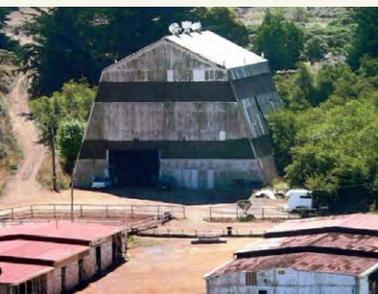




Golden Gate National Recreation Area

# Marin Equestrian Stables Plan Environmental Assessment



October 2011

Prepared for:  
National Park Service  
U.S. Department of the Interior  
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# **Marin Equestrian Stables Plan ENVIRONMENTAL ASSESSMENT**

# Marin Equestrian Stables Plan Environmental Assessment

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## GOLDEN GATE NATIONAL RECREATION AREA (GGNRA) Marin County, California Lead Agency: National Park Service (NPS)

### ABSTRACT

The *Marin Equestrian Stables Plan (Plan) Environmental Assessment (EA)* presents and evaluates alternatives to locate and improve the equestrian stables on lands administered by the National Park Service (Park) within the Golden Gate National Recreation Area.

This Plan describes and analyzes four alternatives—**three action alternatives** and **one no action alternative**—for the improvement and location of the stables. The *purpose* of the Plan is to provide for comprehensive improvement of equestrian sites, facilities, programs, and stables management within the GGNRA. The Plan is designed to improve visitor services and preserve, protect and enhance Park natural and cultural resources in a manner consistent with NPS plans and policies. Both the Park and the existing stables operators have identified the need for a comprehensive plan that will guide GGNRA stables into the future. There is a need to determine the appropriate number of horses to be stabled in GGNRA southern Marin stables in consideration of site capacity, horse health and financial feasibility for business operations. This Plan determines appropriate facilities for horses and the public and establishes Best Management Practices at the stables to better address potential impacts to water quality, restoration of historic structures and preservation of cultural landscapes.

**Comments:** The EA will be available for public review and comment for 45 days. Review copies are available at Golden Gate National Recreation Area Headquarters (Building 201 Fort Mason, San Francisco, CA) and the following local libraries: Marin County Free Library; Mill Valley Public Library; Pt. Reyes Station Library; Sausalito Public Library; and San Francisco Public Library Main Branch. Comments must be submitted or postmarked on or before December 16, 2011. Comments may be submitted online at <http://parkplanning.nps.gov/mesp> (click on project and follow instructions), or by mail to: Superintendent, Fort Mason Building 201, San Francisco, CA 94123, Attn: Marin Equestrian Stables Plan).

Written comments received on the EA will be reviewed to determine whether any important new issues or reasonable alternatives or mitigation measures have been suggested. If major substantive issues are raised which point to the potential for significant impacts, an Environmental Impact Statement would be prepared, otherwise a Finding of No Significant Impact (FONSI) will be prepared. Questions regarding this project may be directed to the NPS Project Manager, Andrea Lucas (415.561.2878), or emailed to: [goga\\_planning@nps.gov](mailto:goga_planning@nps.gov).

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- Appendix D- Results of CNDDDB search within two miles of MESP sites
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## LIST OF ACRONYMS

±	Plus or minus
ABAAG	Architectural Barriers Act Accessibility Guidelines
ACOE	U.S. Army Core of Engineers
ADA	American with Disabilities Act
AGR	Agricultural Supply
APE	Area of Potential Effects
BA	Biological Assessment
BAAQMD	Bay Area Quality Management District
BCDC	San Francisco Bay Conservation and Development Commission
BMPs	Best Management Practices
BNHM	Berkeley Natural History Museum
BOD	Biochemical Oxygen Demand
°C	Celsius
CBA	Choosing by Advantages
CCEP	Coastal Corridor Enhancement Project
CEQ	Council on Environmental Quality
cfs	cubic feet per second
CLR	Cultural Landscape Report
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
COLD	Cold Freshwater Habitat
COMM	Ocean, Commercial and Sport Fishing
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dBA	Weighted decibel scale
DO	Dissolved Oxygen
DO-12	National Environmental Policy Act Guidance Handbook
E. Coli	Escherichia coli
EA	Environmental Assessment
ESA	Endangered Species Act
FIGR	Federated Indians of Graton Rancheria
FRSH	Freshwater Replenishment
GIS	Geographic Information System
GGD	Golden Gate Dairy
GGNRA, or the Park	Golden Gate National Recreation Area
GGT	Golden Gate Transit
GMP	General Management Plan
HI	Headland Institute
HSR	Historic Structures Report
IDT	interdisciplinary team
LBP	Lead-based paint
LEED	Leadership in Energy Efficient Design
LRC	Lower Redwood Creek
LTV	Lower Tennessee Valley
MESP, or the Plan	Marin Equestrian Stables Plan
mg/L	Milligrams per Liter
MIGR	Fish Migration

MHFB	Marin Headlands and Fort Baker Transportation Plan
MMC	Marine Mammal Center
MPN	Most Probable Number of Colonies
MRZ	Mineral Resources Zones
MUN	Municipal and Domestic Supply
MUNI	Municipal Railroad
mya	million years ago
N	Nitrate-Nitrite
NC	New Construction
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTP	Nephelometric Turbidity Units
NW	Northwest
P	Phosphorus
PHP	Park Horse Patrol
PI	Plasticity Index
Plan	Marin Equestrian Plan
PM	Project Manager
PM <sub>10</sub>	Particulates greater than 10 micrograms in size
PRBO	Point Reyes Bird Observatory
PRC	Presidio Riding Club
QA/QC	Quality Assurance/ Quality Control
RARE	Preservation of rare and endangered species
REC-1	Water Contact Recreation
REC-2	Noncontact Water Recreation
ROTC	<b>Reserve Officers' Training Corps</b>
RV	Rodeo Valley
RWQCB	Regional Water Quality Control Board
SAFZ	San Andreas Fault Zone
SHEL	Shellfish Harvesting
SHPO	State Historic Preservation Officer
SMARA	Surface Mining and Reclamation
SPWN	Fish Spawning
SR1	California State Route 1
SW	Southwest
SWAMP	Surface Water Ambient Monitoring Program
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
TIN	Total Inorganic Nitrogen
TL&W	Tamalpais Land and Water Company
TN	Total Nitrogen
TP	Total Phosphorus
TSS	Total Suspended Solids
TV	Tennessee Valley
UBC	Uniform Building Code
μS/cm	micro siemens
USEPA	United States Environmental Protection Agency

USFWS  
USGS  
WARM  
WILD  
WWII

United States Fish and Wildlife Service  
United States Geological Survey  
Warm Freshwater Habitat  
Wildlife Habitat  
World War II

## GLOSSARY

<b>Area of Disturbance</b>	The physical area that is subject to direct disturbance from project implementation.
<b>Arena</b>	An enclosed space or area to train or ride a horse.
<b>Best Management Practices</b>	Effective, feasible (including technological, economic, and institutional considerations) conservation practices and land- and water-management measures that avoid or minimize adverse impacts to natural and cultural resources. Best Management Practices may include schedules for activities, prohibitions, maintenance guidelines, and other management practices.
<b>Biofiltration Swales</b>	Vegetated drainage ditches that use multiple mechanisms to remove pollutants from water. They generally reduce runoff velocities and sediment transport, enhance filtration of runoff and provide for uptake of nutrients and breakdown of other contaminants prior to discharge to receiving waters.
<b>Biostimulatory Substances</b>	Concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. Changes in chlorophyll a and associated phytoplankton communities follow complex dynamics that are sometimes associated with a discharge of biostimulatory substances.
<b>Bunkhouse</b>	A building providing sleeping quarters for ranch hands.
<b>Climate Change</b>	Climate change or global warming implies a significant change from one climatic condition to another.
<b>Colluvium</b>	Loose bodies of sediment that have been deposited or built up at the bottom of a low-grade slope or against a barrier on that slope, transported by gravity.
<b>Cultural Resources</b>	The physical remains of past cultural systems, including prehistoric, archaeological sites, and historic buildings and structures.
<b>Derogation</b>	To take away or deviate from a standard or expectation.
<b>Drainage</b>	Ditches or subsurface drainage tiles to remove excess water from the soil or used to move water from one location to another.
<b>Environs</b>	An area in which something exists or lives.
<b>Environmental Assessment</b>	An environmental analysis prepared pursuant to the National Environmental Policy Act to determine whether a federal action would significantly affect the environment and thus require a more detailed environmental impact statement.
<b>Ephemeral Streams</b>	A stream which flows only after rain or snow-melt and has no base flow component. <b>It does not flow all year; see "Intermittent Steam"</b>
<b>Erosion</b>	The wearing away of land surface by wind or water, intensified by construction or development (e.g., Land clearing practices).
<b>Ethnographic</b>	A study of culture and cultural processes that uses multiple ways to research, observe, and document people, events, or artifacts.
<b>Equestrian</b>	A person that rides a horse or performs on horseback; a place that is associated with horses, stabling, riding, or caring for horses.
<b>Fair Market Value</b>	An estimate of the market value of a property, based on what a knowledgeable, willing, and unpressured buyer or lessee would probably pay

	to a knowledgeable, willing, and unpressured seller or lessee in the real estate market.
<b>Floodplain</b>	The flat or nearly flat land along a river or stream or in a tidal area that is covered by water during a flood.
<b>Historic Resources</b>	Properties, structures, and districts that are listed in or have been determined to be eligible for listing on the National Register of Historic Places.
<b>Hectares</b>	Is a unit of area equal to 100 acres (or 10,000 square meters).
<b>Indicators</b>	A measurement, statistic or values that provide a proximate gauge or evidence of the effect of environmental management or the state or condition of the environment. Indicators can be a biological entity or process, or community whose characteristics show the presence of specific environmental conditions.
<b>Intermittent Stream</b>	The channel contains flowing water for only a portion of the year. When not flowing, the water may remain in isolated pools, or surface water may be absent.
<b>Juxtaposition</b>	The act or an instance of placing two or more things side by side.
<b>Lacustrine</b>	Relating to, formed in, living in, or growing in lakes.
<b>Livery</b>	A stable where horses and vehicles are kept for hire and where stabling is provided.
<b>Lunging Ring</b>	<b>A round, confined area used for or "lunging" a horse for exercise or training.</b>
<b>Metamorphosed</b>	To change in form or nature; transform; subject to or undergo metamorphosis or metamorphism.
<b>Mitigation Measure</b>	Mitigation measures are ways to reduce adverse impacts on the environment.
<b>Natural Resources</b>	Occur naturally within environments that exist relatively undisturbed by mankind in a natural form and can be characterized by amounts of biodiversity existent in various ecosystems.
<b>Paddock</b>	Small, usually enclosed corrals or fields near a stable or barn for pasturing or exercising animals.
<b>Pasture</b>	A grassy area used as food by grazing animals or a ground area suitable for grazing.
<b>Perennial Stream</b>	Is a stream or river (channel) that has continuous flow in parts of its bed all year round during years of normal rainfall.
<b>Remuneration</b>	Is pay or salary typically a monetary payment for services rendered, as in an employment.
<b>Seasonal Stream</b>	A stream whose flow is not constant because it has water in its course only during certain seasons. <b>Same as "Ephemeral" and "Intermittent"</b>
<b>Stable</b>	A building for the lodging and feeding of horses.
<b>Stall</b>	A compartment for one animal located inside a stable.
<b>Stewardship</b>	Refers to our responsibility to care for our natural resources – land, air, wildlife, and water – to allow future generations to enjoy.
<b>Sustainable Development</b>	Long-term maintenance of ecosystem components and functions for future generations.
<b>Turnout</b>	To release one or more horses into an open field or paddock.
<b>Topographical Features</b>	<b>The features of a map that represent the natural features of the earth's surface.</b>
<b>Wetlands</b>	An area that is saturated by surface or ground water with vegetation adapted for life under those soil conditions.

## Executive Summary

The United States Department of Interior National Park Service (NPS) is undertaking the Marin Equestrian Stables Plan (Plan) to guide the future use, management, and location of stables located on lands within the Golden Gate National Recreation Area (GGNRA, the Park) in southern Marin County, California. The Park currently manages three existing horse stables under permit by individual operators including Golden Gate Dairy, Tennessee Valley and Rodeo Valley stables. A fourth stable, operated by NPS and known as Lower Tennessee Valley stables, currently houses Park Horse Patrol operations. The National Park Service has identified certain issues associated with these stables, including site capacity, facility improvements, management, public benefit, and the protection and enhancement of important park resources, both cultural and natural. The Plan has been proposed to address these issues to achieve and maintain consistency with NPS management plans and policies.

This environmental assessment (EA) describes and analyzes four alternatives for the improvement and expansion of the equestrian stables.

### **Purpose and Need for Action**

The *purpose* of the Marin Equestrian Stables Plan is to provide for comprehensive improvement of equestrian sites, facilities, programs, and stables management within the GGNRA. The Plan is designed to improve visitor services and preserve, protect, and enhance park natural and cultural resources in a manner consistent with NPS plans and policies.

Both the Park and the existing stables operators have identified the need for a comprehensive plan that will guide GGNRA stables into the future. During the past 35 years, although many changes have been implemented to improve operations, reduce impacts, and expand public benefit, there has not been a comprehensive management review of the horse operations. The renovated and improved equestrian facilities and management practices proposed in this plan would provide a high quality visitor experience, allow increased access to the facilities, and better protect the natural and cultural resources at the sites.

### **Project Objectives**

The project *objectives* are specific steps toward fulfilling the purpose and must be achieved to a large degree for the project to be considered a success. The Park, in its examination of the issues and needs driving the project, has identified the following primary objectives for the subject areas:

1. **Determine appropriate long-term stables sites:** Identify appropriate sites for long-term stables use. These sites are determined by such factors as site size, topography, proximity to water resources, historic setting and resource sensitivity, cultural landscape protection, natural resource protection, trail and road access, parking, and public transportation.
2. **Establish the number of horses stabled:** Determine the appropriate number of horses based on potential programs combined with site constraints such as site size, facilities, and cultural and natural resource protection.
3. **Identify facilities improvements and desired resource conditions:** Identify new facilities and improvements to existing facilities necessary to achieve project goals and objectives, including improved access and safety for both humans and animals.
4. **Provide guidance to the business leasing phase following the Plan and EA:** Provide a framework for a business management strategy to ensure future business leases are appropriate for equestrian operations on NPS park lands. This business management strategy

reflects long-term management goals of NPS consistent with applicable law, regulations, and policy.

5. **Welcome the general public, and provide education and outreach programs:** Serve both the riding and non-riding public with programs, interpretation, training, and outreach programs. Invite the public to ride, and to view and learn about horses, horse husbandry, and history, site cultural and natural resources, and the Golden Gate National Recreation Area. Examples include websites and signs at nearby visitor centers that invite the public to come to visit and utilize the stables. Increased riding and horsemanship opportunities would be offered for a variety of skill levels and interests. At the stables there could be exhibits about horse husbandry, shoeing, breed information, tack, buggies, and the horses themselves are there to see and enjoy.

### **Alternatives**

The No Action alternative and three action alternatives were analyzed for this environmental assessment.

**Alternative A: No Action** — The No Action alternative consists of continuing existing and ongoing equestrian management and operations. It includes other ongoing plans for improvements that may exist.

**Elements Common to all Action Alternatives** — Activities or elements that would take place under all of the action alternatives are described below. Where action alternatives discuss new or modified facilities and services, the alternative would allow for the specified facility or service to be constructed as soon as a funding mechanism is identified, however, NPS is not obligated to fund and develop the facilities or provide the services identified. Further, implementation of the Plan alternatives must be compatible with the General Management Plan (GMP) which is currently under revision.

1. **Business Management Strategy.** In all alternatives, the NPS would implement a business management strategy that utilizes best practices from the real estate, tourism, and non-profit sector. The business management strategy would update GGNRA equestrian operation management practices and it would conform to law, regulation and NPS policy. The components of this strategy are described in Chapter 1, Introduction.
2. **Public Programs, Outreach and Use (Public Benefit).** Under all action alternatives, equestrian-centered programs would continue at GGNRA in southern Marin. This Plan/EA requires that future business leases would determine specific enhancements made to foster broader public programming in order to reach a wider regional audience of riders and non-riders. Public benefit would be improved through required development and maintenance of increased public equestrian riding programs and events, improved trail and road signs, maps, and Internet sites describing location, public programs and other information about each stable site, with links to NPS websites.
3. **Facilities.** Under all action alternatives, facilities would be upgraded and enhanced.
4. **Sanitation.** Drainage and wastewater management would be improved. At all sites where they exist (Tennessee Valley and Lower Redwood Creek), field treatment septic-systems would be upgraded or replaced with either portable or composting toilets. Treated water would be provided for residential use.

5. **Safety.** A safety and emergency plan and requirements for posting of safety and emergency procedures would be required at each stable.
6. **Cultural Resources.** For all action alternatives, specified major maintenance and capital improvements would include actions designed to protect or enhance cultural resources in accordance with the NPS guidelines. The specific improvements will be determined during the future leasing phase.
7. **Natural Resources.** Incorporation of expanded Best Management Practices (BMPs) into management, operation and maintenance activities associated with all action alternatives would improve protection of natural resources including water quality and sensitive habitats adjacent to equestrian facilities. The specific improvements will be determined during the future leasing phase.
8. **Sustainability.** In all action alternatives major new buildings are designed to reach three sustainability benchmarks: 1) A minimum silver or higher Leadership in Environmentally Efficient Design (LEED) rating (achievable rating may vary by alternative); 2) Minimal increase in electricity usage, natural gas use, water usage, and sewage output and, 3) Reduced potentially polluted storm water runoff from the site(s).

**Alternative B: Enhanced Existing** — Alternative B includes two options; Option B1 would result in permanent stables at *four* sites and **Option B2, the Preferred Alternative**, would result in permanent stables at *three* locations. Under Option B1, Golden Gate Dairy, Tennessee Valley, Lower Tennessee Valley and Rodeo Valley would remain as equestrian stables. In contrast, under Option B2 the same sites are considered *except* Lower Tennessee Valley- which would no longer be a stable, and the horses for the Park Horse Patrol program would be moved to the Tennessee Valley stables. Otherwise, Options B1 and B2 would be similar and would include the elements common to all alternatives, as described above and in section 2.3.2. The overall number of horses in stalls (76) would remain the same as existing (Alternative A).

**Alternative C: Consolidated** — Alternative C would reduce the number of stables in southern Marin GGNRA lands by consolidating existing equestrian stables from four to two of the stable sites – Tennessee Valley and Rodeo Valley. The Park Horse Patrol would move from Lower Tennessee Valley to Tennessee Valley. Equestrian stables and associated programs at Golden Gate Dairy would be eliminated. The overall number of horses in stalls within the GGNRA would be reduced from 76 in Alternative A to 72 in Alternative C.

**Alternative D: Dispersed and Expanded** — Alternative D would result in three stables at existing stable locations and the development of two new stable locations with a maximum capacity of 88 equestrian stalls. Tennessee Valley, Golden Gate Dairy, and Rodeo Valley stables would remain as equestrian sites, with a reduction in the number of horses at Golden Gate Dairy from 11 down to a maximum of four horses. New stables would be developed at Lower Redwood Creek and Marincello Trail sites. The Park Horse Patrol would be located at the Marincello site

**Preferred Alternative** — The preferred alternative for the Plan implementation is Alternative B, Option B2. The action alternatives have many elements in common; however, Alternative B, Option B2 provides the most advantages with regard to the evaluation factors of public benefit, public access, and cultural and historic resource protection when compared to the other action alternatives. Three historic sites, Golden Gate Dairy, Tennessee Valley and Rodeo Valley, remain as stables, an appropriate use that will help preserve these resources for future generations. The goal of natural

resource preservation will be achieved by site improvements and environmental Best Management Practices.

**Environmentally Preferred Alternative** — Taking all impacts together, the differences between the various alternatives are not great. However, Alternative C is anticipated to have the least adverse impacts due to the least number of stables sites. With two sites being stables as opposed to three, four or five sites in the other alternatives, the impacts associated with horse operations would be geographically confined to those two areas, Tennessee Valley and Rodeo Valley, and would not occur in the Redwood Creek drainage (Golden Gate Dairy and Lower Redwood Creek sites), Marincello Road area, or Lower Tennessee Valley. This reduces adverse impacts overall. One of the project objectives is to improve water quality and reduce soil erosion at the facilities. Alternative C would provide for the best protection of natural resources by reducing drainage problems and potentially contaminated water leeching into nearby drainages compared to the other alternatives.

For these reasons, Alternative C was selected as the environmentally preferred alternative. Alternative C provides the most advantages with regard to the evaluation factors of natural resource protection when compared to the other action alternatives.

### ***Impact Topics Analyzed***

The following impact topics were analyzed in this environmental assessment to determine the potential effects that would occur as a result of implementation of each of the four alternatives:

- Geology and Soils
- Water Resources
- Vegetation
- Wildlife
- Species of Special Concern
- Air Quality
- Cultural Resources
- Visitor Experience
- Transportation
- Visual Resources
- Park Operations

No impairment to park resources is expected under the proposed alternatives. Please refer to **Table 2-12** for a summary of impact intensities by alternative. Proposed mitigation measures are described in **Table 2-13**.

### ***Environmental Review Process***

The EA will be available for a 45-day public review and comment period. Written comments received on the EA will be screened to determine whether any important new issues or reasonable alternatives or mitigation measures have been suggested. If major substantive issues are raised which point to the potential for significant impacts, an Environmental Impact Statement would be prepared, otherwise a Finding of No Significant Impact (FONSI) will be prepared.

# CHAPTER 1. PURPOSE AND NEED

## 1.1 Introduction and Background

### 1.1.1 Introduction

The United States Department of Interior National Park Service (NPS) is undertaking the Marin Equestrian Stables Plan (Plan) to guide the future use and management of stables located on lands within the Golden Gate National Recreation Area (GGNRA, the Park) in southern Marin County, California. This Environmental Assessment is being prepared as required under the National Environmental Policy Act (NEPA), and follows National Park Service NEPA Guidance Handbook (DO-12). The National Park Service currently manages three existing horse stables under permit by individual operators and a fourth stable operated by the NPS.

The National Park Service has identified certain issues associated with these facilities that need to be addressed including site capacity, facility improvements, management, public benefit, and the protection and enhancement of important park resources. The federal action herein is the management of equestrian facilities, which in turn regulates the use, location and size of the stables and guides future leasing. This Plan is designed to address these issues and to achieve and maintain consistency with NPS management plans and policies. Pursuant to the National Environmental Policy Act (NEPA) and the NPS NEPA guidance handbook (DO-12), this Environmental Assessment (EA) was prepared to present a range of alternatives that could address the issues identified for stable operations, describe the potential environmental effects of each alternative, and identify a preferred alternative.

Based on this EA and other available information, the NPS has selected Alternative B, Option B2 as the preferred alternative. Alternative B, Option B2 will guide management of these properties and the terms and conditions for future operator leases. This EA addresses the potential environmental effects associated with various proposed improvements at the stables. The specific mix of public and private equestrian programs at each site is not determined by this Plan but rather these management and program issues will be determined under future business leases. Ideas for public benefit and programs are listed in Appendix A to provide guidance to future leases.

#### **Future Leasing Program**

**Competition for opportunities:** Upon completion of this environmental compliance process, the NPS intends to issue a nationwide request for proposals (RFP) for the operation of equestrian programs as described in any FONSI or other decision document which may be prepared as an outcome of this EA process which will detail the leasing opportunity, the fair market value rent, improvements desired (as **identified in the selected alternative**), the **operating parameters, submittal requirements and the NPS's** selection criteria. The outcomes of this planning process, the recommendations and mitigation measures of the preferred alternative will be incorporated and carried forward into this leasing opportunity. Organizations that currently operate equestrian sites within the planning area will be welcome to respond to the RFP. Components of the future leasing program will entail the following items.

