party Easement Holders

8.4.1 Utilities Maintenance and Improvements

Management of various utilities including underground pipelines, fiber optic communication lines, and overhead electric transmission lines are the responsibility of the various utility companies (e.g., PG&E). Utility companies have the right to maintain, construct, and operate their facilities within the easements that predate District ownership. Access to the easements to maintain facilities or infrastructure will be consistent with third-party access easements and will be coordinated with District Watershed staff. Any permits required to conduct the maintenance activities are the responsibility of the third-party contractor and will be presented to District Watershed staff prior to entering the Mitigation Lands. District Watershed staff will advise third-party contractors as appropriate on sensitive resources near work sites and will ensure impacts on sensitive resources are avoided and minimized. Third-party work activities on the Mitigation Lands will be reported in the annual report.
Chapter 9
Prohibited Activities on Easement Lands

Any activity on or use of the Mitigation Lands inconsistent with the purposes of the conservation easement established for those lands is prohibited. The following uses and activities are prohibited except as conducted pursuant to this HMP. This list of prohibitions is consistent with the conservation easement document that will be recorded on Mitigation Lands. While some limited public use may be allowed in the future, no public access or construction of facilities that would promote public access (e.g., trails) will be built during the Interim Management Period. This will allow the District to record a proper baseline for future management actions. Following the Interim Management Period, any proposed new uses will need to go through the District’s standard process including environmental review. The District will consult the Wildlife Agencies as appropriate once a specific proposal is being considered by the District.

- Unseasonal watering; use of fertilizers, pesticides, biocides, herbicides or other agricultural chemicals; weed abatement activities; incompatible fire protection activities; and any and all other activities and uses which may impair or interfere with the purposes of the conservation easement.

- Capture, pursuit, trapping, destruction or removal of plant or wildlife resources except as conducted pursuant to this HMP or authorized under special permit issued by the landowner and approved by the Wildlife Agencies.

- Use of off-road vehicles and use of any other motorized vehicles except on existing roadways or where necessary to implement actions identified within the HMP.

- Agricultural activity of any kind, except livestock grazing.

- New recreational facilities (trails, parking lots, structures) are generally prohibited. Minor facilities or facility upgrades may be completed provided they are consistent with the terms of the CE. All such facilities or facility upgrades shall be approved by the Wildlife Agencies. Low-intensity recreational activities are allowed. These activities are defined as activities that allow passive enjoyment of wildlife and other resources provided on the Mitigation Lands, including, but not limited to, hiking, wildlife viewing, or guided interpretive or educational activities.

- New commercial, industrial, residential, or institutional uses.

- Any legal or de facto division, subdivision or partitioning of the Mitigation Lands where installation of internal fencing for wildlife protection, habitat improvement, or grazing is not considered “partitioning.”

- Construction, reconstruction, erecting, or placement of any building, billboard or sign, or any other structure or improvement of any kind.

- Depositing or accumulation of soil, trash, ashes, refuse, waste, bio-solids or any other materials.

- Planting, introduction, or dispersal of nonnative or exotic plant or animal species, aside from animals used for grazing.
• Filling, dumping, excavating, draining, dredging, mining, drilling, removing, or exploring for or extracting minerals, loam, soil, sand, gravel, rock or other material on or below the surface of the Mitigation Lands, or granting or authorizing surface entry for any of these purposes.

• Altering the surface or general topography of the Mitigation Lands, including but not limited to any alterations to habitat, building roads or trails, paving or otherwise covering the Mitigation Lands with concrete, asphalt or any other impervious material except for those necessary to execute habitat management or monitoring activities specified in the HMP.¹²

• Removing, destroying, or cutting of trees, shrubs or other vegetation, except as required by law or for (i) fire breaks, (ii) maintenance of existing foot trails or roads, (iii) prevention or treatment of disease, (iv) public safety, or (v) to improve habitat (e.g., removing invasive plants or thinning chaparral).

• Manipulating, impounding, or altering any natural water course, body of water, or water circulation on the Mitigation Lands, and activities or uses detrimental to the conservation values, and water quality, including but not limited to degradation or pollution of any surface or sub-surface waters.

• Without the prior written consent of Grantee, which Grantee may withhold, transferring, encumbering, selling, leasing, or otherwise separating the mineral, air, wind, or water rights for the Mitigation Lands; changing the place or purpose of use of the water rights; abandoning or allowing the abandonment of, by action or inaction, any water or water rights, ditch or ditch rights, spring rights, reservoir or storage rights, wells, ground water rights, or other rights in and to the use of water historically used on or otherwise appurtenant to the Mitigation Lands, including but not limited to: (i) riparian water rights; (ii) appropriative water rights; (iii) rights to waters which are secured under contract with any irrigation or water district, to the extent such waters are customarily applied to the Mitigation Lands; and (iv) any water from wells that are in existence or may be constructed in the future on the Mitigation Lands.

• Engaging in any use or activity that may violate, or may fail to comply with relevant federal, state, or local laws, regulations, or policies applicable to Grantor, the Mitigation Lands, or the use or activity in question.

¹² A desktop review for cultural resources has been completed for the Mitigation Lands. Prior to any restoration-related ground-disturbing activities, locations where there is a high probability of uncovering cultural resources will be thoroughly investigated.
Chapter 10
Reporting Requirements

10.1 Annual Reporting

Annual reports will be completed by January 31 of each year, for the life of the permits, to cover monitoring and management conducted during the prior calendar year. An annual report will be required for the first partial year if that period exceeds 4 months. The annual report will include the following.

- Methods, results, and analysis of all monitoring and studies conducted during the year, even if those results or analyses are only partially complete due to the seasonal nature of most monitoring requirements.
- A description of management, enhancement, and restoration actions taken during the year, and success in implementing these actions.
- Recommendations and an implementation schedule for the upcoming management year.
- Any modifications or additions to the standard monitoring plan and/or schedule written into this HMP.
- Recommendations or plans for pilot projects and directed research to be conducted in the near future by the District or by any group coordinating with the District.

The annual report will be submitted to designated representatives of the Wildlife Agencies.
11.1 Printed Literature


11.2 Personal Communications


Figure A-1
Los Vaqueros Expansion Project
Marsh Creek HMU Land Cover

Figure A-2
Los Vaqueros Expansion Project
Los Vaqueros HMU Land Cover

Los Vaqueros HMU Land Cover

- Annual grassland
- Ruderal
- Seasonal wetland
- Silver bush lupine scrub

Figure A-3
Los Vaqueros Expansion Project
Morgan Territory HMU Land Cover

- Annual grassland
- California bay woodland
- California sagebrush scrub
- Coast live oak woodland
- Coast live oak/California bay woodland
- Coast live oak/blue oak woodland
- Developed
- Eucalyptus woodland
- Live oak woodland
- Pond
- Seasonal wetland
- Valley oak woodland
- Willow riparian woodland

November 25, 2013
Figure A-4
Los Vaqueros Expansion Project
Altamont HMU Land Cover

Altamont HMU

Land Cover Type
- Alkali grassland
- Annual grassland
- Developed
- Mulefat scrub
- Pond
- Ruderal
- Saltgrass seasonal wetland
- Seasonal wetland

November 25, 2013
Base: Bing Maps Aerial, 2013
Figure A-5
Los Vaqueros Expansion Project
Corral Hollow HMU Land Cover
Appendix B

Conceptual Wetland Restoration Design for Marsh Creek Habitat Management Unit
Figure B-1
Conceptual Restoration Plan