**Long-term lease agreements:** Leases will be typically 10 years in length although longer terms may be considered. These will enable commercial or non-profit equestrian organizations the proper stability for staffing, marketing, program development, and community engagement. They will enable the

lessees to secure financing for business investments and any facility improvements such as are described in the alternatives in this EA, which might be required in the lease.

**Visitor experience and appropriate public programming:** Public programming, appropriate for this national park setting and which is also consistent with applicable law, regulations, and NPS policies, will be required as a component of future equestrian operations. These programs will include public recreational and educational riding and non-riding equestrian- and Park-related opportunities at the equestrian sites and could include trail rides, youth programs/camps, and therapeutic riding, among others. Private, less public uses such as horse boarding may be considered appropriate if used as a supporting or auxiliary element in a broader, primarily public program, and will be open to all.

**Resource stewardship:** Future operators will be required to partake in stewardship programs and activities which encourage environmental sustainability and resource protection. Best Management Practices as described in this Plan (see Appendix B) will be required in the leases.

**Financial sustainability:** The NPS will be seeking lessees who are financially capable, through relevant experience and a sound business plan, of not only operating but maintaining and improving the equestrian sites. Some sites and facilities may require substantial investment to rehabilitate or otherwise improve leased property. The NPS may also choose to make its own investment in a site, not implement the site, or operate the site, but this would be determined at a later date following the RFP process.

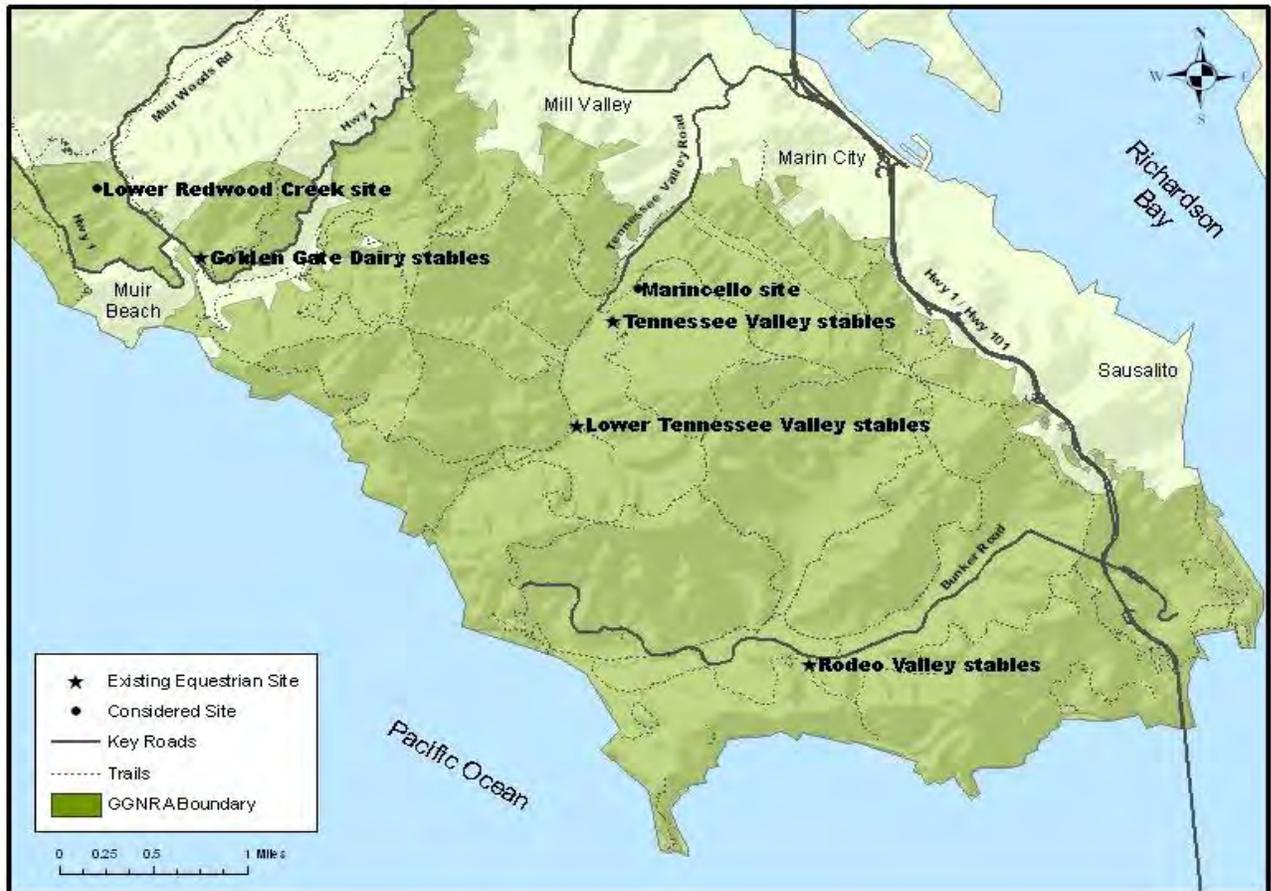
**Single or Multiple Lessees:** Operational efficiencies will be sought by the NPS in the implementation of this leasing effort to ensure efficient management and oversight of equestrian operations in the Park. To do this and to ensure financial sustainability, the NPS intends to have only one lessee per site and may consolidate multiple or all equestrian sites under one lease.

## 1.1.2 Background

The Park's General Management Plan (GMP, NPS 1980) guides development of the GGNRA and supports continuing equestrian facilities in the GGNRA southern Marin lands (see section 1.5.1 for a more detailed discussion). The Park recognizes that horseback riding is a popular means of recreation and that it expands the variety of visitor experiences available in the GGNRA. The Park desires to increase the public benefit and extend this opportunity to a greater number of visitors while improving protection of the historic and natural resources in the vicinity of the stables.

The Golden Gate Dairy, Tennessee Valley, and Rodeo Valley equestrian stables were in existence at their current sites before the area became designated National Park Service in 1972, and have since continued in the GGNRA for over 35 years. These three stable operations provide boarding and Tennessee Valley stables also offer public lessons and programs. A fourth stable in Lower Tennessee Valley houses four NPS horses used in the GGNRA's volunteer Park Horse Patrol (PHP) program, which started in 1976. The stables' use and operation has been modified over time to reduce impacts of their operations and to increase the public benefit. Two additional locations considered in this EA, the Marincello and Lower Redwood Creek sites are currently undeveloped as stables sites but are proposed new equestrian facility locations in Alternative D.

**Figure 1-1** displays the location of project stables.



**Figure 1-1: Project Planning Area and Regional Location Map**

### 1.1.3 Project Area

#### 1.1.3.1 Existing Stables

The four existing GNRA stables are described below.

**Golden Gate Dairy (GGD) stables:** Located at Muir Beach, the stable entrance is accessible directly from California State Route 1 (SR 1). Horse boarding has occurred at the Golden Gate Dairy since the 1960s. The stables area is a historic dairy farm site and it includes approximately six buildings, currently housing 11 privately owned horses. The Muir Beach Volunteer Fire Department uses one building at the GGD site. There is an unoccupied farmhouse.

Current Permittee	LOCATION	ACRES	NEARBY TRAILS
Ocean Riders: Month to month special use permits non-profit 501(c)(7).	Adjacent to the community of Muir Beach, across Highway 1 from the Pelican Inn. Bordered by GNRA lands. Frank Valley is to the north. Green Gulch is to the south.	=/ - 1.0	The Dias Ridge Trailhead is at the south end of GGD site, with additional trail access to the east.

**Tennessee Valley (TV) stables:** Located in Tennessee Valley, the site is accessed via Tennessee Valley Road. The Tennessee Valley site was a dairy ranch until the 1960s and horse boarding has been in place since then. The complex includes approximately 10 buildings situated in close proximity to the junction of four popular multi-use trails, two of which run through the site's boundaries. An intermittent stream passes along the southern edge of the historic ranch complex. The Tennessee Valley site houses both privately boarded horses and horses used in public classes by the subcontractor Miwok Livery. Currently, approximately 17 horses owned by private individuals are on site, while the livery company maintains a stock of approximately 25 horses for its clients. The organization maintains a residence for the two staff members who are on-site overnight.

TV OPERATION	LOCATION	ACRES	NEARBY TRAILS
Miwok Center: Operated under a 5-year permit which expires in 2012.	Tennessee Valley west of Marin City. South of Mill Valley near the Tennessee Valley Trailhead parking area at the end of Tennessee Valley Road. Accessible via Tennessee Valley Road.	10.3	Marincello Trail and Oakwood Valley are north of this stable. Miwok Trail, Old Springs Trail and Gerbode Valley lie to the southeast.

**Lower Tennessee Valley (LTV) stables (GGNRA Park Horse Patrol):** Also located in Tennessee Valley, the site is accessed via Tennessee Valley Road and then through a locked gate along a portion of Tennessee Valley trail. The site was historically operated as a dairy ranch and today the Lower Tennessee Valley stables area includes two buildings and stalls that house four Park-owned horses used in **GGNRA's Park Horse Patrol (PHP) program**. All activities of the Park Horse Patrol are carried out from Lower Tennessee Valley, where approximately two NPS Rangers and 30 volunteers ride and care for the horses.

LTV OPERATION	LOCATION	ACRES	NEARBY TRAILS and TRAILHEADS
GGNRA Park Horse Patrol.	Adjacent to Tennessee Valley Trail about 0.7 miles south of the trailhead parking area at the end of Tennessee Valley Road.	3.81	Located near the Tennessee Valley Trail.

**Rodeo Valley (RV) stables:** Rodeo Valley stables are accessed via Bunker Road within the larger Forts Baker, Barry, and Cronkhite Historic District, which was listed on the National Register of Historic Places (NRHP) in 1973. The facility is considered part of Fort Barry, a former military complex occupying the southwest end of the valley and the site has had horse boarding since the 1960s. The complex includes approximately four buildings that currently house 19 club-member owned horses and the capacity for eight horses visiting the "horse hotel."

RV OPERATION	LOCATION	ACRES	NEARBY TRAILS
Month to month special use permits with Presidio Riding Club.	Rodeo Valley west of Sausalito in the Marin Headlands (east of Rodeo Lagoon on Bunker Road).	5.5	Located near the junction of Coastal Trail, Rodeo Valley Trail, Bobcat Trail.

### 1.1.3.2 Potential New Stables Sites

The locations of the two proposed stables sites within the GGNRA are shown on **Figure 1-1** and described below:

**Marincello Site.** The Marincello site is accessed via Tennessee Valley Road approximately 0.15 mile and uphill from Tennessee Valley stables along the Marincello Trail. The site is currently a vacant area but was previously disturbed by a subdivision project that was never completed in the 1960s. It is the site of a prior equestrian rental operation. Fill was placed on this site during construction of the Marincello Road, now the trail. A small intermittent drainage flows near the south side of the site, with primarily upland habitats otherwise within and surrounding the site.

CURRENT USE	LOCATION	ACRES	NEARBY TRAILS
Vacant.	East of Marincello Trail 0.2 mile from the Tennessee Valley Trailhead Parking Lot and 0.15 mile from the Tennessee Valley stable. Accessed via Marincello Road.	+/- 1.98	Marincello Trail.

**Lower Redwood Creek Site.** The site is accessed via Highway 1 by a graveled access road leading to a private residence. The Lower Redwood Creek site, formerly the Banducci Flower Farm, is a 170-acre parcel of land adjacent to Redwood Creek. The NPS purchased the site in 1980 and farming was discontinued in 1995. The site includes a 28-acre level field and a 5.5-acre area known as the former ball field.

CURRENT USE	LOCATION	ACRES	NEARBY TRAILS
Residential use, habitat and stream restoration area.	Adjacent to Redwood Creek, northwest of the intersection of State Route 1 and Muir Woods Road. To the east are the Muir Beach Community Service District lands, wells, and pumps that supply water for the town of Muir Beach and Golden Gate Dairy. The north border is California State Park lands.	+/- 170	Redwood Creek Trail to the northeast across Muir Woods Road. Heather Cutoff Trail to the northwest in California State Park <b>lands of Frank's Valley with a large horse arena, an overnight horse camp, and restrooms.</b>

## 1.2 Purpose and Need

### 1.2.1 Purpose of the Plan

The *purpose* of the Marin Equestrian Stables Plan is to provide for comprehensive improvement of equestrian sites, facilities, programs, and stables management on Park lands in southern Marin County. The Plan is designed to improve visitor services, and to preserve, protect and enhance Park natural and cultural resources in a manner consistent with NPS plans and policies.

### 1.2.2 Need for Action

This section describes the *need* for the project, including existing conditions, problems, or opportunities that have prompted the Park to take action. The Park has determined the following conditions must be addressed:

**No comprehensive equestrian plan exists to guide management of stables in GGNRA.** Both the Park and the existing stables operators have identified the need for a comprehensive plan that will

guide GGNRA stables into the future. During the past 35 years, although many changes have been implemented to improve operations, reduce impacts, and expand public benefit, there has not been a comprehensive management review of the horse operations. While proposals for facility improvements have been made by the operators, the NPS has not been able to evaluate those proposals in the context of a broader facility site plan. With the proposed Plan, the NPS can properly evaluate any proposed expansion or enhancement of equestrian facilities in southern Marin.

There is a need to determine the appropriate number of horses to be stabled in GGNRA southern Marin stables in consideration of site capacity, horse health and financial feasibility for business operations. There is also a need to determine appropriate facilities for horses and visitors.

**Short term permits hinder business planning.** Short term authorizations - from monthly to five years - do not reflect the long term management goals of the NPS. A consequence is that the **operators' ability** is restricted for long-term planning, program development, staffing, and facility improvements, resulting in limited public programming and poor conditions at certain site facilities. Important operating parameters, such as the number of permitted horses and permitted extent of developed facilities, have not been evaluated for long-term authorizations. There is a need to establish a formalized NPS inspection process to ensure compliance with permit conditions.

There is a need to provide the broader equestrian community the opportunity to operate these facilities through a request for proposals and competitive selection. Additionally, providing fair economic return to the NPS for the assigned use of land and facilities would be required. For example, fair economic return could include payment of a Service District Charge or rent or improvement to Park facilities. Business operations need to be financially feasible; this is essential to the long-term sustainability of the GGNRA and equestrian operations within it.

**The GGNRA equestrian facilities are in poor condition and in need of restoration, repair, upgrades and maintenance.** The equestrian facilities in GGNRA were originally constructed decades ago and are currently in need of substantial repair and upgrades. The age of the facilities is compounded by a shortage of capital investments. The result is that some facilities have a neglected appearance and unsustainable, substandard conditions. Moreover, the facilities need upgrades as part of the NPS commitment to making all practicable efforts to make facilities, programs and services accessible and usable by all people, including those with disabilities. This policy reflects the commitment to provide access to the widest cross section of the public and to ensure compliance with the Architectural Barriers Act of 1968, the Rehabilitation Act of 1973, and the Americans with Disabilities Act of 1991. Additionally, there is a need to build certain facilities such as covered riding rings and hay and manure storage.

**Visitor experience; public benefit and public programs need to be broadened.** Equestrian operations at Golden Gate Dairy and Rodeo Valley have no defined, uniform approach to invite and accommodate the visiting public and are not currently permitted by the NPS to provide public programs.

For example:

- With the exception of Tennessee Valley stables, there are few regional and targeted outreach programs to attract a diverse public.
- There is a need to offer riding opportunities to a diverse public.
- There is a need for interpretive signage explaining the unique history of these public lands.
- Public programs and access need to be clearly signed and explained with office hours.
- There is a need for the NPS signage so the general public feels welcome.

- Websites need to be provided and maintained for all sites, explaining programs, hours, and with references and links to the NPS.
- To the extent practicable, visitor amenities such as public parking and restrooms should be provided.

**There is no defined approach to safety and emergency plans.**

- There needs to be a uniform approach and requirement for safety and emergency planning.
- There is a need for informational and cautionary signage to direct the public to safest route(s) and to educate the public about horse etiquette and safe behavior around horses.
- The ability for immediate emergency response is limited where there is no overnight surveillance or occupancy.
- There is a need to address location and storage of combustibles, such as hay, which are sometimes located in close proximity to animals.
- There is a need for improved fire fighting capability at each site.

**There is a need for improved sanitation facilities.**

- Upgrades to septic systems and their locations are needed (e.g., in relationships to streams). This may include relocation and renovating septic systems or provision of composting toilets.
- There is a need for hand washing facilities to be provided at each site.

**On-site management requirements, such as updated Best Management Practices (BMPs) for resource protection, are not clearly or uniformly identified.** There is a need to update the Best Management Practices at the stables to better address potential impacts to soils, water and air quality, preservation treatments for historic structures, cultural landscapes, and/or archeological resources. Each operator's permit currently requires implementation of practices for clean water protection. However, consistent practices at all the stables, such as BMPs, are not identified. Listed below are examples of current conditions or activities that need to be addressed to protect natural and cultural resources and visitor experiences.

**Natural Resources:**

- Location and storage of horse manure (e.g., uncovered or within stream setbacks).
- Types and runoff of horse chemical treatments and grooming products.
- Location of paddocks and stalls to avoid urine and erosion deposits and increased sedimentation in nearby water courses.
- Prevention of the spread of invasive non-native plants through horse manure.
- Water quality monitoring.

**Cultural Resources (historic structures and landscapes):** Cultural landscapes, historic structures, and archeological sites at Golden Gate Dairy, Tennessee Valley, and Rodeo Valley stables are protected by the National Historic Preservation Act (NHPA). These properties need identification, rehabilitation, and or preservation treatments subject to individual or programmatic approval by the State Historic Preservation Officer (SHPO).

- New facilities must be sensitively designed in accordance with Section 106 of the National Historic Preservation Act and NPS Management Policies.
- There is a need for Historic Structures Reports (HSR) and Cultural Landscape Reports (CLR) to direct activities at these sites.
- There is a need to convey the historic character of these facilities to Park visitors.

- Vegetation removal and ground disturbances associated with construction will require preliminary surface or subsurface archeological survey or project monitoring to identify and determine appropriate treatments for exposed or buried archeological sites or features.

**The NPS has operational and storage needs in the GGNRA.**

- GGNRA has operations needs, including horse patrol, trail maintenance, volunteer stewardship, potential ranger residence/office, and public contact needs that need to be accommodated.
- The Park has storage needs for stewardship and maintenance in the area and to protect motorized equipment, maintenance tools and materials. The NPS policy is to build in previously developed areas whenever possible (NPS Management Policies Chapter 4.6).

### ***1.3 Project Objectives***

The project *objectives* are specific steps toward fulfilling the purpose and must be achieved to a large degree for the project to be considered a success. The objectives of the Plan are to:

**Determine appropriate long-term stables sites.**

These sites are determined by such factors as site size, topography, proximity to water resources, historic setting and resource sensitivity, cultural landscape protection, natural resource protection, access, parking, and public transportation.

**Establish the number of horses stabled.**

Determine the appropriate number of horses based on potential programs combined with site constraints such as site size, facilities, and cultural and natural resource protection.

**Identify facilities, improvements and desired resource conditions.**

Identify new facilities and improvements to existing facilities necessary to achieve project goals and objectives, including improved access and safety for both humans and animals.

Establish guidelines, equestrian uses and facility operations that protect or enhance natural and cultural resources consistent with NPS management policies. The guideline objectives are:

- Improve the condition of historic structures and landscapes.
- Identify and protect archeological features or sites in areas of proposed improvements.
- Protect Park natural resources, including water and air quality.
- Ensure erosion control.
- Reduce pests.
- Protect domestic animals and wildlife.
- Protect Park users and visitors.
- Ensure sustainable development per NPS policies (NPS Management Policy 9.1.1 2006).

**Provide guidance to the business leasing program.**

Following the completion of this Plan, the Park's Business Management Division will competitively offer leases for the stables operations. An objective of this Plan is to provide a framework for a business management strategy to ensure future business leases are appropriate for equestrian operations on the NPS Park lands. This business management strategy reflects long term management goals of the NPS consistent with applicable law, regulations, and policy. Elements of this strategy include:

- Long-term lease agreements.
- Competition for opportunities.

- Appropriate public programming.
- Resource stewardship.
- Financial sustainability.
- Oversight and administration efficiency.

**Enhance visitor experience and public benefit.**

There is a need to increase public benefits and public access to horseback riding and other equestrian programming. For example, the Tennessee Valley stables provides public horseback riding programs; and the Morgan Horse Ranch, located in Point Reyes National Seashore, serves as one example of an equestrian facility that serves the non-riding public. The Morgan Horse Ranch invites the public to view and learn about these special horses. A sign at the nearby visitor center invites the public to come to the stables. At the stables there are exhibits about horse husbandry, shoeing, breed information, tack, buggies and the horses themselves are there to see and enjoy.

## ***1.4 Scope of the Environmental Assessment***

This EA analyzes the No Action alternative and three action alternatives for the Marin Equestrian Stables Plan, as described in Chapter 2 of this document. It describes the project alternatives, existing conditions in the project area, the environmental effects of each alternative, and mitigation measures to avoid or reduce adverse effects. This EA is limited in scope to address proposed improvements at the equestrian stables. After the decision is made and the project goes into implementation, design reviews will be done to ensure that the project is in conformance with the EA/FONSI and NPS Policy. Design reviews will be subject to a Park project review. Through the project review process, an interdisciplinary team will evaluate whether the project is consistent with the EA/FONSI, and that appropriate mitigation measures are incorporated. If it is determined that the project has the potential for new environmental effects not addressed in this EA or effects greater than those described in this statement, a separate environmental process will be conducted. This EA is the result of a broad-scale planning effort to determine the preferred location, facility improvements and best management practices at the stables and, therefore, does not determine or show detailed design or construction drawings. Detailed design will occur at project implementation and will be developed consistent with the Decision/FONSI. This EA does not address the use, designation, or maintenance of equestrian trails, except in the immediate vicinity of the stables. While the location of the Park Horse Patrol (PHP) was considered in the planning process for the Plan and is discussed in this EA, the management of Park Horse Patrol activities is not within the scope of the Plan and is not discussed in this EA.

The NPS is implementing or planning other projects in the vicinity of the Marin Equestrian Stables Plan project area. These projects were the subject of separate planning processes and are consistent with this planning effort. They are considered in the cumulative project analysis section in Chapter 4. They include:

- Trailhead and trail improvements to Dias Ridge Trail adjacent to Golden Gate Dairy stables.
- Trailhead and trail improvements near the Tennessee Valley stables.
- Implementation of components of the Marin Headlands and Fort Baker Transportation Infrastructure and Management Plan, for which a separate Environmental Impact Statement was prepared.
  - Route Coastal Trail along east side of Rodeo Valley stables.
  - Bridge, trailhead, and parking improvements at Smith Road north of Rodeo Valley stables.
  - Parking area improvements for Rodeo Valley stables.

- o The facilities need upgrades as part of the NPS commitment to making all practicable efforts to make facilities, programs and services accessible and usable by all people, including those with disabilities.

## **1.5 Summary of Laws, Regulations and Policies**

### **1.5.1 Park-Related Documents**

#### ***National Park Service Organic Act, Redwood Act***

Under the *Organic Act*, the Department of the Interior and the NPS are directed to “conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations” (16 USC § 1). This was reiterated in the *Redwood National Park Expansion Act of 1978*, under which the NPS is directed to conduct its actions in a manner that will ensure no “derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress” (16 USC § 1a-1).

#### ***National Park Service Management Policies 2006***

With conservation as its predominant mandate, the NPS seeks to avoid or to minimize adverse impacts on Park resources and values. While the NPS has discretion to allow negative impacts when necessary, the NPS cannot allow an adverse impact that constitutes resource impairment (NPS, 2006a). The NPS *Management Policies 2006* that are particularly relevant to the Marin Equestrian Stables Plan are outlined in Appendix C.

***National Park Service Director’s Orders.*** The National Park Service sources of detailed written guidance to help managers make day-to-day decisions include **Director’s Orders**. These directives and guidelines remain in effect until superseded. The National Park Service has issued the following relevant **Director’s Order**:

***Director’s Order #12 Conservation Planning, Environmental Impact Analysis, and Decision-making.*** This Director’s Order and the accompanying Handbook describe the NPS’s approach to NEPA, environmental analysis, public involvement, and making resource-based decisions. They set forth direction in using interdisciplinary teams, incorporating scientific and technical information, and establishing a solid administrative record for the NPS actions.

***Director’s Order #28 Cultural Resources Management.*** This Director’s Order provides definitions and standards used in the identification, evaluation, and management treatment for historic structures, cultural landscapes, and archeological resources.

***Golden Gate National Recreation Area Enabling Legislation.*** The GGNRA was established by Congress in 1972 (PL92-589). The language of the enabling legislation states the **Park’s purpose** as follows:

In order to preserve for public use and enjoyment certain areas of Marin and San Francisco counties, California, possessing outstanding natural, historic, scenic and recreational values and in order to provide for the maintenance of needed recreational open space necessary to urban environment and planning, the Golden Gate National Recreation Area is hereby established (NPS, 1980).

**Golden Gate National Recreation Area General Management Plan, 1980 (GMP).** The operation of the existing stables, with the exception of the Lower Tennessee Valley stable currently housing the Park Horse Patrol, is consistent with the GMP. In particular, the 1980 GMP found: “These facilities [Golden Gate Dairy, Tennessee Valley, and Rodeo Valley stables] will continue to operate in their present general locations; but whereas they were conceived and operated to only offer boarding services to members, they will now be modified to provide such services to the general public as horse rental, overnight boarding, and trailer parking. In addition, application of their membership policies and regulations will be monitored regularly to ensure against discriminatory practices.” (NPS, 1980). The NPS is currently updating the GGNRA General Management Plan. Ongoing coordination between these two planning efforts will ensure consistency in the final approved plans. If an alternative is picked that eliminates one of the stables sites above, the NPS would amend the 1980 GMP. A new GMP that builds on the 1980 GMP is currently underway. The Park anticipates completing the final Plan and Environmental Impact Study (EIS) in 2012.

## 1.5.2 Other Federal Regulations, Laws and Policies

**National Environmental Policy Act (NEPA).** The Council on Environmental Quality (CEQ) regulations for implementing the NEPA requires that federal agencies integrate the NEPA process with other planning efforts to ensure that decisions reflect environmental values, to avoid delays later in the process, and to head off potential conflicts (CEQ, 1978). These regulations further describe the decision-making process used to determine when to prepare an EA—that is, when it is likely that a proposed action would have no significant impact on the environment (CEQ 1978: sec. 1501.4). Internal and external scoping with the NPS, agencies and the public has indicated that proposed actions associated with implementation of the Marin Equestrian Stables Plan would not likely have a significant effect on the environment and, therefore, an EA is the appropriate NEPA document. In the event that a significant impact is identified as part of the EA analysis, then an EIS may be prepared.

**National Parks Omnibus Management Act (16 USC 5901 et seq.).** This act underscores NEPA in that both are fundamental to the NPS management decisions. Both acts provide direction for articulating and connecting resource management decisions to the analysis of impacts, using appropriate technical and scientific information. Both also recognize that such data may not be readily available, so they provide alternative options for resource impact analysis should this be the case. Specifically, the *National Parks Omnibus Management Act* directs the NPS to use the findings of science and the analyses of scientifically-trained resource specialists in decision making.

**Endangered Species Act.** This act requires all federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) and/or NOAA Fisheries (National Marine Fisheries Service (NMFS)) to ensure that federal activities that are authorized, funded, or carried out by a federal agency do not jeopardize the continued existence of federally endangered and threatened plants and animals (listed species) or adversely modify critical habitat for a listed species. There is also a requirement to conference with the USFWS if the proposed action is likely to jeopardize a species proposed for listing, or destroy or adversely modify proposed critical habitat. A Biological Assessment (BA) is being prepared in consultation with the U.S. Fish and Wildlife Service to meet the requirements of the *Endangered Species Act*. The results of consultation with the USFWS will be incorporated into the Decision/FONSI.

**National Historic Preservation Act.** The NHPA is the principal legislative authority for management of cultural resources associated with the NPS projects. Section 106 of the NHPA requires all federal agencies to consider the effects of their actions on cultural resources determined eligible for inclusion in the National Register of Historic Places. This assessment is done in consultation with the SHPO and Advisory Council on Historic Preservation. In addition, the NHPA requires that federal agencies take

actions to minimize harm to historic properties that would be adversely affected by a federal undertaking.

***Migratory Bird Treaty Act and Executive Order 13186.*** The *Migratory Bird Treaty Act of 1918* makes it unlawful to kill, capture, buy, sell, import, or export migratory birds, eggs, feathers, or other parts. The January 2001, Executive Order 13186, restated the value of migratory birds. It directed agencies to develop and implement memoranda of understanding with the USFWS to protect them.

***Coastal Zone Management Act.*** The *Coastal Zone Management Act* (CZMA) requires federal agency participation in the development of coastal states' coastal zone management programs. The California Coastal Commission implements the CZMA. The CZMA also requires federal agencies to prepare a consistency determination for every federal agency activity within or outside the coastal zone that affects land or water use or natural resources of the coastal zone. A consistency determination indicates that the federal activities are consistent with the enforceable parts of the state programs. Once the EA is completed, it and a letter regarding consistency with the CZMA will be submitted for review in compliance with these requirements.

***Clean Water Act.*** The U.S. Army Corps of Engineers (ACOE) and the United States Environmental Protection Agency (USEPA) regulate the discharge of dredged or fill material into Waters of the United States (including wetlands) under Section 404 of the *Clean Water Act* (CWA). Projects that would result in the discharge or placement of dredged or fill material into Waters of the U.S. require a Section 404 permit from the ACOE, unless otherwise exempt from Section 404 regulations. Some classes of fill activities may be authorized under Nationwide Permits if specific conditions are met. Under CWA Section 401, a water quality certification or waiver may be required for some permitted activities. Depending on the size and scope of activities, this certification is provided by the State Water Resources Control Board or a Regional Water Quality Control Board (RWQCB).

***Executive Order 11988.*** Executive Order 11988 – Flood Plain Management addresses floodplain issues related to public safety, conservation, and economics. It generally requires federal agencies constructing, funding or permitting projects in a floodplain to:

- Avoid incompatible floodplain development.
- Be consistent with the standards and criteria of the National Flood Insurance Program, and
- Restore and preserve natural and beneficial floodplain values.

***Executive Order 11990.*** Executive Order 11990 – Protection of Wetlands requires federal agencies to follow avoidance, mitigation, and preservation procedures with public input before proposing new construction in wetlands.

## ***1.6 Scoping Process and Public Participation***

Scoping is designed to be an open process to gather input early in the NEPA process. In addition to notifying interested parties about a proposed project, it helps identify environmental issues and alternatives to be addressed in the EA.

A number of internal and public scoping meetings were conducted with the NPS staff to identify the **project's purpose, need, and objectives**; to develop preliminary alternatives; and to identify associated issues and impact topics.

Public scoping occurred from May 24 to June 21, 2006, and again from February 3 to March 5, 2010, and included public meetings and open houses. The results of earlier scoping were used to develop

concept alternatives that provided the basis for preliminary alternatives presented at the public meeting and open house held February 3, 2010. Scoping meetings were designed to receive input regarding the stated purpose, need, and objectives of the Plan; the preliminary action alternatives; and identify issues of concern to the public related to the planning effort. Communication with USFWS, the SHPO, and other agencies occurred on April 4, 2006, January 13, 2010 and February 2011. A more detailed description of scoping activities, including agency consultation, is presented in the Chapter 5 - *Consultation and Coordination* of this EA.

## **1.7 Issues and Impact Topics**

Environmental issues were analyzed to determine impact statements of problems or effects (both beneficial and detrimental) that might occur if the actions identified in the alternatives were implemented (or in the case of the No Action Alternative, continue to be implemented). Issues and concerns related to the potential environmental effects of the proposed action were identified through input from individuals, organizations, federal agencies, and the NPS public scoping efforts. Subsequently, the issues identified were used to help formulate the alternatives and mitigation measures. The comments generally addressed the following:

- The number of horses allowed and appropriate stable sites;
- How privately boarded horses benefit Park visitors;
- The number and type of Park partner facility operators (e.g., for-profit versus non-profit operators);
- The type and extent of public programs that should be offered;
- The size and best location for the volunteer horse patrol program;
- The need for facility improvements; and
- Impacts to federally protected species and other natural and cultural resources.

In response to the comments and concerns raised through scoping, as well as the requirements of laws, regulations, and policies, the NPS identified those impact topics needing detailed analysis. A summary of the impact topics is provided below. The analysis of the impact topics evaluated is presented in Chapter 4 – *Environmental Consequences* of this EA.

### **1.7.1 Natural Resources**

**Soils.** Stable site modification associated with certain alternatives may result in short-term increases in erosion during construction. However, with the application of construction Best Management Practices (BMPs), these short-term effects would be expected to be negligible. Potential long-term effects such as increased soil erosion resulting from trampling, crushing, and removal of vegetation could occur if an alternative increases stable site footprints (e.g., such as adding a new horse turnout area, or a new stables site) or results in substantial increases in uses of adjacent trails or unpaved parking areas. Potential long-term beneficial effects could also occur from implementation of alternatives which result in reduction of areas of exposed soil and/or including erosion prevention improvements to site design and implementation of improved BMPs during operations.

**Water Resources and Flood Potential.** Construction and rehabilitation of stable buildings and associated facilities could alter erosion and sedimentation, deposition of oil and grease (such as from parked cars), groundwater infiltration, and surface stream hydrology, water quality, and storm water flows. Short-term water quality effects during construction are expected to be negligible with the application of specified BMPs. Potential long-term water quality effects are expected to be beneficial due to application of improved BMPs for potentially polluted waters. Certain alternatives also increase

facility setbacks from creeks and result in beneficial facility design improvements. Alternatives that increase the number of horses or add residential use would likely increase water use demands.

**Vegetation (includes wetland and riparian vegetation).** Construction of certain new stable buildings and other facilities would require vegetation removal, and heavy equipment and construction crews may trample adjacent vegetation. In addition, as noted above, destruction of vegetation would likely occur where new horse turnout areas or new stables sites are added. Substantial increases in uses of adjacent trails could indirectly affect vegetation through the introduction of invasive species, soil erosion and loss in frequently used areas.

**Wildlife.** Construction, facility or site rehabilitation, and changes in stable site footprints and use patterns at stables and adjacent areas could result in disturbance of wildlife or alter wildlife habitat.

**Species of Special Concern.** Species of Special Concern. Construction, facility or site rehabilitation, and changes in stable site footprints and use patterns at certain stables and adjacent areas could impact special status species or their habitats. This Plan evaluates potential direct, indirect and cumulative impacts to federally listed species (northern spotted owl, tidewater goby, steelhead trout, coho salmon, the California red-legged frog, and the Mission Blue butterfly), and two state listed animals (California black rail and the little willow flycatcher). These species are referred to as "listed species". No federal or state listed threatened or endangered plant species are known to grow in the Project area.

**Air Quality.** Heavy equipment used to construct or rehabilitate buildings and other stable facilities, vehicles delivering construction supplies, and vehicles associated with increased public use of stable sites could increase air pollutants.

## 1.7.2 Cultural Resources

**Archeological Resources.** Ground-disturbing activities associated with rehabilitation and new construction of stable facilities has the potential to affect known and unknown historic and prehistoric archeological materials.

**Cultural Landscapes and Historic Districts.** Depending on the alternative selected, the project may have effects on features that are contributing resources to the existing NRHP districts or eligible properties. Alternatives will involve the rehabilitation of existing historic structures and/or new construction of structures within NRHP-listed Forts Baker, Barry, and Cronkhite Historic District and historic sites Tennessee Valley and Golden Gate Dairy. Such modifications have the potential to affect the integrity and significance of cultural resources. Topics analyzed in this EA include stabilization and rehabilitation of historic buildings, new construction (including horse stalls, hay sheds and other facilities), paddocks and pastures, removal of certain non-historic features, and the relationship of the leased equestrian area to the historic property as a whole.

## 1.7.3 Other Resource Topics

**Visitor Experience.** Under all action alternatives, increased equestrian public programs would potentially benefit more visitors; however, construction of facility improvements or modifications could result in short-term or long-term disruption of adjacent roads or trails. If stables sites are rehabilitated, remodeled or have new facilities added, existing facilities, programs and sites could be disrupted due to construction activities; short-term noise, dust, or construction traffic, or restricted access could also reduce current visitors' enjoyment of stable sites or cause them to visit other locations. Increased noise has the potential to affect the enjoyment of other recreational resources and is discussed under soundscapes.

**Transportation (traffic volume, circulation, parking).** The existing equestrian facilities currently are accessed via public roads and generally provide adequate parking for equestrian visitors on site. Under certain alternatives, equestrian visitors may need to share parking facilities with other Park users (employees, other Park visitors, Park partners). An increase in visitors to certain equestrian sites could affect circulation and parking in and around these sites. Certain alternatives may result in an increase in the number of vehicle trips and the number of trail riders associated with various stable sites. This has the potential to affect the enjoyment of other recreational resources.

**Visual Resources.** Improvements or modifications could change the visual character of the existing stable sites and, under certain alternatives, add new visual elements at new or existing locations. Short-term construction impacts would be evident to visitors in the immediate area where construction is occurring, and in some cases, briefly visible from lightly to moderately travelled roads or heavily used trails.

**Park Operations.** Potential impacts to the NPS operations include those resulting from the NPS sharing of a stables facility under two alternatives. Operations impacts would include potential capital and operating cost impacts due to infrastructure and utilities improvements. Park staff and programs such as Park Horse Patrol staff could be disrupted or suspended during relocation. **The Park's** staffing and annual operating budget may increase due to the need for increased administrative oversight and site monitoring of the equestrian operations.

## ***1.8 Issues Eliminated from Further Consideration***

Resources and resource-related issues may be dismissed from detailed analysis in an environmental document if a resource is not present within the project area or within the area of potential effect or if the resource would not be measurably impacted by proposed actions. The following impact topics were eliminated from further consideration, either because the topic was not relevant in the context of **the project and its setting**, or because **the project's effects** would be only minor, negligible or beneficial.

- **Wilderness Values**—No designated wilderness areas are located within the study area.
- **Indian Trust Resources and Sacred Sites**—No Indian trust resources are held by the Park. Sacred sites have not been identified within the study area.
- **Prime and Unique Farmlands**—No lands qualifying as prime or unique farmlands are found within the project area.
- **Wild and Scenic Rivers**—No designated wild and scenic rivers are located within the study area.
- **Ethnographic Resources**—No known ethnographic resources are believed to be located within the study area.
- **Environmental Justice (Executive Order 12898)**—The project is not believed to have the potential to result in disproportionately high and adverse human health or environmental effects on minorities and low-income populations and communities. The project could increase opportunities for under-represented equestrians—particularly low-income children of color—by describing requirements for increasing outreach programs in future business leases.
- **Human Health and Safety (Hazardous Materials and Waste)**—No hazardous materials/waste are known to exist in areas for which ground disturbing activities are proposed within the project area, with the exception of portions of the Rodeo Valley stable site. However, prior to detailed building and site rehabilitation design and construction, site investigations for hazardous materials would occur. The NPS or construction contractors would be responsible for conducting testing for

lead-based paint or other hazardous materials before construction activities. During building rehabilitation, construction workers would implement practices mandated by law to avoid exposure to hazardous levels of lead-based paint and asbestos. Before site excavation or subsurface construction, the contractor would develop a Hazardous Materials Work Plan to govern requirements and provisions that apply when the contractor encounters, discovers, or is notified of potential contamination in or around buildings or soil or groundwater.

- **Socioeconomics**—The project would at most create only a small number of new jobs, and would not substantially affect the overall socioeconomic character of the Muir Beach, Tennessee Valley, Marin Headlands or San Francisco Bay Area.
- **Night Sky**—In future planning, existing and proposed lighting (e.g., arenas or exterior building-mounted lighting) will be evaluated for compliance with the NPS **Director’s Orders and other NPS** management guidelines concerning the night sky. The project proposes to use lighting systems designed to avoid effects to a dark night sky. Since the project proposes to use lighting systems designed to avoid effects to a dark night sky, no project-related adverse effects to night views are anticipated.
- **Seismicity, Geotechnical Hazards, and Tsunami**—While the project is located in a seismically active area, existing stables buildings have not had sufficient seismic retrofit work done. Additional retrofit work, as needed, would be accomplished as part of the building rehabilitation process. New buildings would be designed and constructed to the necessary engineering specifications and to the most current seismic standards. Geotechnical evaluations would include an assessment of landslide hazard for both existing and proposed facilities. As such, the risk posed by a seismic event would be reduced under any of the implemented action alternatives compared to current conditions. Retrofits and new construction would comply with all applicable building codes implemented by the NPS.

Only one site, Golden Gate Dairy, could be affected by a tsunami. A georeferenced tsunami inundation map from the California Emergency Management Agency (2010) indicates that two structures (hay barn and main residence) and part of the main turn-out touch edge of the hypothetical inundation line. However, the map seems to suggest that the site has sufficient elevation to escape the brunt of a tsunami impact. While the low-lying areas at Golden Gate Dairy could be flooded by such waves, any new buildings would be constructed at locations higher than this level. Consequently, the risk under the project would not exceed current conditions.

- **Global Climate Change**—The project would not be substantially affected by global warming and associated climate and sea level changes. In addition, the action alternatives incorporate sustainability elements which would reduce the stables contribution to global warming. As such, the project would have negligible to beneficial effects related to global climate change. More details regarding climate change as it relates to the project, and the Park in general, are provided in the paragraphs below.

Global warming and associated climate and sea level changes are likely to have an effect upon **GGNRA’s natural systems**, cultural resources such as the coastal defense system, and the **Park’s infrastructure**. The most likely changes that GGNRA will experience in the coming decades are:

- Coastal erosion and flooding may become more prevalent as sea level rises and winter storm severity potentially increases;
- Wildland fire season will lengthen and there may be more and larger fires;

- o Plants will become more drought stressed as temperatures increase, even if rainfall also increases, leading to greater susceptibility to pathogens and invasive species.

To properly manage and care for these resources, the Park must monitor the changes as they emerge and develop new adaptive strategies to respond to these threats. Scientists and Park staff are monitoring a variety of indicators for climate change including air temperature, humidity and wind speed; water quality, quantity, temperature and salinity; sea level; and vegetation and wetland cover. These data will help Park managers understand what is happening and inform their response to ecosystem disruptions. As part of this, the Park will conduct an inventory of Park resources (both natural and cultural) and rate them for climate change risk. For buildings and facilities, the inventory will assign a climate risk index to assist in the evaluation and prioritization of maintenance projects.

The following are particular areas of global climate change that have been considered as part of this project:

***Sustainable practices.*** In Chapter 2, each of the action alternatives address elements of sustainability that would be incorporated at stable sites including opportunities associated with building rehabilitation, new construction of stalls, storage sheds, residences or others stables facilities, infrastructure upgrades, and program operations. For any proposed new facilities or building rehabilitation proposed in the action alternatives, the NPS anticipates that the building materials, heating, insulation, water use, site grading and drainage, and/or lighting efficiency at stable sites will be improved.

***Energy Requirements and Conservation Potential.*** The Council on Environmental Quality requires that environmental documents consider energy requirements and the conservation potential of various alternatives and mitigation measures. Currently, visitors arrive almost exclusively by private automobile. However, vehicle miles traveled because of Park visitation is negligible in the context of regional travel because the proposed alternatives would result in (1) no reduction to less than a 1.5% reduction in private vehicle trips to southern Marin; and (2) no reduction to a 5% reduction in private vehicle trips within the study area. The potential for energy conservation as a net result of auto reduction and increased transit trips would be imperceptible on both a local and regional scale. Changes in energy requirements resulting from the changes in auto and bus trips would be imperceptible. On a regional scale existing transportation-related energy consumption within the study area is negligible compared to transportation-related energy consumption within the region as a whole. Construction of the action alternatives would consume energy, but the expenditure would last only for the duration of construction. The short- and long-term impacts of energy consumption would be negligible under all alternatives, so this topic was dismissed.

***Effects of sea level change.*** Where action alternatives contemplate construction of new buildings, these are located upslope to avoid any potential conflicts with rising sea level. The following excerpt is taken from the Big Lagoon EIS (NPS, 2007)

The sea level has risen approximately 400 feet since the peak of the last ice age about 18,000 years ago. The bulk of that occurred before 6,000 years ago (Axelrod 1981). From 3,000 years ago to the start of the 19th century the rate of sea level rise was almost constant; however, rates of sea level rise increased in the 20th century. In the last century, the measured rate of rise near San Francisco is 0.7 feet/century or 0.35 feet/50 years.

The NPS, in coordination with San Francisco Bay Conservation and Development Commission (BCDC) and the United States Geological Survey (USGS), will be updating the coastal vulnerability maps. The Park will monitor the changes to sea level and other indicators of

global warming, in coordination other affected Park partners, and make adaptive management decisions as necessary in the future.

- **Utility Infrastructure**—The Plan does not propose major relocations of or changes to utility systems. The Park Operations discussions in Chapters 3 and 4 also include sustainable designs and green power options.
- **Land Use and Planning**—Proposed actions would more clearly define which lands in the study area are specifically available for public use and which lands are to be protected for naturally occurring processes. Overall, these changes would result in minor beneficial changes to land use. Therefore, this impact topic was dismissed.

## CHAPTER 2. ALTERNATIVES

### 2.1 Introduction

This chapter describes the alternatives developed by the NPS in response to the principal issues raised concerning the purpose and need (Chapter 1) and issues raised during the scoping process. Each alternative addresses the purpose and need for the proposed action and specifically those actions considered necessary to protect cultural and natural resources as well as infrastructure. Common throughout all the action alternatives are management practices for business, safety, environmental protection, and resource protection. Additionally, certain facilities are common in all action alternatives. **These “Common to All” elements are described in section 2.3.2. The proposed alternatives differ primarily with respect to the number and location of equestrian stable sites on GGNRA lands in southern Marin, the number of horses stabled there, and the types of facility improvements.**

The following paragraphs describe the various alternatives, how those alternatives were developed, and the preferred alternative. A discussion of alternatives that were considered but eliminated from detailed study is also provided.

### 2.2 Alternatives Development Process

The development of alternatives to enhance and improve resource protection and equestrian facilities in southern Marin has a relatively long history, dating from 2004. In the last several years, NPS and the public have discussed possible alternatives and worked together to develop concepts to address equestrian facilities issues while also avoiding environmental impacts. The following paragraphs provide a summary of the development of the action alternatives.

#### 2.2.1 Background

In 1996, NPS held internal design discussions to develop a plan for managing equestrian stables in the GGNRA. These discussions resulted in a range of plans but none that appeared to fully support the range of resource protection needed. In 2004, NPS organized internal workshops to explore the creation of an equestrian management plan that would provide resource protection, reflect the ideals shared by the Park and fully interpret the site’s resources.

A project concept was developed in 2005, and an interdisciplinary team (IDT), which brought together representatives from key NPS divisions, was formed. A preliminary set of planning guidelines was developed by the IDT to assist in the development of alternatives. The NPS identified a planning effort to comprehensively manage all stables located on park lands in southern Marin.

The Park project manager (PM), a landscape architect, studied privately and publically operated stables located on other National Park Service lands and other public lands. The PM visited stables and interviewed operators, land managers and users concerning operations, facility needs for horses and programs, environmental management, programs, safety and accessibility. The PM studied stables design and prepared lists of minimum facilities (and facility sizes) for a stables operation on NPS lands. The result of this information **is reflected in the project plan, site plans and “Best Management Practices”** and has been vetted at public meetings. Members of the IDT have visited public programs offered at the subject stables, including general classes, youth and cancer-patient outreach programs at Tennessee Valley stables, and group rides at Presidio Riding Club, Rodeo Valley stables. The PM met

multiple times with the current stables operators who openly shared their expertise, site and programs concepts, and ideas for the future. The PM and IDT staff participated in the Marin County stream protection education program for stables operators and horse owners. The PM has reviewed many documents and websites related to environmental management of horses including manure management, pest and weed management, and erosion and runoff control. The park Cultural Resources division supported the project with documentation of historic resources and historic integrity, determining which of the proposed or existing stables sites were historic resources and which were not. The IDT led a cultural resources workshop for the Marin Equestrian Stables Plan in 2010 that resulted in detailed recommendations for the three historic sites considered; Tennessee Valley, Rodeo Valley and Golden Gate Dairy.

Based on the extensive research cited above, the IDT reviewed southern Marin NPS lands in GGNRA to determine the best-suited sites for horse stables. In this process the Lower Redwood Creek site and the Marincello Road site were identified as being adequate distance from streams, relatively flat to avoid major grading and erosion, and close to roads and trails.

Research on horse-related programs for riders and non-riders was conducted, resulting in a list of possible programs. This list is included in Appendix A.

Stables operations agreements between private operators and public landowners were also reviewed for lengths and types of agreements, capital investment and facility maintenance requirements, boarding parameters, program requirements, and safety and environmental requirements.

## 2.2.2 Alternatives Formulation

This EA considers four existing and two proposed site locations as part of this Plan. Every site is not affected by every action alternative; the proposed changes to some sites remain the same under more than one alternative. Section 1.1.3 provides detailed descriptions of the site locations listed below in Table 2-1. Two sites remain as stable sites in each of the action alternatives; the Tennessee Valley stables and the Rodeo Valley Stables are **"common to all" alternatives**.

<b>Table 2-1 Site Locations</b>
<b>Existing Stable Locations</b>
Golden Gate Dairy stables
Tennessee Valley stables
Lower Tennessee Valley stables
Rodeo Valley stables
<b>Additionally Considered New Stable Locations</b>
Marincello site
Lower Redwood Creek site

In October 2009, over 20 park staff representing all divisions participated in an internal alternatives development workshop from which three action alternative concepts for equestrian facility improvements were drafted, including: 1) Alternative B - Enhanced Existing: four sites with facility and operational improvements (Golden Gate Dairy, Tennessee Valley, Lower Tennessee Valley and Rodeo Valley stables); 2) Alternative C - Consolidated: reduces to two stables sites by expanding and improving Tennessee Valley and Rodeo Valley sites and by removing stables operations from Golden Gate Dairy and Lower Tennessee Valley, or 3) Alternative D - Dispersed and Expanded: expands the number of stables and horses; it includes five sites, adding two new stable locations and by reducing stables in some locations. All of these concepts were believed to provide natural and cultural resource protection while accommodating a range of visitors. The options were differentiated by the number of

stables sites, number of horses, and approach to facility location. Through the fall and winter of 2009-2010, these concepts were refined, and then reviewed and approved for scoping.

As described in Common to All section 2.3.2, all of the action alternatives share a common approach to improved best management practices and enhanced public outreach and programs which is also **outlined in Chapter 1, section 1.1.1 introduction; "Future Leasing Program"**. As part of the preliminary planning effort, NPS collected supplemental data about Park natural and cultural resources that could be affected by actions under the proposed alternatives. In 2006 and again in February 2010, public scoping, open houses, and solicitation of public comments (see Chapter 5) provided valuable input to the alternatives.

The NPS natural resource analyses involved the use of new and existing studies and surveys. These resources included soils, hydrology (streams, wetlands, and water quality), wildlife, threatened and endangered species, and other studies particular to areas potentially affected by the Marin Equestrian Stables Plan.

To address protection of cultural resources, the NPS utilized existing studies such as historic structures **reports and then prepared a "Determination of Eligibility" for the four prior ranch sites** – Lower Redwood Creek, Golden Gate Dairy, Tennessee Valley and Lower Tennessee Valley. The descriptions of these analyses of these historic sites are included in Chapter 4. NPS staff identified potential uses of historic structures and buildings within each equestrian site that would meet equestrian program needs and fit in with the project objectives identified earlier in the process. Criteria used to evaluate structures included size, layout and potential for rehabilitation. All action alternatives incorporate measures to protect and maintain the historic features of the sites and to improve cultural resources stewardship.

In addition to the No Action alternative, as a result of the alternatives formulation process, three action alternatives representing a reasonable range of alternatives were carried forward for analysis in this EA. Table 2-2 summarizes each of the four alternatives. An overview of the equestrian facility configurations for each alternative is presented in Section 2.3 below. See Figure 1.1 for locations.

<b>Alternative</b>	<b>Description</b>
<b>A</b>	No Action (existing conditions).
<b>B Option 1</b>	Enhanced Existing, Option 1— four sites: facility improvements at Golden Gate Dairy, Tennessee Valley, Lower Tennessee Valley and Rodeo Valley stables.
<b>B Option 2 (Preferred)</b>	Enhanced Existing, Option 2— three sites: Same as above but remove Lower Tennessee Valley stables facilities. Develop facilities for the Park Horse Patrol at Tennessee Valley stables site.
<b>C</b>	Consolidated— two sites: Expand and improve Tennessee Valley and Rodeo Valley stable sites. Remove stables facilities from Golden Gate Dairy and Lower Tennessee Valley stables sites. Develop facilities for the Park Horse Patrol in the Tennessee Valley stable site.
<b>D</b>	Dispersed and Expanded— five sites: Expand and improve Tennessee Valley and Rodeo Valley stable sites. Reduce stables capacity from 11 to four horses at Golden Gate Dairy stable site. Develop a new stable site at Lower Redwood Creek. Develop a new stable site at the Marincello Road site for the relocated Park Horse Patrol program. Remove stables facilities from the Lower Tennessee Valley stable site.

### 2.2.3 Preferred Alternative

In June 2010, the NPS conducted an internal value analysis process known as a "Choosing By Advantages" (CBA) Workshop. The alternatives developed through project scoping and refined over time by the IDT were carried forward into the CBA session. This process identified project-specific

evaluation factors based on project goals and the NPS mission, and ranked the relative advantages of each of the alternatives in meeting the evaluation factors.

During the CBA Workshop, Alternative B was recommended by NPS staff as the preferred alternative. Alternative B, "**Option 2**" or "**B2**" was further developed and identified as having the best combination of a balanced financial investment, long-term benefits for achieving project objectives, and a high level of resource protection and enhancement. Option B2 differs from the original Alternative B (now Alternative B, "Option 1" or "B1") by its removal of stable facilities at Lower Tennessee Valley and the relocation of the Park Horse Patrol program to Tennessee Valley stables.

The preferred alternative for the Plan implementation is Alternative B, Option 2. The action alternatives have many elements in common; however, Alternative B, Option 2 provides the most advantages with regard to the evaluation factors of public benefit, public access, and cultural and historic resource protection when compared to the other action alternatives. Three historic sites, Golden Gate Dairy, Tennessee Valley and Rodeo Valley, remain as stables, an appropriate use that will help preserve these resources for future generations. The goal of natural resource preservation will be achieved by site improvements and environmental Best Management Practices.

## **2.3 Alternatives Description**

### **2.3.1 Alternative A - No Action**

A No Action Alternative is required for consideration as part of the National Environmental Policy Act. This alternative encompasses the existing facilities, ongoing stable management, and operation practices that are relevant for a comparison with the proposed action alternatives. The No Action alternative establishes baseline conditions at the six project site locations. These conditions form the basis against which the action alternatives, the magnitude and extent of the proposed changes and the environmental effects of those changes, can be compared. No Action for this project would be the retention of existing GGNRA stable facilities, management and operations, and horse numbers. For the two sites with no existing equestrian stables, Marincello and Lower Redwood Creek, no changes would occur under the No Action Alternative and use or development would be determined by future NPS planning.

Under the No Action Alternative, only those incremental improvements and adjustments that are required by law, regulation, and policy would be implemented. For example, implementation of site and program access for the disabled would be implemented in accordance with National Park Service regulations. Site and program accessibility, and universal design concepts would be incorporated in all new and renovated sites, facilities, services and programs to achieve the highest level of accessibility that is reasonable, while ensuring consistency with the other legal mandates of conservation and protection of the resources, per NPS policy. This includes rehabilitating existing facilities (including historic buildings and cultural landscapes) where public programming is introduced at sites currently lacking such programming.

Changes could also occur at the sites as a result of other existing planning projects such as Park transportation projects and the Trails Forever planning projects.

**Figures 2-1** through **2-4** depict the existing facilities at Golden Gate Dairy, Tennessee Valley, Lower Tennessee Valley and Rodeo Valley. The locations of the proposed Marincello and the Lower Redwood Creek sites are depicted on **Figures 2-5** and **2-6**.

**Existing Equestrian Business Plans.** Under the No Action Alternative, the Golden Gate Dairy, Tennessee Valley, and Rodeo Valley stables would continue to be operated by the existing permittees. The existing stables business operations involve the following components:

- Short-term operating permits and authorizations. Up until 2001, stable operators had year-long Special Use Permits authorizing the use of the equestrian facilities per the provisions specified by the NPS for each site. After expiration of those agreements in 2001, the permits converted to month-to-month. Rodeo Valley and Golden Gate Dairy stables continue to operate on a month-to-month permit. In July 2007, the Tennessee Valley stable was advertised to the public for proposals and the current operator was granted a five year Special Use Permit. In 2012 the Tennessee Valley Special Use Permit converts back to a month-to-month permit.
- Short term planning (one month to five years) to address program development, staffing, facility improvements, and resource protection.
- The provisions for selecting boarders vary by site. Tennessee Valley stables have a boarding and selection process that is open to the general public. Golden Gate Dairy and Rodeo Valley stables do not have an open selection process for equestrian boarders.

**Existing Operations.** The No Action Alternative would continue the existing equestrian management programs at Golden Gate Dairy, Tennessee Valley, Lower Tennessee Valley (NPS operations) and Rodeo Valley stables. The three private stables would continue to operate without a comprehensive management plan. Existing programs include boarding of privately-owned horses at Golden Gate Dairy, Tennessee Valley and Rodeo Valley stables as currently permitted. Rodeo Valley has an additional restriction that boarders are limited to individuals with active or retired military service or their immediate family members. Lower Tennessee Valley would continue to be operated by the Park Horse Patrol. **Table 2-3** provides a comparison of stable operations at the four sites.

<b>Site Location</b>	<b>Current Permittee</b>	<b>Business Type</b>	<b>Process for Selecting Boarders</b>	<b>Public Programs</b>	<b>Estimated Annual Riders Served</b>
<b>Golden Gate Dairy</b>	Ocean Riders	Non-profit 501(c)x	Interview	Allows public to tie-up horses short-term	50
<b>Tennessee Valley</b>	Miwok Stables Center	Non-profit 501(c)3 with for-profit subcontractor to operate stables and programs	Open and formal process	Public classes, trail rides, programs and events, "horse hotel," and programs for individuals with special needs	1,100
<b>Lower Tennessee Valley</b>	Park Horse Patrol	NPS operation	No boarding	Patrol TV trails, serving more than 12,000 park visitors per year.	30+ volunteers
<b>Rodeo Valley</b>	Presidio Riding Club	Non-profit 501(c)3	Interview, restricted to military	Informal horse trailer parking at the Rodeo Valley parking lot with public "horse hotel," events	50

<b>Table 2-4 Horse Capacity at Existing Stables</b>			
<b>Location</b>	<b>Overnight Capacity (No. of Horses)</b>		
	<b>Permanent Year-Round Horses in Stalls</b>	<b>Additional Seasonal Capacity (summer only)</b>	<b>Short-term Visiting Year-Round (Horse Hotel)</b>
<b>Golden Gate Dairy</b>	11	0	0
<b>Tennessee Valley</b>	42	10	4
<b>Lower Tennessee Valley</b>	4	0	0
<b>Rodeo Valley</b>	19	0	8
<b>Total No. of Overnight Horse Facilities</b>	76	10	12

**Visitor Experience and Programs.** Under the No Action Alternative, per NPS permit, a visitor riding experience would continue to be offered only at Tennessee Valley stables. Visitor services would continue to include information, maps, and toilet facilities at each site, and a picnic table is available at the Rodeo Valley site. Informal horse trailer parking would continue to be available at the Tennessee Valley parking lot and near the Rodeo Valley site, but not the Golden Gate Dairy or Lower Tennessee Valley site. Overnight, short-term “horse hotel” accommodations for up to four visiting horses at the Tennessee Valley site and up to eight visiting horses at the Rodeo Valley site would continue to be available. The Park Horse Patrol would continue to operate from Lower Tennessee Valley.

Existing visitor programs include:

Golden Gate Dairy Stables: The current permittee, Ocean Riders of Marin, currently has no public programming offered at this location. Previously, the permittee offered a program for abused children and had executed a program for school children.

Tennessee Valley Stables: The current permittee, the Miwok Stables Center operating in cooperation with sub-contractor Miwok Livery, offers free programs to special groups serving around 100 participants annually including these two examples: 1) a riding and horse care program run during the normal school year for the **Sunny Hills Children’s Services of San Anselmo, California**, an organization that serves youth at risk (boys and girls ranging in age from 12 to 18); and 2) riding lessons for members of the Marin General Breast Cancer Survivors Support Group. Another program sponsors 80 youth attending with visiting school groups annually. Additionally, the Miwok Livery offers ring and trail classes, youth events, equestrian clinics, and summer programs. These programs serve an estimated 1,700 visitors annually.

Lower Tennessee Valley: The Park Horse Patrol, operated out of Lower Tennessee Valley provides a highly visible point of contact for the visiting public, and supports the **Law Enforcement Ranger division by increasing the Park’s presence in the field. Initiated in 1976**, this program currently has uniformed volunteers from the local community who perform patrol functions using four NPS horses. Patrol activities include the following:

- Assist the public by answering questions about the Park, provide maps, and render first aid and/or radio for assistance in emergencies;
- Support public safety and deter inappropriate activities through visible presence and by actively watching for and reporting unauthorized uses;
- Educate visitors about proper use of the trails;
- Accommodate families and visitors who want to greet the horses;
- Report trail maintenance needs;
- Maintain training and fitness of program horses to enable their use in search and rescue and other NPS law enforcement activities as needed; and,
- Provide operation and maintenance support including daily care of the horses (e.g., feeding, grooming, mucking) and as-needed repairs to facilities.

Rodeo Valley: The current permittee, the Presidio Riding Club, per the NPS permit currently has no public or outreach programs except the horse hotel operation which serves about 30 public visitors per year. In 2010 the Presidio Riding Club was approved for 501(c)3 non-profit status and they have informed the park that they want to add public programs to their use.

Interpretation. No NPS interpretive signs or displays concerning GGNRA, NPS or the stables are provided at any of the stable sites.

**Existing Facilities, Sanitation, and Safety.** Under the No Action Alternative no additional modifications to sites or facilities would be implemented except those needed for NPS Architectural Barriers Act Accessibility Guidelines (ABAAG) compliance as determined by the NPS. The number of overnight horse hotel sites available for reservation by visitors who trailer their own horses to the park would remain unchanged. Toilet facilities at the Golden Gate Dairy, Rodeo Valley, Tennessee Valley, and Lower Tennessee Valley sites would continue to include an operator-provided portable toilet. In addition, the NPS would maintain the existing residential sewage field septic system at the Tennessee Valley site. Overnight caretakers would continue to be resident at the Tennessee Valley site only, and posting of safety and emergency procedures would continue to be handled differently at each stable. The Tennessee Valley site would continue to have two 500-gallon water tanks supported by an emergency generator and fuel for fire suppression purposes; Rodeo Valley and Golden Gate Dairy currently have pressurized treated water available.

**Existing Resource Protection.** Written into the existing permits are practices intended to lessen or deter impacts on the natural and cultural resources found near the equestrian facilities. These practices address issues such as horse location, site maintenance, and water quality protection (e.g., animal waste management). To insure compliance, all permittees have agreed to periodic monitoring for environmental impacts, and to cooperation with corrective measures.

The existing resource protection measures described in the permits address both requirements shared by all facilities and requirements specific to each site. The permits provide general guidelines as to where horses can be stabled, washed and treated at the facility. Site specific guidelines are dictated by the natural resources found at the location (such as waterways and pastureland) and by historic features found at the location as described below.

Natural Resources. Protection of natural resources at the stable sites includes corrective measures required by the Superintendent of GGNRA to remedy environmental impacts identified during periodic monitoring. Protection also includes cooperative measures undertaken by the permittee and NPS Natural Resources Management staff (and other parties) to mitigate water quality and other natural resource impacts. All stable facilities are expected to collect manure from paddocks and stalls on a daily basis to prevent water contamination and NPS approval is required prior to vegetation management. The following resource protection measures would continue to be implemented:

1. Maintenance of riparian and vegetative buffers;
2. Daily removal of manure from paddocks and stalls to covered storage areas for off-site removal;
3. Exclusion of horses from waterways to prevent surface runoff from transporting animal wastes to water courses; and,
4. Periodic dry-season wet-down of paddocks to prevent erosion and dust.

In practice, one stable does not have covered manure storage, and with the exception of Golden Gate Dairy (Green Gulch Tributary, Field 7), there has been no recent water quality measurement downstream of any of the existing stables sites. Additionally, NPS typically provides an annual safety inspection of the facilities. However, there is no NPS inspection personnel assigned to the task of inspecting or monitoring the stables for permit compliance on a frequent or regular basis.

Cultural Resources. Protection of cultural resources at the stable sites includes corrective measures required by the Superintendent and/or the business agreements to remedy impacts identified during periodic monitoring by NPS Maintenance or Cultural Resources staff or other parties. These measures are designed to mitigate cultural resource impacts and stabilize historic structures and landscape features. The NPS would continue to provide oversight and advice regarding the management, maintenance, and repair of historic sites. As above, there is no NPS inspection personnel assigned to **the task of inspecting or monitoring the stables'** cultural resources for permit compliance on a frequent or regular basis. NPS must adhere to protection measures required under the National Historic Preservation Act.

**Lower Redwood Creek and Marincello Sites.** Under the No Action Alternative the areas identified as potential equestrian sites would remain in the current condition. Lower Redwood Creek is a prior flower farm now serving as a residential site. Many of the farm buildings and facilities are present. The Marincello site is an approximately 2-acre open space on Marincello Trail about 0.2 miles north of the Tennessee Valley Trailhead Parking lot.

### 2.3.2 Elements Common to All Action Alternatives (B through D)

Features common to all of the action alternatives are described below. Where action alternatives discuss new or modified facilities and services, the alternative would allow for the specified facility or service to be constructed as soon as a funding mechanism is identified, such as via business leases. NPS is not obligated to fund and develop the facilities or provide the services identified in these alternatives. Further, implementation of the Marin Equestrian Stables Plan alternatives must be compatible with the General Management Plan (GMP). **Business Management Strategy. Table 2-5** outlines the components of this strategy.

<b>Table 2-5 Marin Equestrian Stables Plan: Future Business Management Strategy</b>	
<b>Natural Resources</b>	<ul style="list-style-type: none"> <li>• Incorporation of expanded Best Management Practices (BMPs) into routine management, operation and maintenance activities associated with all action alternatives would protect natural resources including water quality and sensitive habitats adjacent to equestrian facilities.</li> <li>• A detailed list of proposed BMPs is provided in Appendix B.</li> <li>• A source of potential degradation to water quality would be eliminated by replacing existing field treatment septic-systems and pit toilets as described above under Facilities, Safety and Sanitation.</li> </ul>

<b>Table 2-5 Marin Equestrian Stables Plan: Future Business Management Strategy</b>	
	<ul style="list-style-type: none"> <li>• Water quality would also be protected by removing the northeastern paddocks on steep slopes at Tennessee Valley and revegetating the steep portions.</li> <li>• Due to drainage issues at Lower Tennessee Valley, turnouts would be reduced in size, drained, graded, steep portions fenced off, and biofilter swale added.</li> </ul>
<b>Visitor Experience and Public Benefit</b>	<ul style="list-style-type: none"> <li>• Specific details of public programming would be left to the future leasing phase.</li> <li>• Equestrian-centered programs would continue in GGNRA with enhancements to foster broader public programming and a wider regional audience of riders and non-riders. Riding classes and trail rides would continue to be offered.</li> <li>• Public outreach would be improved through increased public equestrian events, signing, maps, and internet sites describing public programs and other information about each stable site.</li> <li>• Increased stewardship and volunteerism by facility operators, boarders, and program participants would be encouraged.</li> <li>• Equestrian operations at the Tennessee Valley and Rodeo Valley stable sites would remain under all alternatives.</li> <li>• In all alternatives up to 12 horse hotel spaces could be available for overnight rental – four at Tennessee Valley and eight at Rodeo Valley. Designated horse enclosures would be reserved for short-term overnight boarding (“horse hotel”) during spring, summer, and fall. Each action alternative provides this option at a minimum of one site. All stable sites included in action alternatives would have convenient access to trails.</li> <li>• Military service prerequisite at the Rodeo Valley Stable would be discontinued.</li> </ul> <p><u>Interpretation.</u> For all action alternatives, a minimum level of one interpretative sign and two directional signs would also be required. Future lessees would be required to describe and perform interpretive functions. For example, equestrian interpretation could showcase the unique cultural and natural resources found at each site. This would be determined by lease negotiations. Examples might include:</p> <ul style="list-style-type: none"> <li>• Ranch sites (GGD, LRC, TV, LTV) could interpret historic dairy farming and show how horses were used in farming and trade in the early 20<sup>th</sup> century. Interpretation would focus on nineteenth century Azorean Portuguese immigration to Marin County as well as dairy farming; buildings would be used for historic interpretation.</li> <li>• All sites could install displays that describe the history of the horse and horsemanship, historic tack, and historic use of wagons.</li> <li>• Rodeo Valley site could install displays that describe the history of military use of horses and mules (i.e., displaying old horse drawn military equipment and photos) and provide information on the history of the Balloon Hangar and the Motor Pool.</li> </ul>
<b>Facilities, Sanitation, and Safety</b>	<ul style="list-style-type: none"> <li>• Under all action alternatives, facilities would be upgraded and enhanced.</li> <li>• Compatible new site features, including erosion-resistant paths, stalls, sheds, fences and paddocks would be built, or existing ones would be upgraded.</li> <li>• Each site would provide a covered place to exercise horses in wet weather, and adequately sized stalls with a separate or adjoining individual outdoor paddock for each horse or a shared outdoor paddock. Safety and emergency plan elements would be included in the business plan for selected alternative.</li> <li>• Facilities would be improved for all action alternatives, including the addition of compatible new site features such as hardened paving, structures, ramps, fences and paddocks.</li> <li>• Equestrian stables sites would provide a covered place to exercise horses in wet weather and adequately sized stalls with either a separate or adjoining individual outdoor paddock for each horse or a shared outdoor paddock.</li> <li>• Lessees would be responsible to conduct, participate in, or pay for water quality monitoring downstream and/or adjacent to stable sites.</li> </ul>

<b>Table 2-5 Marin Equestrian Stables Plan: Future Business Management Strategy</b>	
	<ul style="list-style-type: none"> <li>• Drainage and wastewater management would be improved.</li> <li>• Short-term animal residents (e.g. summer program/overnight horses) could be accommodated in outdoor paddocks.</li> <li>• At Tennessee Valley stable, improvements would include a fenced area south of existing arena for a horse turnout during dry weather only.</li> <li>• Existing septic systems would be improved or replaced with portable or composting toilets.</li> <li>• Flammable feed would be stored in fire-proof buildings or buildings physically separated from horse stalls.</li> <li>• A unit for overnight caretaker would be required at each horse stable site.</li> <li>• For firefighting or emergency water needs each stable site would have on-site water storage, an emergency pump, generator and fuel accessible to emergency personnel. Drainage and wastewater management would be improved.</li> <li>• A safety and emergency plan and requirements for posting of safety and emergency procedures would be required at each stable.</li> <li>• At Tennessee Valley and Lower Redwood Creek, field treatment septic-systems would be replaced with either portable or composting toilets. Treated water would be provided for residential use.</li> </ul>
<b>Cultural Resources</b>	<ul style="list-style-type: none"> <li>• The Tennessee Valley, Golden Gate Dairy and Rodeo Valley sites would be treated as historic properties as they are eligible for the National Register of Historic Places.</li> <li>• Historic Structures Reports (HSRs) and Cultural Landscape Reports (CLRs) would be prepared to guide rehabilitation. Cultural resource stewardship actions would be implemented in areas dedicated for equestrian use.</li> <li>• Cultural landscapes and historic structures would be stabilized, and monitored.</li> <li>• Treatment of historic properties would be identified in the business plans for each stable site.</li> </ul>
<b>Historic Building Rehabilitation</b>	<p>All rehabilitation of historic structures would fulfill the following goals and requirements:</p> <ul style="list-style-type: none"> <li>• Rehabilitate buildings for existing and new uses; retain existing historic character in <b>compliance with Secretary of the Interior’s Standards for the Treatment of Historic Properties</b>.</li> <li>• Use state-of-the-art sustainable materials, fixtures, and systems.</li> <li>• Fulfill Architectural Barriers Act Accessibility Guidelines (ABAAG) standards for access to facilities and programs.</li> <li>• Upgrade or expand existing utilities and infrastructure in a manner that better serves visitors, protects resources, and decreases the use of non-renewable resources.</li> <li>• Abatement of hazardous materials such as lead paint and asbestos-containing materials would occur. Appropriate abatement treatments would follow GGNRA and NPS guidelines.</li> <li>• Remove most non-historic additions and alterations from historic buildings that have diminished historic character.</li> <li>• Meet required building codes, including the California State Historic Building Code.</li> </ul>

**Visitor Experience and Public Benefit: Public Programs and Outreach.** Under all action alternatives, existing equestrian-centered programs would continue at GGNRA in southern Marin. In accordance with the goals identified in Chapter 1, the action alternatives would require increased public benefit of the stables, primarily in the form of riding programs and outreach.

## Facilities, Sanitation, and Safety

Facilities. The information presented in the action alternatives is based on conceptual site plans and designs. Alternatives are based upon an understanding of the likely programmatic requirements of an equestrian operation at each site. Specific sizes, dimensions, areas and layouts are estimates that would be refined during the design and development, as part of a long-term lease arrangement with an operator. If any changes proposed during the design process were inconsistent with the intent and assessed effects of the selected alternative, additional environmental compliance would be conducted as appropriate.

**Cultural Resources.** For all action alternatives, specified major maintenance and capital improvements would include actions designed to protect or enhance cultural resources in accordance with the NPS guidelines. The intent under all alternatives is to preserve the historic landscape and historic core areas to the greatest extent possible while protecting water quality by removing all non-historic facilities from the stream buffer zones. Certain non-historic features in the historic core areas would also be removed unless they are needed for stables operations (e.g., paddocks or turn-outs). Those modern equestrian facilities that must remain in the historic core area would be designed to blend appropriately with historic features.

Archeology. Common to all alternatives would be the requirement that project level research and documentation and Section 106 compliance and consultation with the California State Historic Preservation Officer prior to the commencement of specific project constructions and development. There is additional identification of resources and research required.

**Muir Beach Volunteer Fire Department.** All three action alternatives provide for the Muir Beach Volunteer Fire Department to continue to maintain facilities at Golden Gate Dairy under an appropriate business agreement and in a manner consistent with the protection of park resources at the site.

**Sustainability.** In all action alternatives, major new buildings such as residences are designed to reach three sustainability benchmarks:

A minimum silver or higher Leadership in Environmentally Efficient Design (LEED) rating (achievable rating may vary by alternative). Section 9.1.1.6 of the NPS Management Policies (2006) states that "All projects that include visitor centers or major visitor services facilities must incorporate LEED standards to achieve a silver rating". The Plan likely fits under LEED NC (for New Construction and major rehabilitation). Executive Order 13514 (signed in Oct 2009) directs Federal agencies to "implement high performance sustainable Federal building design, construction, operation and management, maintenance, and deconstruction including by ... (ii) ensuring that all new construction, major renovation, or repair and alteration of Federal buildings complies with the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings such as:

1. Minimal increase in electricity usage, natural gas use, water usage, and sewage output.
2. Reduced potentially polluted storm water runoff from the site(s).

<b>Table 2-6 Proposed Facility Changes Common to All Action Alternatives</b>				
<b>Site Location</b>	<b>Facilities To Remain</b>	<b>New Facilities</b>	<b>Facilities Remodeled</b>	<b>Facilities Removed</b>
Golden Gate Dairy	Historic buildings and structures	-Accommodate trail segment along Route 1 in accordance with GGNRA Trail Planning including equestrian trailhead facilities such as tie ups and water mounts. -Install horse trailer pads. -Install accessible toilet either as a New Facility or incorporated into existing structure.	-Shorten front turn out to accommodate trail segment.	-All non-historic horse stalls, paddocks and equestrian facilities removed (including stalls at the existing turn-out vicinity, a shed behind the barn, and stalls to the north). -Remove uncovered manure container.
Tennessee Valley	Equestrian Stable Facilities, Historic buildings and structures	-Install manure shed. -Install trailer parking, pads, water tank, pump generator and turn-out. -Install accessible toilet either as a New Facility or incorporated into existing structure.	-Remove, abandon or reinstall plumbing and septic system of the historic bunkhouse. -Convert main hay barn to new stalls. -Rebuild red barn for hay or storage. -Rebuild historic shed near stream for hay and feed storage.	-Remove manure staging pads, stalls and paddocks inside stream buffers and historic core areas. * -Remove paddock from slope and restore vegetation.
Rodeo Valley	Equestrian Stable Facilities, Historic buildings and structures	-Install trailer parking pads, new water tank, pump and generator. -Install accessible toilet either as a New Facility or incorporated into existing structure.	-Remodel Motor Vehicle Sheds to accommodate other use such as stalls, residence or office space. -Repair Balloon Hangar for use	-Remove uncovered manure container.

- Stream buffers = 50 feet for intermittent streams and 100 feet for perennial streams.

### 2.3.3 Alternative B - Enhanced Existing

Alternative B includes two options; Option B1 would result in permanent stables at *four* sites. Option B2, the Preferred Alternative, would be the same as Option B1 except it would result in permanent stables at *three* locations. The following sections describe these options in more detail. The following description under Option B2 describes only the differences between options B1 and B2.

#### OPTION B1

Under Option B1, Golden Gate Dairy, Tennessee Valley, Lower Tennessee Valley and Rodeo Valley would remain as equestrian stables. Option B1 would include the components common to all alternatives, as described above in Section 2.3.2. The following paragraphs provide narrative descriptions of the critical site modifications proposed as part of Option B1 as well as the reasoning behind the proposed changes. **Table 2-6** provides a summary of the proposed facility modifications and **Figures 2-7** through **2-10** display conceptually how the existing sites would be modified under Option B1.

This option would improve and enhance the existing facilities while keeping the total numbers of horses and stalls unchanged at each facility from Alternative A – No Action. Overall the proposed facility modifications at all sites would improve visitor access.

Many of the sites offer alternative uses of existing structures that are designed for improved flow and safety. For example, to separate horses from combustible feed, the existing feed and hay area at Tennessee Valley would be converted to stalls and the hay storage would be relocated to the historic red barn and the historic shed. At Rodeo Valley, the West Motor Vehicle Shed would be used as a offices, meeting space, and/or storage of noncombustible items, and could be used as a residential unit, while all 19 stalls would be located in the eastern Motor Vehicle Sheds.

This option also offers improved, upgraded and stabilized facilities with enlarged ratio of number of horses to exercise area. For example, a covered ring north of the north windbreak at Golden Gate Dairy would expand horse use area on a previously disturbed area.

#### OPTION B2

Under Option B2, changes to Golden Gate Dairy and Rodeo Valley stables would remain the same as those described above for Option 1. Option B2 would also include the components common to all alternatives, as described above in Section 2.3.2, with changes specific to this option as described below.

Option B2 would relocate Park Horse Patrol operations out of Lower Tennessee Valley to Tennessee Valley stables. New paddocks and stalls would be constructed, and existing historic buildings would be rehabilitated at Tennessee Valley stables to accommodate the horses utilized by Park Horse Patrol operations and by other programs. The designation of specific stalls to be utilized by Park Horse Patrol would be determined at a later date. Once the Lower Tennessee Valley site is vacated, the equestrian stalls, paddocks, other stable facilities, would be removed. The existing nursery facilities, yurt, barn and campground would be addressed as part of site-specific future planning.

**Other Identified Uses and Needs.** Under Option B2 the actions at Rodeo Valley stables would be the same as for Option B1 except that NPS might utilize the Balloon Hangar for long-term interim use for approximately 10 years. In this case, the West Motor Pool Building could be remodeled to create

an indoor exercise ring, and hay and feed would be placed in a steel container 25 feet south of the West Motor Pool Building. After repair and potential NPS use of the Balloon Hangar, hay and feed storage and an indoor riding ring would be located in the Hangar. The long-term interim use of the Balloon Hangar by NPS would continue until funding is identified to construct the proposed new NPS Operations facility in the Marin Headlands. In all cases, due to its condition the Balloon Hangar will be closed for repair.

The total numbers of horses and stalls would remain unchanged at Rodeo Valley and Golden Gate Dairy from Alternative A – No Action. The number of horses housed at Tennessee Valley would increase by four to 46 in order to accommodate Park Horse Patrol operations. **Table 2-7** provides a summary of proposed modifications to each facility and **Figures 2-11** through **2-13** display conceptually how the existing sites would be modified under Option B2.

<b>Table 2-7 Alternative B – Option B1 (4 sites) Enhanced Existing Summary of Proposed Changes</b>				
<b>Site Location</b>	<b>New Facilities</b>	<b>Facilities Remodeled</b>	<b>Facilities Removed</b>	<b>Number of Year-round Horses in Stalls</b>
Golden Gate Dairy	-Install paddocks, water tank, pump and generator.. - Upgrade utilities. -Install stalls and paddocks. -Install covered lunging ring. -Install manure shed at rear of existing hay barn.	-Stabilize historic pit toilet. -Historic farmhouse rehabilitated as residence <sup>1</sup> . -Front turnout would be modified for trail.		11
Tennessee Valley	-Install manure shed in NE site.	-Historic main residence converted to caretaker residence, and sewage upgraded. -Renovate bunkhouse for use as program space.		42
Lower Tennessee Valley	-Install manure shed. -Install new residence. -Install covered lunging ring.	-Office barn converted to hay storage. -Turnouts drained, graded, steep portions fenced off, biofilter swale added.		4
Rodeo Valley	-Install turnout near large arena.	-Move hay/feed to Balloon Hangar. -Reduce large arena to 190 feet in length. - Construct overnight caretaker unit <sup>2</sup> . in West Motor Vehicle Shed. -Renovate stalls. -Relocate manure storage to covered location.		19
<b>Grand Total</b>				<b>76</b> (plus 22 visiting and dry season horses)

<sup>1</sup> Unless operator can provide acceptable alternative for equestrian safety and monitoring.

<sup>2</sup> Unless operator can provide acceptable alternative for equestrian safety and monitoring.

<p align="center"><b>Table 2-8 Alternative B – Option B2 (3 sites) Enhanced Existing Summary of Proposed Changes compared with Alternative B – Option 1</b></p>				
<p>Note: <i>The proposed changes would remain the same as Alternative B-Option B1 <b><u>with the following exceptions:</u></b></i></p>				
<b>Site Location</b>	<b>New Facilities</b>	<b>Facilities Remodeled</b>	<b>Facilities Removed</b>	<b>Number of Horses compared to Option B1</b>
Tennessee Valley	-Install four stalls, paddocks, and PHP use area to accommodate PHP operations.	-Rehabilitate main residence and Red barn building for PHP office and storage. -Rehabilitate bunkhouse for continued residence use.		+4
Lower Tennessee Valley			-Remove PHP facilities associated with equestrian operations including manure shed, stalls, paddocks and turnouts.	-4
Rodeo Valley	-Long-term interim NPS operations use of Balloon Hangar will require 1.) an alternative facility [a steel container] for long-term interim Hay/feed storage, and 2) remodel of West Motor Pool Building to include a small covered ring.	-Rehabilitate Balloon Hangar for long-term NPS interim use		

### 2.3.4 Alternative C - Consolidated

Alternative C would reduce the number of stables in southern Marin GGNRA by consolidating existing equestrian stables from four to two of the stable sites – Tennessee Valley and Rodeo Valley. The Park Horse Patrol would relocate from Lower Tennessee Valley to Tennessee Valley. Equestrian stables and associated programs at Golden Gate Dairy would be eliminated, (requires amendment of the 1980 GMP) reducing the overall number of horses in stalls within the GGNRA from 76 in Alternative A to 72 in Alternative C.

Alternative C would include the components common to all alternatives, as described above in Section 2.3.2, with changes specific to this alternative as described below. The following paragraphs provide narrative descriptions of the critical site modifications proposed as part of Alternative C as well as the reasoning behind the proposed changes. **Table 2-8** summarizes the Alternative C changes to each facility beyond those changes that are common to all alternatives. **Figures 2-14** through **2-17** display conceptually how the existing sites would be modified under Alternative C.

The opportunities for public benefit would be reduced from four sites to two sites. The number of horses would increase at the two remaining sites so that overall horse numbers would decrease by five percent (76 to 72). To offset this impact, this alternative would improve, enhance and expand the existing facilities at Tennessee Valley and Rodeo Valley in order to keep the total numbers of equestrian opportunities, horses and stalls, similar to existing opportunities.

As described in section 2.3.2, Alternative C would accommodate the trailhead facilities at Golden Gate Dairy for Dias Ridge Trailhead. The historic buildings at Golden Gate Dairy would remain and could be utilized as park operations and storage.

Similar to Option B2 and for the protection of water quality, Alternative C would move Park Horse Patrol operations out of Lower Tennessee Valley to Tennessee Valley stables. At Tennessee Valley stables, new paddocks and stalls would be constructed and existing historic buildings would be rehabilitated to include accommodation of the four horses utilized by Park Horse Patrol operations. The designation of specific stalls to be utilized by Park Horse Patrol would be determined at a later date. Once the Lower Tennessee Valley site is vacated, equestrian stalls, paddocks and other stable facilities would be removed. The existing nursery facilities, yurt and campground would remain. The use of existing barn, where horses are currently stabled, would be determined by future planning. The lands would be restored with native vegetation.

At Tennessee Valley water quality would be protected by relocating and renovating the existing caretaker house (the Bunkhouse) at Tennessee Valley 25 feet to the north to be outside the stream setback and sewage would be treated on site or contained and hauled off-site.

Similar to Option B1, Alternative C would address the need for enhanced overnight emergency response, and each of the stables facilities would include a caretaker residence, unless the business operator can provide an acceptable alternative solution for equestrian safety and 24-hour monitoring. For example, a new caretaker residence could be constructed at Rodeo Valley at the southwest end of the site outside the stream buffer, in a previously disturbed stall and building location; increasing the current permit footprint of the site. The site would stable up to 24 horses and could accommodate 8 horse hotel guests.

**Cultural Resources**

Golden Gate Dairy. Non-historic buildings and structures (e.g., horse stalls and paddocks) would be removed and historic buildings would be rehabilitated for uses such as NPS, Park Partner or community meeting spaces, garages, stewardship center, and/or NPS maintenance purposes. One or more of these structures could be used for ranger residence, office or public contact facilities if consistent with the GMP. Non-historic structures (e.g., accessible toilet) would be added or incorporated into an existing structure. Specific uses of existing facilities no longer designated for equestrian uses would be directed by other future NPS planning.

Tennessee Valley. Cultural landscape features would be rehabilitated and restored, similar to Alternative B, except that a new hay/feed structure would be built between the Main Barn and the Bunkhouse and new stalls would be built along the north side of the Main Barn across the historic concrete path.

Rodeo Valley. Historic structures would have stabilization such as new roofing and repair of the Balloon Hangar and the historic Motor Vehicle Sheds. A new residence, water tank and manure shed would be constructed.

<b>Table 2-9 Alternative C – Consolidated Summary of Proposed Changes</b>				
<b>Site Location</b>	<b>New Facilities</b>	<b>Facilities Remodeled</b>	<b>Facilities Removed</b>	<b>Number of Year-round Horses in Stalls</b>
<b>Golden Gate Dairy</b>		-Structures not removed could be used by NPS or Park Partners.	-Remove front turn-out.	0
<b>Tennessee Valley</b>	-Install new stalls at northeast paddock area. -Install stalls, paddocks, and PHP use area to accommodate PHP operations.	-Relocate existing bunkhouse 25 feet north out of stream buffer. -Rehabilitate main residence building for PHP office and storage. - Rehabilitate bunkhouse for continual residence use.		48
<b>Lower Tennessee Valley</b>		-Main Barn continues use as storage facility.	-Remove PHP facilities associated with equestrian operations including manure shed, stalls, paddocks and turnouts.	0
<b>Rodeo Valley</b>	-Construct caretaker residence west of Balloon Hangar. -Install manure shed north of east Motor Vehicle Shed.	-Relocate hay and feed storage to Balloon Hangar. -Renovate former hay and feed storage area into stalls		24
<b>GRAND TOTAL</b>				72

### 2.3.5 Alternative D - Dispersed and Expanded

Alternative D would result in three stables at existing stable locations and the development of two new stable locations with a maximum capacity of 88 equestrian stalls. Tennessee Valley, Golden Gate Dairy, and Rodeo Valley stables would remain as equestrian sites, with a reduction in the number of horses at Golden Gate Dairy. New stables would be developed at Lower Redwood Creek and Marincello Road sites. The total number of stabled horse sites at each location is provided in **Table 2-10**.

Alternative D would include the components common to all alternatives, as described above in section 2.3.2, with changes specific to this alternative as described below. The following paragraphs provide narrative descriptions of the critical site modifications proposed as part of Alternative D as well as the reasoning behind the proposed changes. **Table 2-10** summarizes the Alternative D changes to each facility beyond those changes that are common to all alternatives. **Figures 2-18** through **2-23** display conceptually how the existing sites would be modified under Alternative D.

The opportunities for public benefit under Alternative D would be increased from four sites to five sites. The number of horses would increase from 76 to 88 so that overall horse numbers would increase by 16 percent. This alternative would improve, enhance and expand the existing facilities at Tennessee Valley and Rodeo Valley and provide new equestrian facilities at Marincello and Lower Redwood Creek. The Lower Redwood Creek site could be operated in cooperation with the adjacent California State Park lands in an agreement between NPS and State Parks, for example, to share the use and maintenance of the State Park's large arena. At Golden Gate Dairy, the site would be improved and limited to facilities for four stabled horses and Dias Ridge Trailhead amenities and uses, which would remain outside the stream buffer. Additional horses could use the public tie-ups for short term day use. The number of horses accommodated at Tennessee Valley would remain at 42 horses in stalls. The number of horses stabled at Rodeo Valley would increase from 19 to 24 (not including horse hotel numbers).

Similar to the Option B2 and Alternative C and for the protection of water quality, Alternative D would move Park Horse Patrol operations out of Lower Tennessee Valley but under Alternative D new facilities would be constructed at Marincello to serve as the new location for the GGNRA Park Horse Patrol program. The opportunities for public benefit would be reduced at Golden Gate Dairy from 11 horses to four horses; however, a new stables facility would be developed nearby at the Lower Redwood Creek site that would accommodate up to 12 total horses in stalls. Development would occur within the existing developed area and at the north boundary of the site. At Golden Gate Dairy the historic structures; barn, and others, could be used for NPS or Park Partner purposes. The historic residence could be renovated to be used as a residence.

**Cultural Resources.** Tennessee Valley, Rodeo Valley and Golden Gate Dairy sites would be treated similarly to Alternative B. Marincello Trail, a badly degraded road due to erosion, would be restored by adding fill materials, and stabilized with a paved or hardened surface for 0.2 mile.

**Other Identified Uses and Needs.** Treatment of the Golden Gate Dairy facilities would be similar to those described under Alternative B with horse stalls being removed from the central site and added in the north site, along with a new covered ring and manure shed. The four stall stable facility would be developed such that NPS could use it for expanded Park Horse Patrol - or other operations that would be determined by future planning. Rodeo Valley would have NPS operations facilities permanently centered in the Balloon Hanger, differing from Alternative B, Option B2 which allows for NPS Operations to have long-term interim use of that facility..

<b>Table 2-10 Alternative D – Dispersed and Expanded Summary of Proposed Changes</b>				
<b>Site Location</b>	<b>New Facilities</b>	<b>Facilities Remodeled</b>	<b>Facilities Removed</b>	<b>Number of Horses in stalls</b>
<b>Golden Gate Dairy</b>	-Install paddocks, water tank, pump, and generator. -Upgrade utilities. -Install 60 foot diameter covered lunging ring. -Install four new stalls at north site, and manure shed	-Residence would be rehabilitated. -Front turnout would be modified for trail.		4
<b>Tennessee Valley</b>	-New hay and manure shed outside historic core areas.	-Lopes House rehabilitated as residence. -Bunkhouse rehabilitated as program space.		42
<b>Lower Tennessee Valley</b>			-Remove PHP facilities associated with equestrian operations including manure shed, stalls, paddocks and turnouts.	0
<b>Rodeo Valley</b>	-Construct feed and hay shed south of the outdoor arena. -Construct a roof to provide a covered ring on the upper outdoor arena. -Install manure shed in the lower parking area adjacent to the west Motor Vehicle Shed.	-Balloon Hangar to be used for NPS operations. - Construct overnight caretaker unit in West Motor Vehicle Shed.		24
<b>Marincello</b>	-Construct Park Horse Patrol office, residence, parking and turnout, stalls and paddocks, hay, storage, manure shed, tack shed and covered ring. -Install water tank, pump and generator. -Install accessible toilet	-The existing access road would be filled and improved to resist erosion and accommodate drainage. It would remain a single lane with the existing curbed, concrete median to one side.		4
<b>Lower Redwood Creek</b>	-Install 12 stalls and paddocks, water tank, pump and generator, hay, feed and manure shed, tack and storage shed, and turnout developed in the existing housing cluster. -Install new turn-outs below the developed area. -Install covered lunging ring, office, parking and parking pad and additional trailer parking on the north end of site. -Install accessible toilet either as a New Facility or incorporated into existing structure.	-Rehabilitate the residence. -Improve driveway through the facility with grading and base rock or gravel.	-Remove a 40 by 40 foot pond. -Remove the nursery, shade structure and small sheds.	12
			<b>Grand Total</b>	88

## ***2.4 Alternatives Considered but Eliminated from Further Study***

The Council on Environmental Quality (CEQ) is a federal agency that oversees the NEPA process. CEQ requires that a full range of reasonable alternatives is analyzed in a NEPA document (NPS Director's Order 12 Question 1a). Reasonable alternatives are those that are "practical or feasible from the technical and economic standpoint and using common sense" (NPS Director's Order 12 Question 2a). Alternatives that cannot be implemented or do not resolve the need for action and fulfill the purpose in taking action are eliminated from further analysis. Alternatives can be dismissed from further analysis for a variety of other reasons, including: cost, technical or logistic barriers; and/or unacceptable environmental impacts (NPS 2001:20). This section describes alternatives that have been considered but eliminated from further study. This discussion includes only alternatives initially thought at one time to be viable or suggested by the public. The rationale for their elimination is also discussed (e.g., technical/economic infeasibility, inability to meet project objectives, etc.).

NPS considered alternatives that were later eliminated from further study. Those alternatives initially were thought to be viable or they were suggested by the public. The following Table 2-11 lists these alternatives and the reasons that they have been eliminated which may include:

- (a) Technical or economic infeasibility
- (b) Inability to meet project objectives or resolve need
- (c) Duplication with other, less environmentally damaging or less expensive alternatives
- (d) Conflict with an up-to-date and valid park plan, statement of purpose and significance, or other policy, such that a major change in the plan or policy would be needed to implement
- (e) Too great an environmental impact

<b>Table 2-11 Description of Alternatives Considered But Eliminated from Further Study</b>	
<b>Description</b>	<b>Reason Eliminated</b>
Lower Redwood Creek - develop stables at north boundary area.	Restricts stables to small area; NPS policies promote the reuse of existing facilities.
Lower Redwood Creek - develop stables in the meadow below existing developed area.	NPS policies promote the reuse of facilities. Adverse visual impacts to meadow; inhibits future park planning.
Rodeo Valley - remove Motor Vehicle Sheds and build new stables facilities in an area that would be more compatible with the old airfield.	Adverse impacts to historic structures.
Balloon Hanger- develop sites as a public event venue per General Management Plan.	Future GMP planning does not identify area for public events.
Rodeo Valley – roof the entire large arena.	Visual impacts were determined to be unacceptable.
Golden Gate Dairy- develop trail connection across Highway 1.	Agency scoping is ongoing for this issue.
Include equestrian trail use as part of the planning process.	Prior planning determined which trails equestrians can use.
Golden Gate Dairy, Lower Tennessee Valley, Marinello - to eliminate the proposed BMP of a covered lunging ring facility.	Eliminating the covered ring would increase horse exercising on trails in wet season and exacerbate erosion.
Grazing pastures at all sites- to revisit or allow horse grazing around stables.	Prior NPS decision eliminates grazing pastures at these Marin sites due to erosion and sediment impacts.
All existing sites - To remove all facilities to 100 feet from top of stream bank per the proposed Marin County regulations.	This eliminates the footprint of these existing stables.
Tennessee Valley to relocate a multi-use trail from crossing within the main stables site to around the west of the large arena and provide a new bridge.	Based on public comments- this would potentially frighten horses and distract students in the school rings and arena.
Tennessee Valley - Remove all stables facilities.	Popular site serves more than 1000 visitors per year. The existing location and other screening factors make it rate high as a stables site.
Rodeo Valley - Remove all stables facilities.	Weekend public transportation access, location and other screening factors make it rate high as a stables site.
Greatly increase the number of horses at all stables.	NPS decision that the existing numbers are sustainable. Public comment supported no big increase in horse numbers.
Greatly reduce the # of horses.	NPS decision that the existing numbers are sustainable. Public comment supported no big reduction in horse numbers.
Eliminate facilities for a Park Horse Patrol (PHP).	NPS decision and public comment support keeping the PHP as a beneficial program.
Include detailed site planning.	Too restrictive to future business leases and operations, too detailed for master plan level.
Expand the footprints of the stables at existing site to previously undisturbed lands.	NPS policy prioritizes reuse of previously disturbed land.
Locate PHP stables at Tennessee Valley Parking lot.	Technically infeasible due to congestion and lack of space.
Locate PHP stables at Rodeo Valley.	Not centrally located, NPS prefers Tennessee Valley location.

## **2.5 Environmentally Preferred Alternative**

NEPA includes six statements of purpose in Section 101(b) of the Act. The degree to which an alternative fulfills these statements of policy is one measure of environmental superiority, and is used to help in identifying the environmentally preferred alternative in an EA or EIS. Because it is intended to help in identifying one alternative over others, the discussion focuses on differences, rather than similarities, among alternatives to:

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
- Assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings.
- Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences.
- Preserve important historical, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment that supports diversity and variety of individual choice.
- Achieve a balance between population and resource use that would permit high standards of **living and a wide sharing of life's amenities.**
- Enhance the quality of renewable resources and approach the maximum attainable recycling of unsustainable resources.

NPS identifies the environmentally preferred alternative in its NEPA documents for public review and comment. The environmentally preferred alternative is defined by CEQ NEPA regulations as the **alternative that "causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves and enhances historic, cultural and natural resources"** (40 CFR 1500–1508). The CEQ NEPA regulations also indicate that the environmentally preferred **alternative is the one that "would promote the national environmental policy as expressed in NEPA's Section 101"** (Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations 40 CFR 1500 – 1508; Question 6a).

Using both the CEQ's interpretations of the Section 101 purpose statements and the comparison of environmental effects to natural and cultural resources expected under each alternative, Alternative C was identified as the environmentally preferred alternative. Taking all impacts together, the differences between the various alternatives are not great, but Alternative C is anticipated to have slightly reduced adverse impacts overall for the primary reason that it has only two stables sites. With two sites being stables in Alternative C as opposed to three (Alternative B, Option 2), four (Alternative B, Option 1) or five sites (Alternative D), the impacts associated with horse operations would be geographically confined to only two areas, Tennessee Valley and Rodeo Valley, and would not occur in the Redwood Creek drainage (Golden Gate Dairy and Lower Redwood Creek sites), Marincello Road area, or Lower Tennessee Valley. This reduces adverse impacts overall.

Alternative C provides the most advantages with regard to the evaluation factors of natural resource protection when compared to the other action alternatives. One of the project objectives is to improve water quality and reduce soil erosion at the facilities. Alternative C would provide for the best protection of natural resources by reducing drainage problems and potentially contaminated water leeching into nearby drainages compared to the other alternatives. For these reasons, Alternative C was selected as the environmentally preferable alternative.

## 2.6 Summary of Alternative Actions

As stated in section 2.4 of this EA, action alternatives selected for analysis must meet all objectives to a large degree. Action alternatives must also address the stated purpose of taking action and resolve the need for action and alternatives that did not meet the plan objectives were dismissed from further analysis.

## 2.7 Summary of Impacts and Mitigation

Mitigation measures have been designed to minimize or avoid adverse effects to resources that were identified in each alternative, and are applicable to all alternatives. The mitigation measures are presented in **Table 2-12**, followed by the impacts by alternative in Table 2-13. Table 2-13 lists the impact before and after mitigation.

<b>Table 2-12 Summary of Mitigation Measures</b>		
<b>ID (see Chapter 4)</b>	<b>Name</b>	<b>Measure</b>
<b>Geology and Soils</b>		
GS-1	Ground Disturbance Timeframe	The ground disturbing aspects of construction would be limited to the dry season (typically between April 15 and October 15).
GS-2	Soil Erosion Protection	<ol style="list-style-type: none"> <li>To the extent practical, all equipment, materials, and construction personnel would limit movements to access roads, surface streets, or other disturbed areas that are already compacted.</li> <li>All residual soils and/or materials would be cleared from the project site once activities are complete.</li> <li>Building materials and other project-related materials would not be stockpiled or stored where they could spill or drain into water bodies or storm drains or where they would cover aquatic, riparian or other native vegetation.</li> <li>Watering of dust-prone construction areas, especially during the dry season, would be used to reduce generation of fugitive dust and to control migration of sediment outside of the project area.</li> <li>All stockpiled soils shall have properly installed and maintained erosion control to prevent soil loss, migration and contamination.</li> </ol>
GS-3	Staging Areas	Staging areas would be located in previously disturbed areas near project sites. Staging areas would be returned to pre-construction conditions or better once construction is completed.
GS-4	Soil Reuse	Soils excavated during ground-disturbing activities would be reused to the extent that these locally-derived materials are found to be clean and weed-free. Any such reuse is subject to applicable NPS policies and guidance. Wherever appropriate, soils and native plants affected by construction would be salvaged for use in site restoration. Any surplus soils and native plants may be used, as appropriate, for the restoration of other degraded areas in the park. Surplus soils not used in this way would be stockpiled and managed to keep them clean and weed-free for future use. Imported soils must (1) be compatible with existing soils, (2) be free of undesired seeds and organisms; and (3) fulfill the horticultural requirements of plants used for restoration. If the use of off-site soil to repair damaged sites is needed, parks are to select materials that are the best match for the original native soils.
GS-5	Runoff	Practices would be implemented to ensure that concentrated run-off is avoided that any discharged are redirected away from exposed slopes or stockpiled soils,

<b>Table 2-12 Summary of Mitigation Measures</b>		
<b>ID (see Chapter 4)</b>	<b>Name</b>	<b>Measure</b>
		including the placement of a vegetated buffer, straw wattles or bales, silt screens, or other materials to filter and reduce runoff velocity if needed.
GS-6	Planting and Revegetation after Landscape Treatment	Sites where activities result in exposed soil would be stabilized to prevent erosion and revegetated as soon as feasible after activities are complete. Revegetating disturbed sites would be done in accordance with an approved revegetation plan that provides protection to seeds, holds them in place and helps to retain moisture. Tightly woven fiber netting or non-bound materials (e.g., rice straw) would be used for erosion control or other purposes at the work sites. This limitation would be communicated to the contractor through use of Special Provisions included in the bid solicitation package. No plastic mono-filament matting would be used for erosion control.
Water Resources WR-1	Stormwater and Runoff Management	<p>The goal of stormwater and runoff management is the protection of clean water and natural water sources such as streams and groundwater. The primary objectives of WR-1 are to minimize the amount of water that becomes contaminated by diverting polluted water away from clean water sources; and managing water that does become contaminated in ways that minimize pollutant loading to water resources. Pollutants include manure, urine, waste from feeding sites and horse confinement areas, horse grooming products, wash water and detergents, veterinary medicines, chemicals and pesticides, septic systems, surface soils, sediment, waterway erosion, and vehicles. Best Management Practices which address this objective would include:</p> <ol style="list-style-type: none"> <li>1. Storm water management: Storm water shall be managed to protect water quality. It would be controlled to avoid polluting local streams such as by diverting runoff from animal areas and by covering manure collection containers.</li> <li>2. Runoff and drainage: Drainage would be managed and to prevent water pollution by separating clean runoff from polluted runoff. Runoff from animal areas would not come in contact with, or drain directly into, all-year or seasonal streams.</li> <li>3. Stream setbacks: The NPS shall maintain a 50-foot setback from seasonal streams that dry out in the summer, and a 100-foot setback from perennial streams (see site maps).</li> <li>4. Implement filter strips, berms, swales, and drainfields: Installation of bioswales, engineered drainfields, vegetated buffers, and similar measures allow for uptake and absorption of nutrients and other contaminants to reduce pollutant loading on water resources.</li> <li>5. Interceptor ditch and conveyance: An interceptor ditch for clean water collects water flowing toward the stable site and conveys it around rather than through the site. This keeps clean water from sweeping through the stable, picking up and carrying pollutants to a stream or other site. Within the stable site an interceptor ditch can also pick up polluted runoff and convey it to a safe place such as a seasonal treatment pond.</li> </ol>

<b>Table 2-12 Summary of Mitigation Measures</b>		
<b>ID (see Chapter 4)</b>	<b>Name</b>	<b>Measure</b>
Water Resources WR-1	Stormwater and Runoff Management	<p>Water Quality monitoring would be required based on methods outlined in an approved water quality monitoring plan. This may include regular testing for temperature, pH, dissolved oxygen, coliform/bacteria, nitrates, ammonia, and total dissolved solids (conductivity). Monitoring would be conducted monthly at monumented sampling sites. Sampling would occur upstream and downstream of each stable. Additional stormwater and runoff management measures could be triggered if monitoring results indicate water quality protection levels are not being met.</p> <p>A Stormwater Management Plan would be required for each stable. The Storm Water Management Plan would show the drainage system on a site plan or aerial photograph; the separation and conveyance of clean and polluted waters, treatment areas, slope directions, along with activities such as for erosion control revegetation, vegetated strip maintenance, and would describe the minimum frequency of upkeep. It would show wells, creeks, drainage structures, and septic systems. The plan would include the contact information for the person responsible and his or her title.</p>
WR-2	Manure Management	<p>Manure Management: Manure would be managed to avoid water pollution, airborne contaminants and dust, and to reduce pests such as fly infestations. Manure and dirty bedding would be collected daily and be stored in a covered, waterproof enclosure. Manure shall be stored on a contained (curbed) concrete slab that has at least three walls and a roof that fully protects the stored manure from blowing rain. Manure and used stall bedding would be removed from the site weekly, and would be responsibly disposed of, preferably to a non-NPS composting facility. There would be no site composting and no open waste storage.</p> <p>A Manure Management Plan shall be required for each stable. The Manure Management plan would include an aerial plan showing the location of the covered manure bin and shed or other storage techniques. It would state the frequency of manure maintenance such as cleaning of stalls and grounds, and storage. It would explain the manure disposal technique including covered hauling, destination, and a statement about the disposal, treatment, or composting process and location. It would include the contact information for the person responsible and his or her title.</p>
WR-3	Stables Management	<p>There would be in place practices to control and minimize the use of water, such as float valve type waterers or nose pumps activated by animal for stall watering bowls. Revegetation would use native seed with low water use requirements. Efficient (even water distribution) professionally designed sprinkler systems for dust control in arenas would be installed if required by NPS. Rainwater collection via roof drains, gutters and downspouts would be allowed for non-consumptive use. Water would be managed to control contaminated nutrient runoff. This may require diverting surface and roof drainage runoff water away from stalls, paddocks or turnouts.</p> <p>Septic systems would be abandoned or replaced. Existing drainfields would be vegetated. Roof and surface water runoff would be diverted from drainfields. Composting or vault toilets would be installed. Management and maintenance plans would be required, and would be provided by the stable lessee to the park as a condition of their permit. These plans would provide for ongoing incorporation of new or future stables management practices and technologies to protect water resources as they become available.</p>
WR-4	Stables Chemical Management	<p>Many of the chemicals found in barns –paints, hoof oils, and pesticides to name a few – require careful handling and proper disposal. In general, stable products</p>

<b>Table 2-12 Summary of Mitigation Measures</b>		
<b>ID (see Chapter 4)</b>	<b>Name</b>	<b>Measure</b>
		and chemicals would be used minimally, only as necessary for the health and safety of the animals and users, and that are safe for the environment. Runoff that may contain these products shall be treated as polluted runoff.
WR-5	Equipment Inspections	All vehicles and equipment would be kept clean. Excessive build-up of oil or grease would be avoided. All equipment used would be inspected for leaks each day prior to initiation of work. Action would be taken to prevent or repair leaks, if necessary. Vehicle and equipment maintenance activities would be conducted off-site or in a designated, protected area away from stream buffers where vehicle fluids and spills can be handled with reduced risk to water quality. If maintenance must occur on-site, designated areas would not directly connect to the ground, surface waters, or the storm drainage system to prevent the run-on of stormwater and runoff of spills. The service area would be clearly designated with berms, sandbags, or other barriers. Secondary containment, such as a drain pan or drop cloth, to catch spills or leaks would be used when removing or changing fluids. Fluids would be stored in appropriate containers with covers, and properly recycled or disposed of off-site.
WR-6	Spill Prevention and Response Plan	The National Park Service would develop a Spill Prevention and Response Plan for construction prior to commencement of construction activities to contain and/or clean up any stored or spilled fuels or chemicals and prevent oil, grease, or fuel leaks from equipment.
<b>Vegetation and Wildlife</b>		
VEG-1	Planting and Revegetation after Landscape Treatment	<ol style="list-style-type: none"> <li>1. Sites where activities result in exposed soil would be stabilized to prevent erosion and revegetated as soon as feasible after activities are complete.</li> <li>2. Erosion control fabric, hydromulch, or other mechanism would be applied as appropriate to provide protection to seeds, hold them in place, and help retain moisture. Woven fiber netting materials (e.g., rice straw) would be used for erosion control or other purposes at the work sites to ensure that the California red-legged frogs do not get trapped. This limitation would be communicated to the contractor through use of Special Provisions included in the bid solicitation package. No plastic monofilament matting would be used for erosion control.</li> </ol>
VEG-2	Noxious Weed Control	Soils and vegetation contaminated with weed seeds from within the GGNRA would be segregated and disposed of or treated as appropriate. Similarly, soils heavily infested with noxious invasive plant material would be disposed of off-site.
WL-1	Pre-Construction Educational Training	Prior to construction activities, all personnel would participate in an educational training session conducted by a qualified biologist. Training sessions would include identification of National Park Service staff resource contacts; special-status plants, wildlife, or other sensitive resources in the work area; markings for the limit line of disturbance; thresholds that would trigger a change in implementation techniques or require a halt in project implementation; prohibitions on feeding resident wildlife; and proper disposal of food waste and garbage to discourage feeding by wildlife which may increase predation on native wildlife. Upon completion of training, employees or contracting crews would be required to sign a form stating that they attended the training and understand all the conservation and protection measures.
WL-2	Nesting Bird and Raptor Protection Measures	<ol style="list-style-type: none"> <li>1. To the greatest extent possible, activities would be planned and conducted outside the bird-nesting season (defined as January 1—July 31 for raptors, and March 1—July 31 for landbirds).</li> <li>2. In intensively managed landscapes, vegetation would be maintained at a <b>height of less than 8" throughout the landbird nesting season to discourage the nesting of such bird species. Any vegetation (i.e., trees, shrub, grasses) taller than 8" that is not removed within the timing window specified in the GGNRA Standard Operating Procedures for vegetation cutting and removal</b></li> </ol>

<b>Table 2-12 Summary of Mitigation Measures</b>		
<b>ID (see Chapter 4)</b>	<b>Name</b>	<b>Measure</b>
		would be subject to the additional measures 3 and 4, below. 3. If work is conducted within the nesting season, prior to the onset of construction involving ground-disturbing activities using heavy machinery, a qualified wildlife biologist would be retained to conduct pre-maintenance surveys for raptors and nesting birds within suitable nesting habitat in a 300 foot radius of the construction area. If no active nests are detected during surveys, activities may proceed. If active nests are detected then measure 4 would be implemented. 4. If active nests are identified within the construction area, a biologist would establish a suitable nest buffer in coordination with NPS where no work can occur until the young have successfully fledged or the nests have been otherwise abandoned.
WL-3	Protection of Bat Populations	Preconstruction surveys for bat species would be conducted in areas of suitable habitat within the project area. For tree-roosting bats, all potential roost trees that must be removed would be surveyed and identified in the field, and the following procedures would be applied prior to felling: 1. Avoid implementing tree removal between April 1 and August 31 to protect potential maternity roosts, 2. Trees would be removed under the warmest possible conditions practical, 3. Sections of the exfoliating bark would be peeled off the tree gently to search for any roosting bats underneath, 4. Noise and vibrations (e.g., striking the tree base) would be created on the tree itself. When cutting sections of the bole, if any hollows or cavities (such as woodpecker holes) are discovered, a biologist would carefully check for the presence of bats in those areas.
WL-4	Construction-Related Noise Control	See full description in section 4.10.2.
<b>Cultural Resources</b>		
CR-1	Pre-Construction Field Surveys and Training	Where not already completed, professional archeologists would perform surveys prior to ground disturbance in areas previously undisturbed. In addition, NPS or the permittees would provide training for all personnel involved with ground disturbance activities to facilitate recognition of potential archaeological materials and to avoid impacts to deposits.
CR-2	Archaeological and Native American Monitoring	NPS or the lessees would ensure that there is an archaeological monitor and representative of the Federated Indians of the Graton Rancheria (Coast Miwok) during ground disturbing activities in the vicinity of high archaeological sensitivity. While the goal of NPS is to preserve archaeological resources, this mitigation measure would ensure that if additional deposits associated with known sites are discovered, there would be an archaeologist and Native American representative on site to identify and assess the find and impacts immediately and to halt construction.
CR-3	Previously Undiscovered Cultural Resources	<u>Inadvertent Discoveries</u> : If buried cultural resources are inadvertently discovered during ground-disturbing activities, work shall stop in that area and within a 100-foot radius of the find until a qualified archaeologist can assess the significance of the find. Alternatively, an archaeologist and Native American monitor may monitor ground disturbances in vicinity of the site to ensure that such discoveries are protected until they can be properly recorded and assessed, and management decisions can be made about their treatment. Avoidance in place or no adverse effect from project actions is the preferred approach to all discoveries that are potentially eligible for listing on the NRHP. Inadvertent discoveries would be treated in accordance with 36 CFR 800.13 (Protection of Historic Properties: Post-review discoveries). The archaeological resource would be assessed for its eligibility for listing on the NRHP in consultation with the SHPO

<b>Table 2-12 Summary of Mitigation Measures</b>		
<b>ID (see Chapter 4)</b>	<b>Name</b>	<b>Measure</b>
		<p>(and a Native American Monitor from the Federated Indians of Graton Rancheria if it is an indigenous archaeological site) and a determination of the project effects on the property would be made. If the site would be adversely affected, a treatment plan would also be prepared as needed during the assessment of the <b>site's significance</b>. <b>Assessment of inadvertent discoveries</b> may require archaeological excavations or archival research to determine resource significance. Treatment plans would fully evaluate avoidance, project redesign, and data recovery alternatives before outlining actions proposed to resolve adverse effects.</p> <p><u>Discovery of Human Remains</u>: If human skeletal remains are encountered, all work shall stop in the vicinity of the discovery, and the find would be secured and protected in place. The Marin County coroner and Park Archaeologist would both be immediately notified. If a determination finds that the remains are Native American, and that no further coroner investigation of the cause of death is required, they would be treated in accordance with the Native American Graves Protection and Repatriation Act Regulations at 43 CFR 10.4 (Inadvertent discoveries). The coroner would also contact the NAHC (pursuant to Section 7050.5[c] of the California Health and Safety Code) and the County Coordinator of Indian Affairs.</p>
CR-4	Cultural Resources Monitoring Plan	A cultural resource monitoring plan would be prepared to ensure that ground-disturbing activities within the project areas result in no adverse effects to buried resources. The monitoring program would include oversight of project schedules and excavation areas to ensure that important opportunities for archaeological discovery are realized, and that potentially buried archaeological deposits are recognized in the course of active excavation and restoration. If archaeological resources are found that could be adversely affected by the proposed project, NPS shall comply with Mitigation Measure CR-3.
CR-5	Treatment of Historic Cultural Landscape	<ol style="list-style-type: none"> <li>1. Building and landscape restoration and rehabilitation would conform to The <i>Secretary of the Interior's Standards for the Treatment of Historic Properties</i> and would be guided by the "Final Marin Equestrian Stables Plan Summary of the NPS Cultural Landscape Workshop, June 1 and 2, 2010 Memorandum." This memorandum provides guidelines that NPS should adhere to at all cultural landscapes within the Plan APE.</li> <li>2. Prior to implementation of the action alternative Historic Structures Reports and Cultural Landscape Reports would be prepared by a professional historical architect and a historical landscape architect, respectively. Recommendations provided in these reports would be used to guide design work for the project areas.</li> <li>3. Guidelines for compatible new construction would be prepared to ensure compatibility of new building construction and the introduction of other new elements into the historic setting and would be subject to review and approval by NPS. The guidelines would conform to The <i>Secretary of the Interior's Standards for the Treatment of Historic Properties</i>.</li> <li>4. Design review prior to implementation would be required.</li> </ol>
<b>Visitor Experience</b>		
VE-1	Construction Management Plan	For each phase of work, a construction management plan would be developed to carefully sequence construction activities to minimize disruption to existing facilities and services. The plan shall be submitted and approved by NPS and would include information on days/hours of operation, times in which particularly loud or noisy operations could occur, how equipment would be maintained, how noise and disruption would be minimized, safety protocols, etc.
VE-2	Construction Exclusion Areas –	During construction, oversight would be provided to ensure that all active construction, staging, and stockpile areas are fenced to render them inaccessible

<b>Table 2-12 Summary of Mitigation Measures</b>		
<b>ID (see Chapter 4)</b>	<b>Name</b>	<b>Measure</b>
	Visitor Restrictions	to the public. To minimize visual intrusiveness of fencing, it would be designed and installed to blend into the surrounds as much as possible. All construction, staging, and stockpile access would be gated and kept locked except when in use. Signs would be conspicuously posted to inform the public about the need for caution and to safely route visitors around construction areas. Established and maintained walkways would be provided across the site, as well as barrier fencing along trails and paths.
VE-3	Construction Related Noise Control	See full description in Section 4.10.2.
VE-4	Post Trail Etiquette Recommendations	Trail Etiquette Recommendations would be posted at the stables/trailheads to <b>increase equestrian awareness and consideration of other users and the "leave no trace" ethic.</b> The signs could include recommended use of equestrian sanitation sack, noise kept to minimum, public safety around horses, protection measures concerning natural and cultural resources and efforts not to disturb other visitors etc.
VE-5	Coordination of Equestrian Public Outreach Programs	The selection of specific public outreach programs should take into consideration the timing of the use of trails to minimize potential impacts to other recreationists. For instance, some programs could be restricted as to how many groups may visit and when they may visit.
<b>Transportation</b>		
TR-1	Construction Traffic Control Plan	A traffic control plan would be developed in conjunction with the construction documents for review and approval by NPS. This plan would include information on construction phases and duration, traffic scheduling, staging area management, visitor safety, construction equipment travel routes, detour routes, parking area closures, and equestrian, pedestrian and bicyclist movements on adjacent routes.
TR-2	Parking Monitoring and Outreach	NPS would require that the lessees monitor parking to identify management issues in a timely manner and work with NPS and other partners to seek timely solutions. Lessees would provide information on alternative transportation and parking availability to all visiting groups and encourage groups to provide that information to their members.
<b>Visual Resources</b>		
VR-1	Minimize Long-Term Visual Impacts	New construction would be designed to be compatible with existing structures and landscape features to ensure visual continuity. The design and placement would take into account elements of massing, scale, materials, and color. Site furnishings would be consistent with the Park wide Site Furnishings Guidelines for similar features found elsewhere in the park. New design elements would be sited so that they would not compete with important views and vistas and would be incorporated into the surrounding landscape.
VR-2	Prepare Visual Simulations During Design Phase	For those alternatives that include new facility construction, the NPS (or lessee) would prepare visual simulations or other visual aids during the schematic design phase to assist in studying and communicating to others the proposals and to determine the visual impacts
VR-3	Minimization of Construction-Related Visual Impacts	Construction activities would be coordinated with other construction activities in the area to the greatest extent possible to minimize visual intrusion of construction equipment and activity in popular visitor areas.
<b>Park Operations</b>		
PO-1	Utilities	Utility and infrastructure work that requires interruptions in service would be coordinated at least 60 days in advance between NPS, lessees, and appropriate park partners at each stable site.

<b>Table 2-13. Environmental Consequences, by Alternative</b>						
<b>Resource Topic</b>	<b>Impact by Alternative (before mitigation/after mitigation)</b>					<b>Mitigation Measures</b>
	<i>Note that all impacts listed are adverse unless specifically identified as beneficial.</i>					
	<b>Alternative A No Action</b>	<b>Alternative B Enhanced Existing (Option 1)</b>	<b>Alternative B Enhanced Existing (Option 2)</b>	<b>Alternative C Consolidated</b>	<b>Alternative D Dispersed and Expanded</b>	
<b>Soils</b>						
<b>Construction</b>	Minor	Moderate / Negligible	Minor/Negligible	Moderate / Negligible	Moderate/ Negligible	GS-1: Ground Disturbance Timeframe GS-2: Soil Erosion Protection GS-3: Staging Areas GS-4: Soil Reuse GS-5: Runoff GS-6: Planting and Revegetation after Landscape See Appendix B (BMPs)
<b>Soil Erosion</b>						GS-1, GS-2, GS-3, GS-4, GS-5, GS-6
Temporary to Mid Term	Negligible to Minor	Moderate / Negligible	Moderate / Negligible	Minor / Negligible	Minor	
Long Term	Beneficial - Negligible to Minor	Beneficial - Minor to Moderate	Beneficial - Minor to Moderate	Negligible to Minor to Beneficial-Minor to Major	Moderate / Negligible to Beneficial-Minor to Major	
<b>Soil Compaction</b>						GS-1, GS-2, GS-3, GS-4, GS-5, GS-6
Short Term	Negligible to Minor	Minor/Negligible	Minor/Negligible	Minor/Negligible	Minor	
Long Term	Negligible to Minor	Beneficial - Minor	Beneficial - Minor	Beneficial-Minor to Major	Moderate / Negligible to Beneficial-Minor to Major	
<b>Soil Nutrients</b>	Negligible to Moderate	Beneficial - Negligible to Moderate	Beneficial - Negligible to Moderate	Negligible to Beneficial-Minor to Major	Moderate / Negligible to Beneficial-Minor to Major	GS-1, GS-2, GS-3, GS-4, GS-5, GS-6
<b>Cumulative</b>	Negligible to Major to Beneficial	Major / Negligible to Beneficial	Major / Negligible to Beneficial	Major / Negligible to Beneficial	Major / Negligible to Beneficial	

<b>Table 2-13. Environmental Consequences, by Alternative</b>						
<b>Resource Topic</b>	<b>Impact by Alternative (before mitigation/after mitigation)</b> <i>Note that all impacts listed are adverse unless specifically identified as beneficial.</i>					<b>Mitigation Measures</b>
	<b>Alternative A No Action</b>	<b>Alternative B Enhanced Existing (Option 1)</b>	<b>Alternative B Enhanced Existing (Option 2)</b>	<b>Alternative C Consolidated</b>	<b>Alternative D Dispersed and Expanded</b>	
<b>Water Resources</b>						
<b>Facility Construction</b>	Minor to Moderate	Moderate / Negligible	Moderate / Negligible	Moderate	Moderate to Major	GS-2, WR-1: Stormwater and Runoff Management WR-2: Manure Management WR-3: Stables Management WR-4: Stables Chemical Management WR-5: Equipment Inspections WR-6: Spill Prevention and Response Plan
<b>Stable Management and Operations Activities</b>	Minor to Moderate	Minor to Moderate	Minor to Moderate	Minor to Moderate	Minor to Moderate	WR-2, WR-3, WR-4
<b>Riparian Corridor Enhancement</b>	No Impact	Negligible	Negligible	Moderate / Negligible	Negligible	WR-1
<b>Storm-Surface Water Runoff</b>	Minor to Moderate	Negligible to Minor	Negligible to Minor	Negligible to Moderate	Negligible to Minor	WR-1, WR-2, WR-3, WR-4, WR-5, WR-6
Temporary to Mid Term						
Mid to Long Term		Beneficial-Minor	Beneficial-Minor	Negligible to Minor to Beneficial-Minor to Major	Minor to Beneficial-Minor	
<b>Groundwater</b>	Negligible to Moderate	Beneficial-Minor to Moderate	Beneficial-Minor to Moderate	Negligible to Minor to Beneficial-Minor to Moderate	Negligible to Minor to Beneficial-Minor	
<b>Cumulative</b>	Moderate	No Impact	No Impact	Minor to Beneficial	Negligible to Moderate to Beneficial	WR-1, WR-2, WR-3, WR-4, WR-5, WR-6

<b>Table 2-13. Environmental Consequences, by Alternative</b>						
<b>Resource Topic</b>	<b>Impact by Alternative (before mitigation/after mitigation)</b>					<b>Mitigation Measures</b>
	<i>Note that all impacts listed are adverse unless specifically identified as beneficial.</i>					
	<b>Alternative A No Action</b>	<b>Alternative B Enhanced Existing (Option 1)</b>	<b>Alternative B Enhanced Existing (Option 2)</b>	<b>Alternative C Consolidated</b>	<b>Alternative D Dispersed and Expanded</b>	
<b>Vegetation</b>						
<b>Facility Construction</b>	Negligible to Minor	Minor / Beneficial	Minor / Beneficial- Moderate	Minor / Beneficial- Moderate	Minor / Beneficial	Veg-1: Planting and Revegetation after Landscape Treatment Veg-2: Noxious Weed Control
<b>Stable Management and Operations Activities</b>	No Impact	Negligible	Negligible	Negligible	Negligible	Veg-2
<b>Cumulative</b>	Minor to Beneficial	Minor/Beneficial	Minor/Beneficial	Minor/Beneficial	Minor/Beneficial	Veg-1, Veg-2
<b>Wildlife (sec 4.6)</b>						
<b>Facility Construction</b>	Moderate / Negligible	Moderate / Negligible to Moderate	Moderate / Negligible to Moderate	Moderate / Negligible to Moderate	Moderate / Negligible to Moderate	WL-1: Pre-Construction Educational Training WL-2: Nesting Bird and Raptor Protection Measures WL-3: Protection of Bat Populations WL-4: Construction- Related Noise Control
<b>Stable Management and Operations Activities</b>	No Impact	No Impact	No Impact	No Impact	No Impact	
<b>Cumulative</b>						
Short Term	Minor to Moderate	Minor to Moderate	Minor to Moderate	Minor to Moderate	Minor to Moderate	
Long Term	Moderate to Minor / Beneficial	Moderate to Minor / Beneficial-Minor to Moderate	Moderate to Minor / Beneficial-Minor to Moderate	Moderate to Minor / Beneficial-Minor to Moderate	Moderate to Minor / Beneficial-Minor to Moderate	WL-1, WL-2, WL-3, WL- 4
<b>Species of Special Concern</b>						
<b>Tidewater Goby</b>						
<b>Facility Construction</b>	Moderate / Negligible					WL-1, WL-2, WL-3, WL- 4

<b>Table 2-13. Environmental Consequences, by Alternative</b>						
<b>Resource Topic</b>	<b>Impact by Alternative (before mitigation/after mitigation)</b>					<b>Mitigation Measures</b>
	<i>Note that all impacts listed are adverse unless specifically identified as beneficial.</i>					
	<b>Alternative A No Action</b>	<b>Alternative B Enhanced Existing (Option 1)</b>	<b>Alternative B Enhanced Existing (Option 2)</b>	<b>Alternative C Consolidated</b>	<b>Alternative D Dispersed and Expanded</b>	
Short Term		Moderate / Negligible	Moderate / Negligible	Moderate / Negligible	Moderate / Negligible	
Long Term		Beneficial-Minor	Beneficial-Minor	Beneficial-Minor	Beneficial-Minor	
<b>Stable Management and Operations Activities</b>	No Impact	Beneficial	Beneficial	Beneficial	Beneficial	
<b>Cumulative</b>	Minor to Moderate	Minor to Moderate to Beneficial	Minor to Moderate to Beneficial	Minor to Moderate to Beneficial	Minor to Moderate to Beneficial	WL-1, WL-4
<b>Salmonids (Coho and Steelhead)</b>						
<b>Facility Construction</b>						WL-1, WL-2, WL-3, WL-4
Short Term	Moderate / Negligible	Moderate / Negligible	Moderate / Negligible	Moderate / Negligible	Moderate / Negligible	
Long Term		Beneficial-Minor	Beneficial-Minor	Beneficial-Minor	Beneficial-Minor	
<b>Stable Management and Operations Activities</b>	No Impact	Beneficial	Beneficial	Beneficial	Beneficial	
<b>Cumulative</b>	Minor to Moderate	Minor to Moderate to Beneficial	Minor to Moderate to Beneficial	Minor to Moderate to Beneficial	Minor to Moderate to Beneficial	WL-1, WL-4
<b>Red Legged Frog</b>						
<b>Facility Construction</b>						WL-1, WL-2, WL-3, WL-4
Short Term	Moderate / Negligible	Moderate / Negligible	Moderate / Negligible	Moderate / Negligible	Moderate / Negligible	
Long Term		Beneficial-Minor	Beneficial-Minor	Beneficial-Minor	Beneficial-Minor	
<b>Stable Management and Operations Activities</b>	No Impact	Beneficial	Beneficial	Beneficial	Beneficial	
<b>Cumulative</b>	Minor to Moderate	Minor to Moderate to Beneficial	Minor to Moderate to Beneficial	Minor to Moderate to Beneficial	Minor to Moderate to Beneficial	WL-1, WL-4
<b>Mission Blue Butterfly</b>						
<b>Facility Construction</b>	Moderate / Negligible					WL-1, WL-2, WL-3, WL-4

<b>Table 2-13. Environmental Consequences, by Alternative</b>						
<b>Resource Topic</b>	<b>Impact by Alternative (before mitigation/after mitigation)</b>					<b>Mitigation Measures</b>
	<i>Note that all impacts listed are adverse unless specifically identified as beneficial.</i>					
	<b>Alternative A No Action</b>	<b>Alternative B Enhanced Existing (Option 1)</b>	<b>Alternative B Enhanced Existing (Option 2)</b>	<b>Alternative C Consolidated</b>	<b>Alternative D Dispersed and Expanded</b>	
Short Term		Moderate / Negligible	Moderate / Negligible	Moderate / Negligible	Moderate / Negligible	
Long Term		Beneficial-Minor	Beneficial-Minor	Beneficial-Minor	Beneficial-Minor	
<b>Stable Management and Operations Activities</b>	No Impact	Beneficial	Beneficial	Beneficial	Beneficial	
<b>Cumulative</b>	No Impact	No Impact	No Impact	No Impact	No Impact	
<b>Special Status Plants</b>						
<b>Facility Construction</b>	No Impact	Negligible	Negligible	Negligible	Minor	Veg-1, Veg-2
<b>Stable Management and Operations Activities</b>	No Impact	Beneficial	Beneficial	Beneficial	Beneficial	
<b>Cumulative</b>	No Impact	No Impact	No Impact	No Impact	Minor	
<b>Air Quality</b>						
<b>Construction Emissions</b>	No Impact	Minor	Minor	Minor	Minor to Moderate	Implement Bay Area Air Quality Mgt District Measures (see Table 4-11)
<b>Odors</b>						
<b>Cumulative</b>	No Impact	Negligible to Minor	Negligible to Minor	Negligible to Minor	Negligible to Minor	
<b>Cultural Resources</b>						
<b>Cultural Landscape Resources</b>	No Impact	No Impact	No Impact	No Impact	No Impact	Table 4-13
<b>Existing Equestrian Business Plan</b>	Negligible	Minor	Minor	Minor	Minor	Table 2-5
<b>Existing Operations</b>	Negligible	Minor	Minor	Minor	Minor	Table 2-5
<b>Visitor Experience</b>	Negligible	Minor	Minor	Minor	Minor	
<b>Existing Facilities, Sanitation, and Safety</b>	Negligible	Minor to Beneficial-Moderate	Minor to Beneficial-Moderate	Minor to Beneficial-Moderate	Minor to Beneficial-Moderate	CR-1, CR-2, CR-3, CR-4, CR-5
<b>Natural Resource Protection</b>	Negligible	Minor	Minor	Minor	Minor	

<b>Table 2-13. Environmental Consequences, by Alternative</b>						
<b>Resource Topic</b>	<b>Impact by Alternative (before mitigation/after mitigation)</b>					<b>Mitigation Measures</b>
	<i>Note that all impacts listed are adverse unless specifically identified as beneficial.</i>					
	<b>Alternative A No Action</b>	<b>Alternative B Enhanced Existing (Option 1)</b>	<b>Alternative B Enhanced Existing (Option 2)</b>	<b>Alternative C Consolidated</b>	<b>Alternative D Dispersed and Expanded</b>	
<b>Archeological Resources</b>	Negligible to Moderate to Major Adverse	Minor	Minor	Minor	Minor	CR-1, CR-2, CR-3, CR-4, CR-5
<b>Cumulative</b>	No Impact	No Impact to Beneficial	No Impact to Beneficial	Minor to Beneficial	No Impact to Beneficial	
<b>Visitor Experience</b>						
<b>Construction</b>	No Impact	Minor / Moderate	Minor/Moderate	Minor / Moderate	Moderate	VE-1: Construction Management Plan VE-2: Construction Exclusion Areas-Visitor Restrictions
Public Access/Restrictions	No Impact	Minor / Negligible	Minor	Minor / Negligible	Minor	VE-1: Construction Management Plan VE-2: Construction Exclusion Areas-Visitor Restrictions
Circulation/Parking	No Impact	Negligible	Negligible	Negligible	Negligible	TR-1: Traffic Control Plan
Soundscapes/Noise	No Impact	Moderate / Negligible	Moderate / Negligible	Moderate / Negligible	Moderate / Negligible	VE-1, VE-3: Construction Related Noise Control
Long-Term Impacts	n/a	Beneficial	Moderate	n/a	n/a	
<b>Equestrian Stables</b>						
Inside Soundscape	Negligible to Minor	Beneficial	No Impact	Minor	No Impact	VE-1
Outside Trails	Negligible to Minor	Minor / Negligible	Minor / Negligible	Minor / Negligible	Negligible	VE-4: Posted Trail Etiquette Recommendations VE-5: Coordination of Equestrian Public Outreach Programs
Outside Soundscapes	Negligible to Minor	Minor / Negligible	Minor / Negligible	Minor / Negligible	Negligible	VE-5: Coordination of Equestrian Public Outreach Programs

<b>Table 2-13. Environmental Consequences, by Alternative</b>						
<b>Resource Topic</b>	<b>Impact by Alternative (before mitigation/after mitigation)</b>					<b>Mitigation Measures</b>
	<i>Note that all impacts listed are adverse unless specifically identified as beneficial.</i>					
	<b>Alternative A No Action</b>	<b>Alternative B Enhanced Existing (Option 1)</b>	<b>Alternative B Enhanced Existing (Option 2)</b>	<b>Alternative C Consolidated</b>	<b>Alternative D Dispersed and Expanded</b>	
<b>Cumulative</b>	No Impact	Minor to Beneficial	Minor	No Impact to Beneficial	Negligible to Minor to Beneficial	
<b>Transportation</b>						
<b>Short-term Impacts</b>						
Circulation	No Impact	Negligible	Negligible	Negligible	Negligible	
Parking Utilization	No Impact	Minor / Negligible	Minor / Negligible	Minor / Negligible	Minor / Negligible	TR-1
Enjoyment of Other Recreational Resources	No Impact		Moderate	Moderate	Moderate	TR-1
<b>Long-term Impacts</b>						
Circulation	No Impact	Minor	Negligible	Minor to Moderate	Minor to Moderate	
Parking Utilization	No Impact	Minor to Moderate / Negligible to Minor	Minor to Moderate / Negligible to Minor	Moderate / Minor	Moderate / Minor	TR-2: Parking Monitoring and Outreach
Enjoyment of Other Recreational Resources	No Impact	Minor	Minor	Moderate	Moderate	
<b>Cumulative</b>	No Impact	Negligible to Moderate	Negligible to Moderate	Negligible to Moderate	Negligible to Moderate	
<b>Visual Resources</b>						
<b>Construction</b>	No Impact	Negligible to Moderate / Minor	Negligible to Moderate / Minor	Negligible to Moderate / Minor	Negligible to Moderate / Minor	CR-5: Treatment of Historic Properties and Landscape VR-1: Minimize Long-Term Visual Impacts VR-2: Prepare Visual Simulations during Design Phase VR-3: Minimization of Construction-Related Visual Impacts

<b>Table 2-13. Environmental Consequences, by Alternative</b>						
<b>Resource Topic</b>	<b>Impact by Alternative (before mitigation/after mitigation)</b>					<b>Mitigation Measures</b>
	<i>Note that all impacts listed are adverse unless specifically identified as beneficial.</i>					
	<b>Alternative A No Action</b>	<b>Alternative B Enhanced Existing (Option 1)</b>	<b>Alternative B Enhanced Existing (Option 2)</b>	<b>Alternative C Consolidated</b>	<b>Alternative D Dispersed and Expanded</b>	
<b>Cumulative</b>	No Impact	Minor to Moderate to Beneficial	Minor to Moderate to Beneficial	Negligible to Minor to Beneficial	Minor to Moderate to Beneficial	
<b>Park Operations</b>						
<b>Short-term</b>	No Impact	Moderate / Minor	Moderate / Moderate	Moderate	Moderate / Minor	PO-1: Utilities PO-2: Staff and Programs
<b>Long-term</b>	No Impact	Negligible	Minor	Minor	Moderate	
<b>Cumulative</b>	No Impact	Negligible	Negligible	Negligible	Minor to Moderate	

# Golden Gate Dairy Alternative A

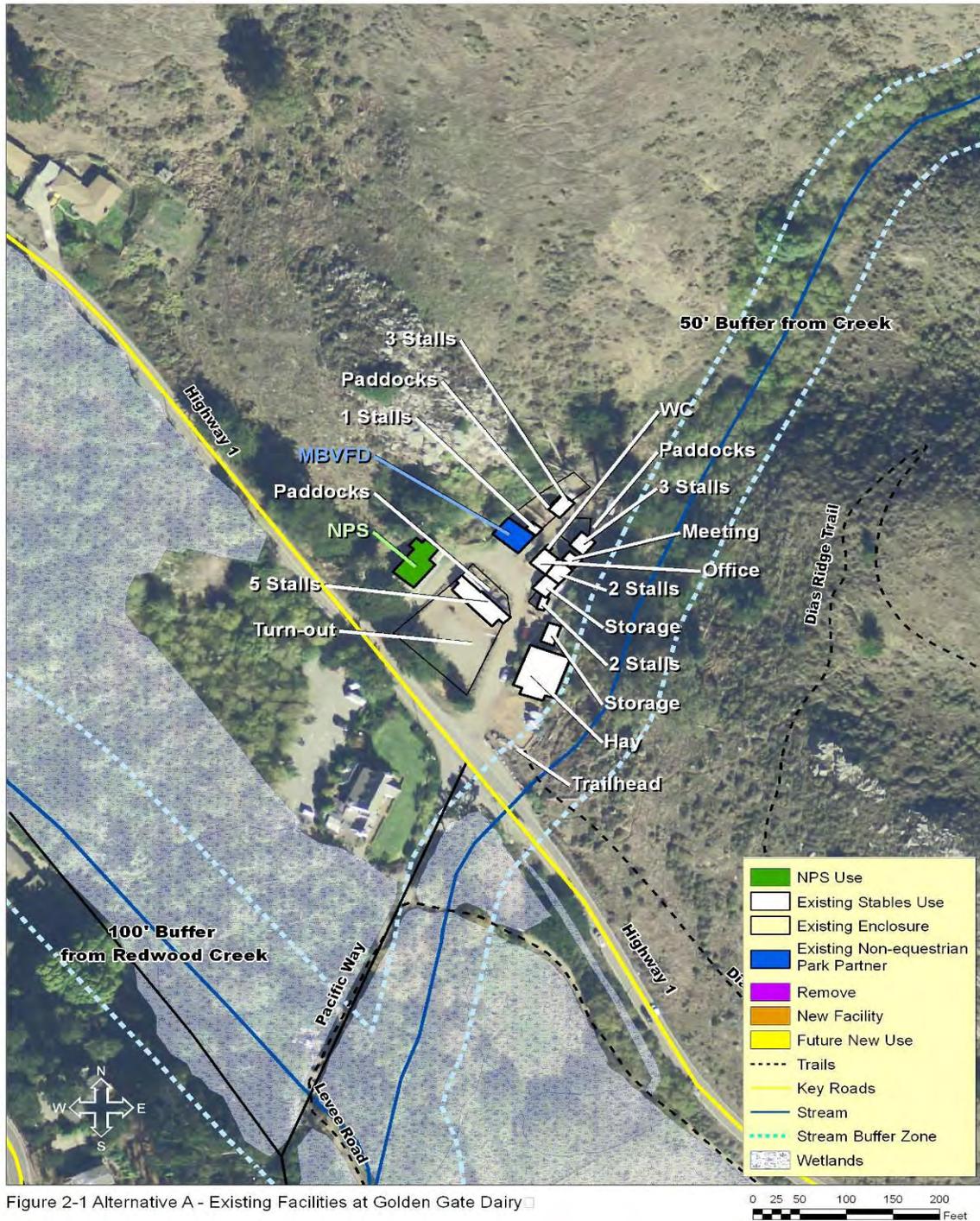


Figure 2-1 Alternative A - Existing Facilities at Golden Gate Dairy

# Tennessee Valley Stables Alternative A

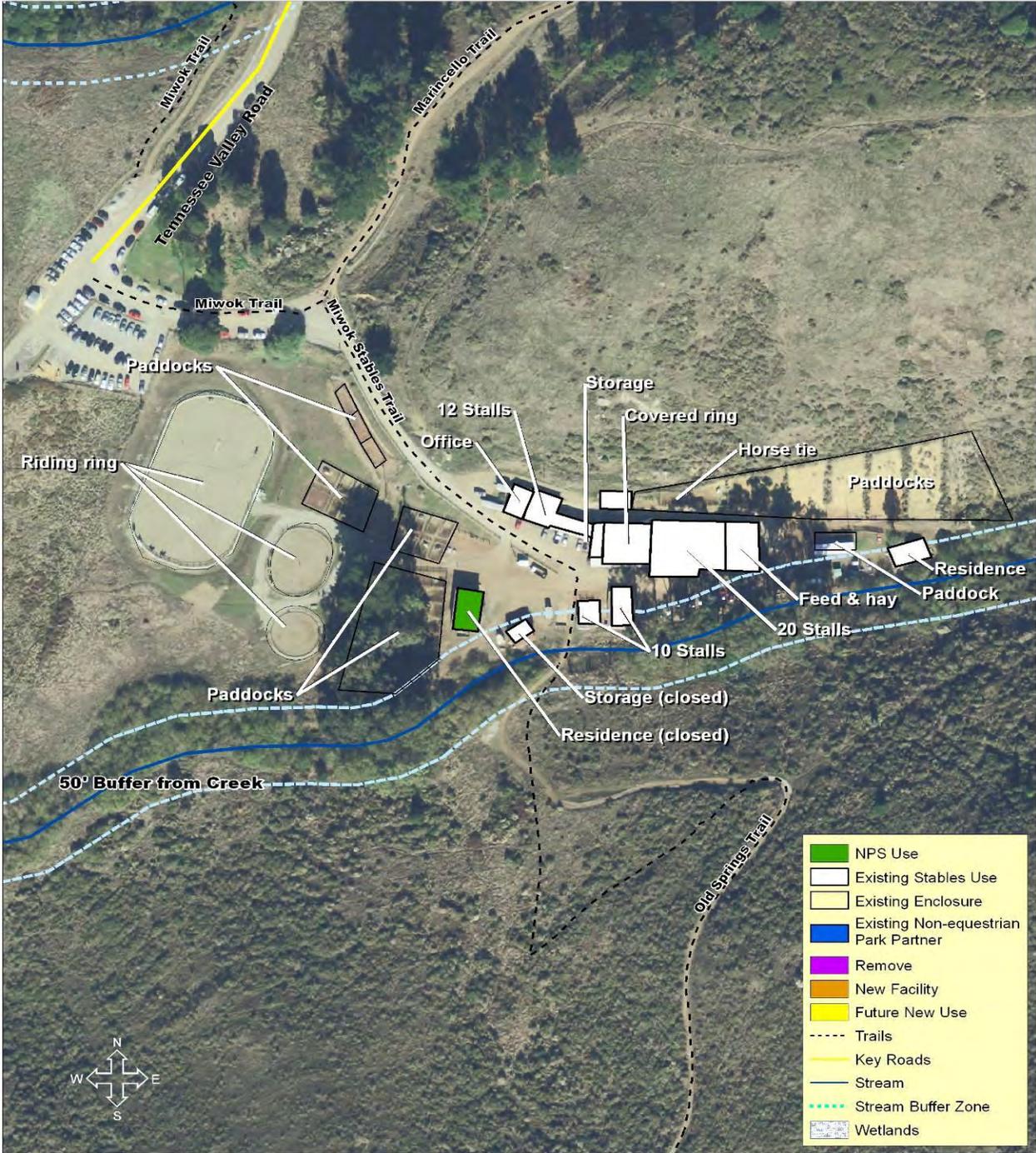


Figure 2-2 Alternative A - Existing Facilities at Tennessee Valley

# Lower Tennessee Valley Alternative A

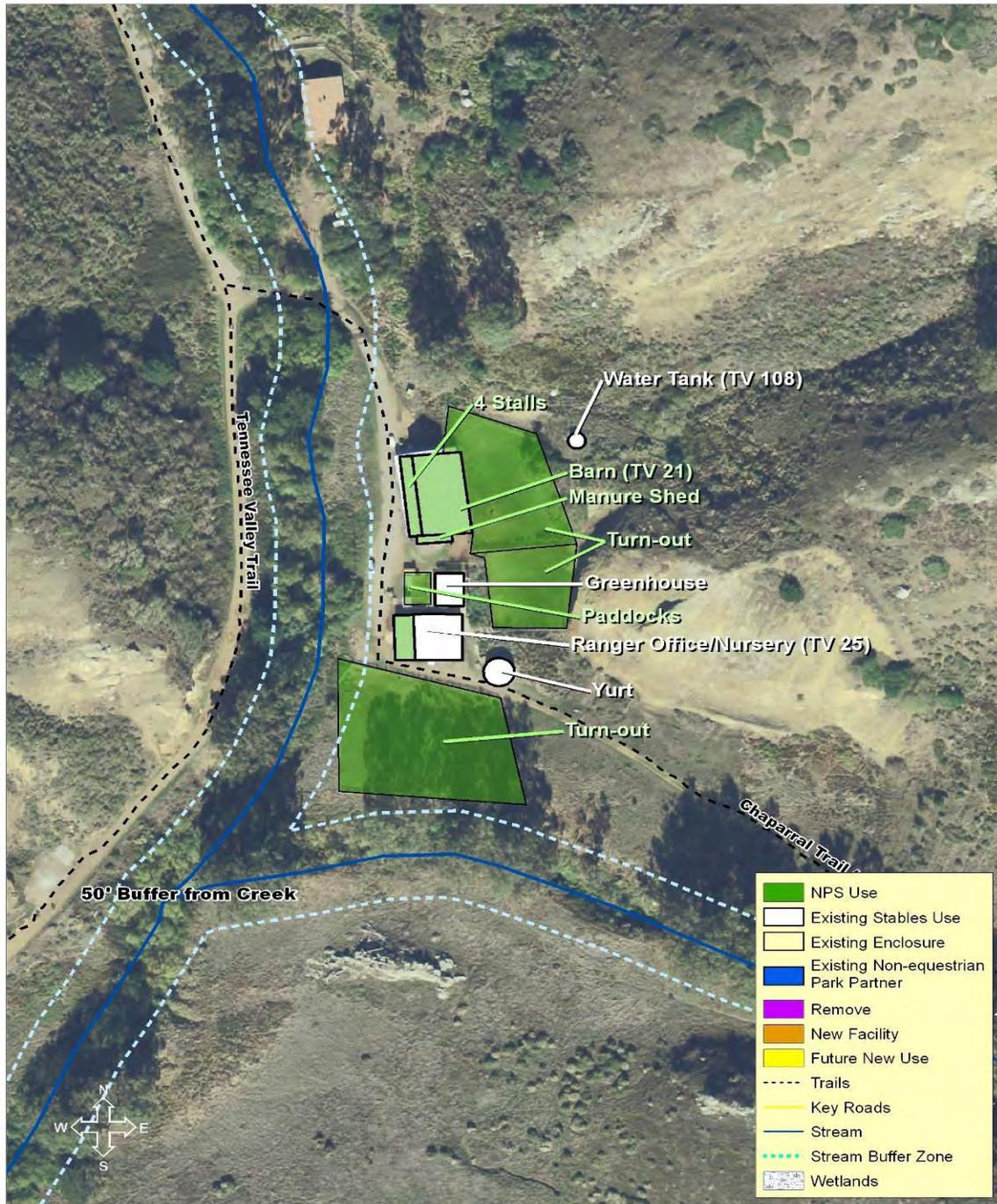


Figure 2-3 Alternative A - Existing Facilities at Lower Tennessee Valley

# Rodeo Valley Stables Alternative A

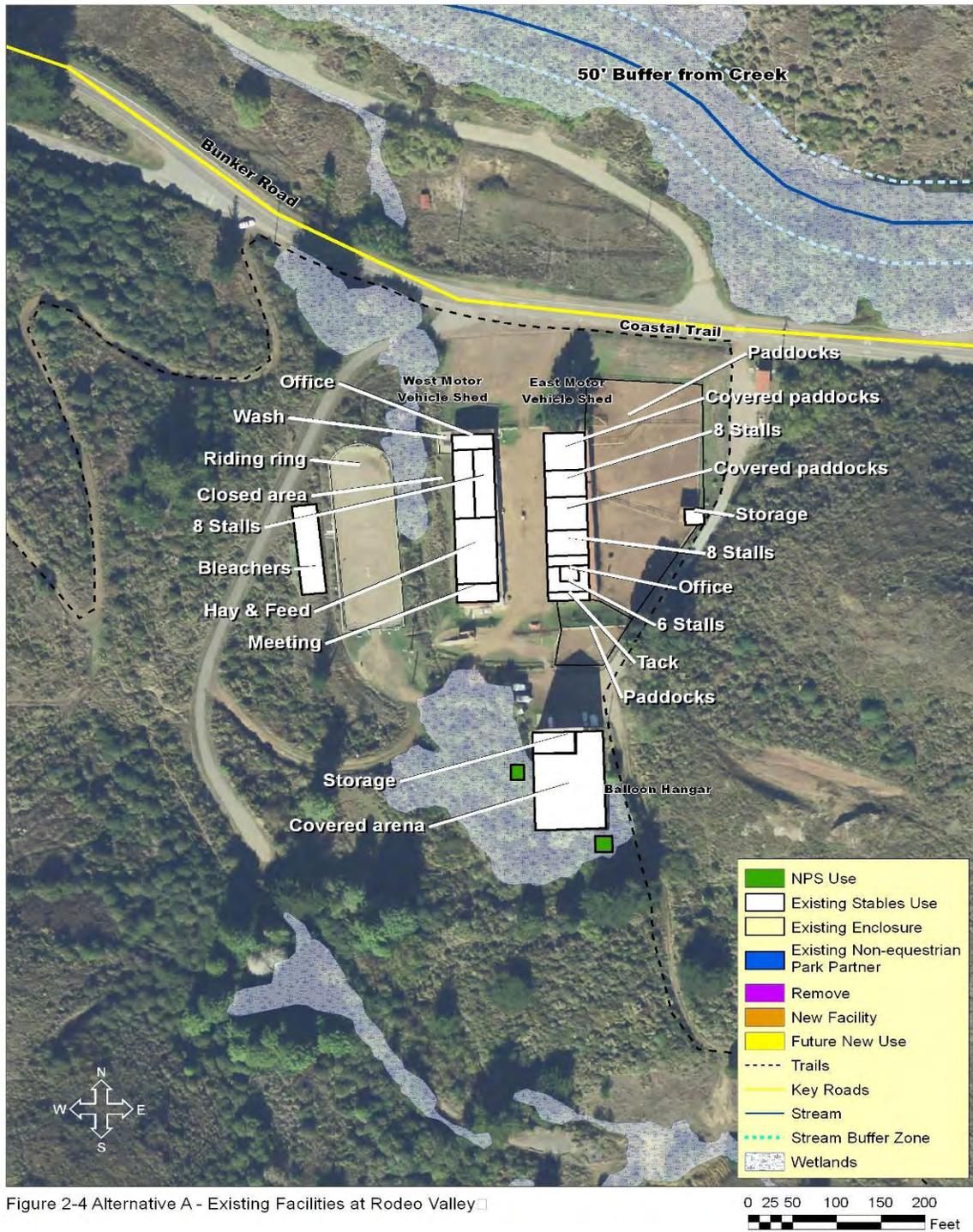


Figure 2-4 Alternative A - Existing Facilities at Rodeo Valley

# Lower Redwood Creek Alternative A

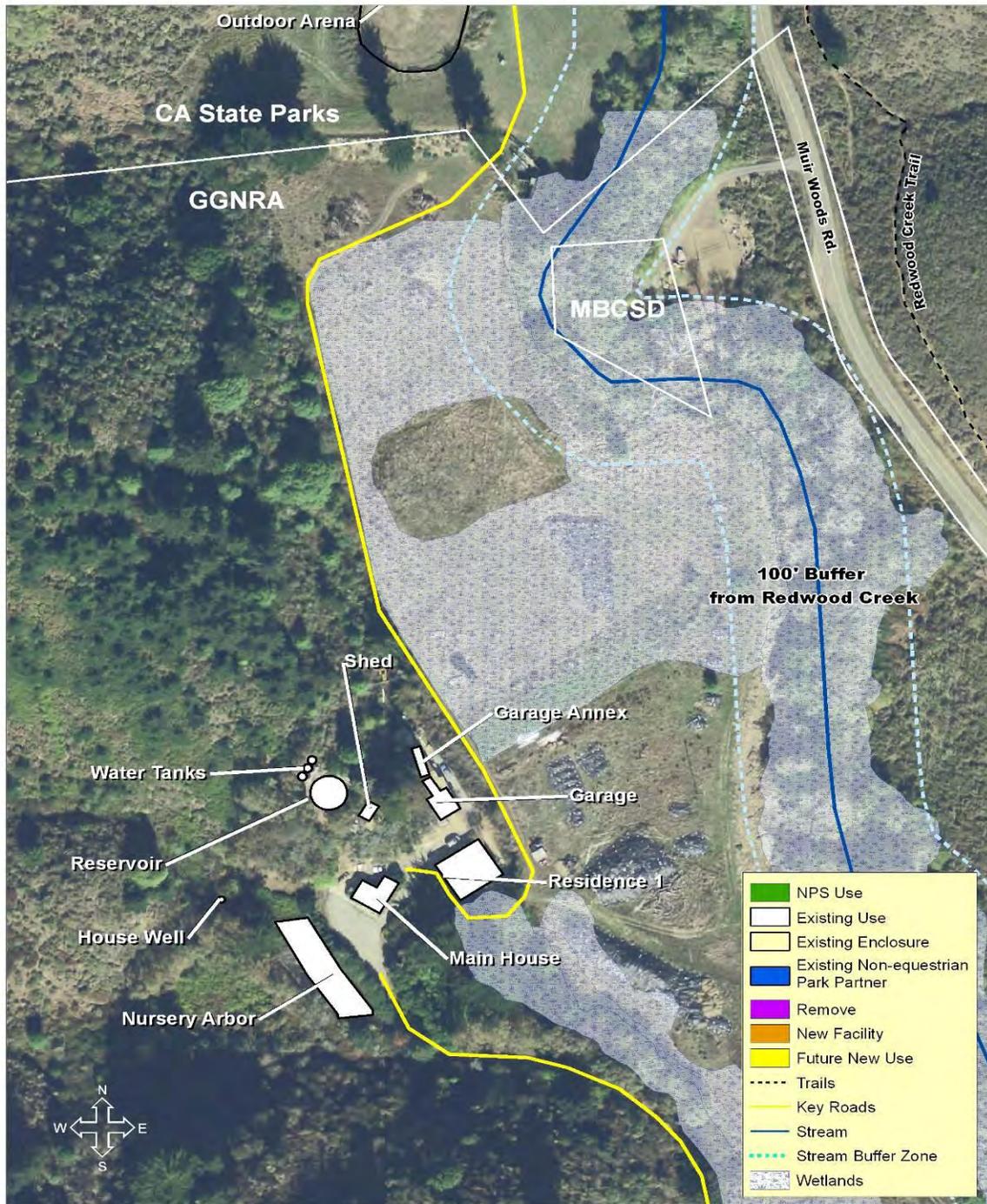


Figure 2-5 Alternative A - Existing Facilities at Lower Redwood Creek Site

0 25 50 100 150 200  
Feet

# Marincello Trail Site Alternative A



Figure 2-6 Alternative A - Existing Facilities at Marincello Site

# Golden Gate Dairy Alternative B, Options B1 & B2

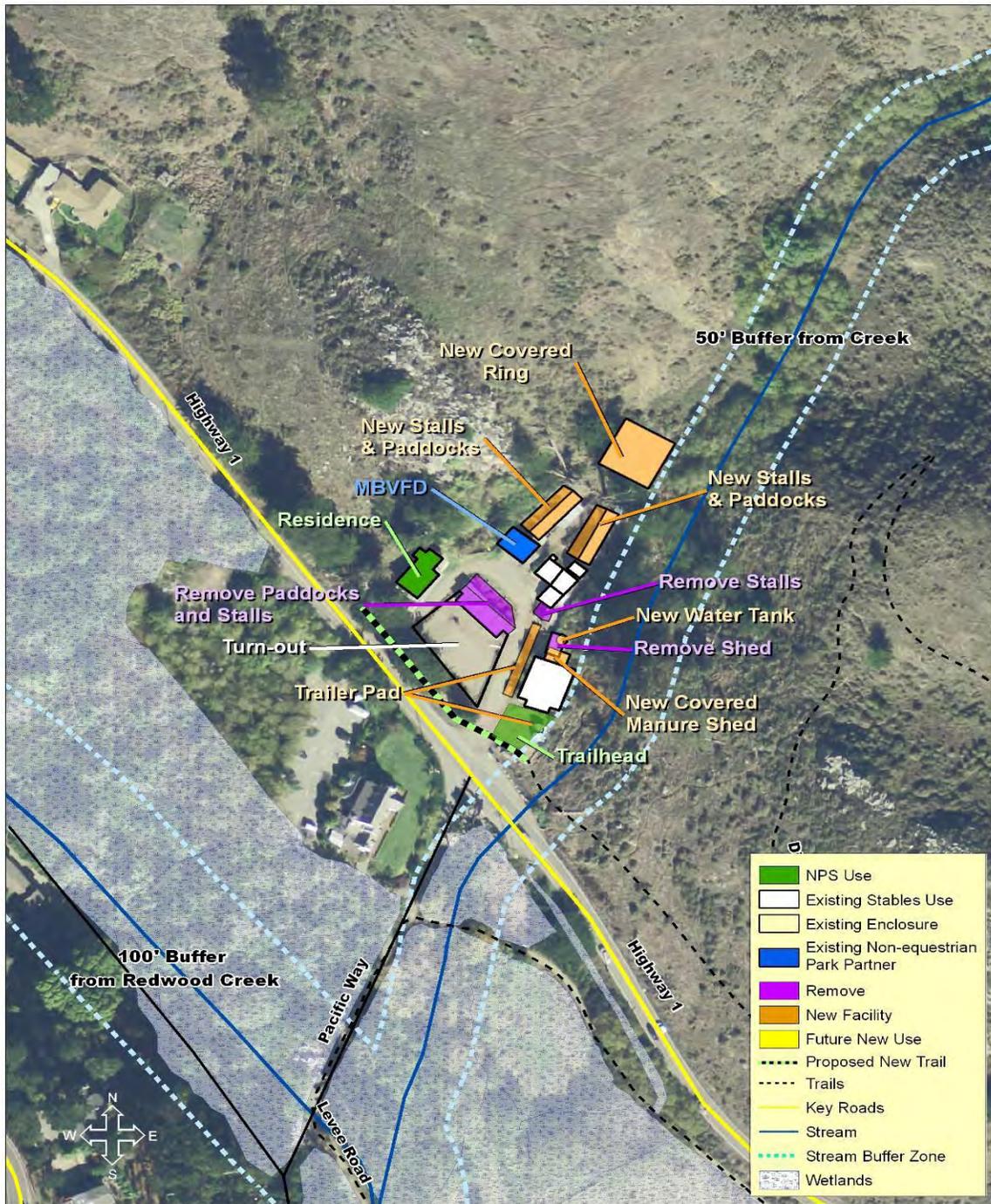
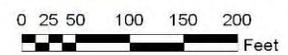


Figure 2-7 Alternative B - (Option B1) and (Option B2, Preferred) - Golden Gate Dairy



# Tennessee Valley Stables Alternative B, Option B1

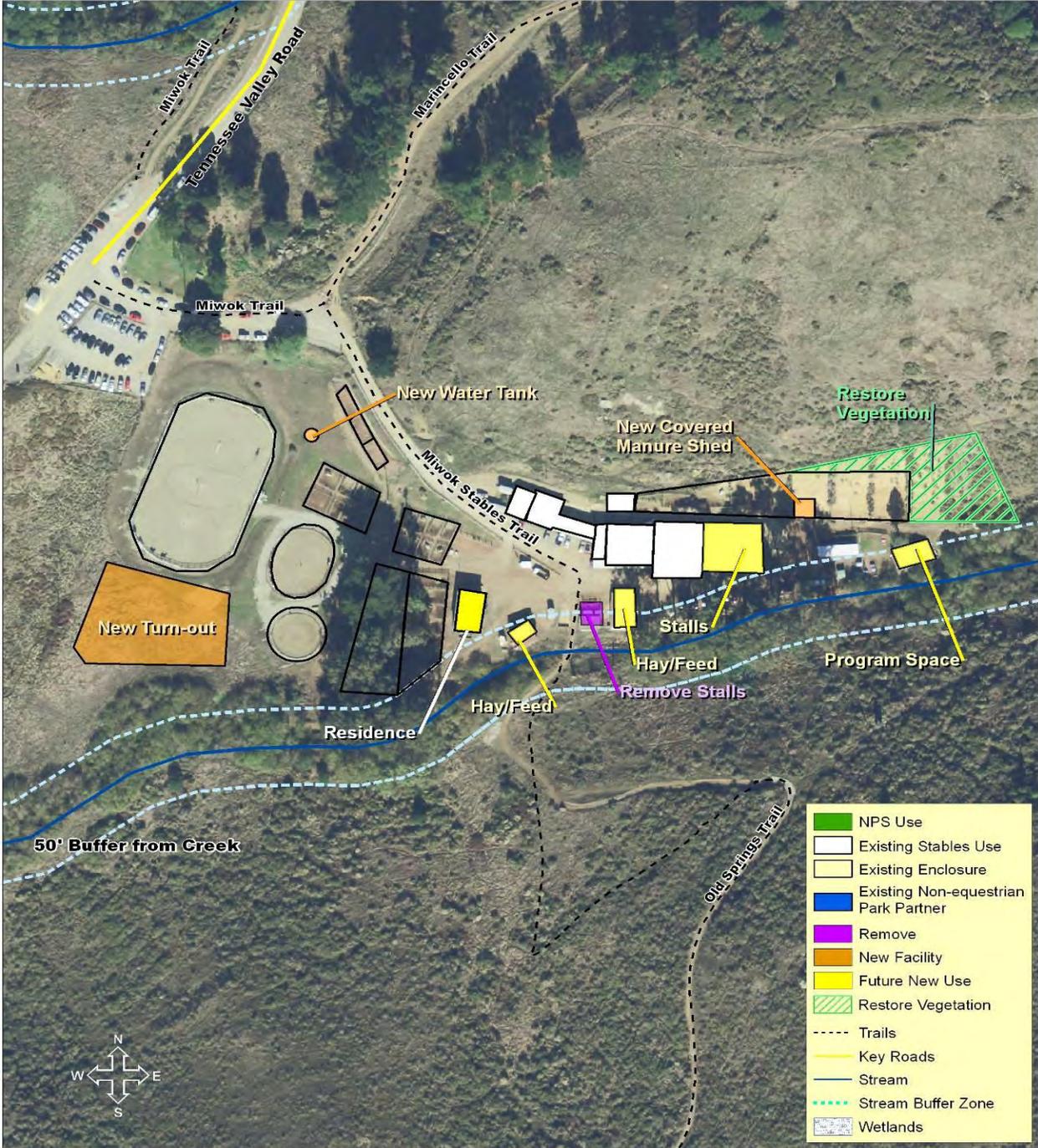
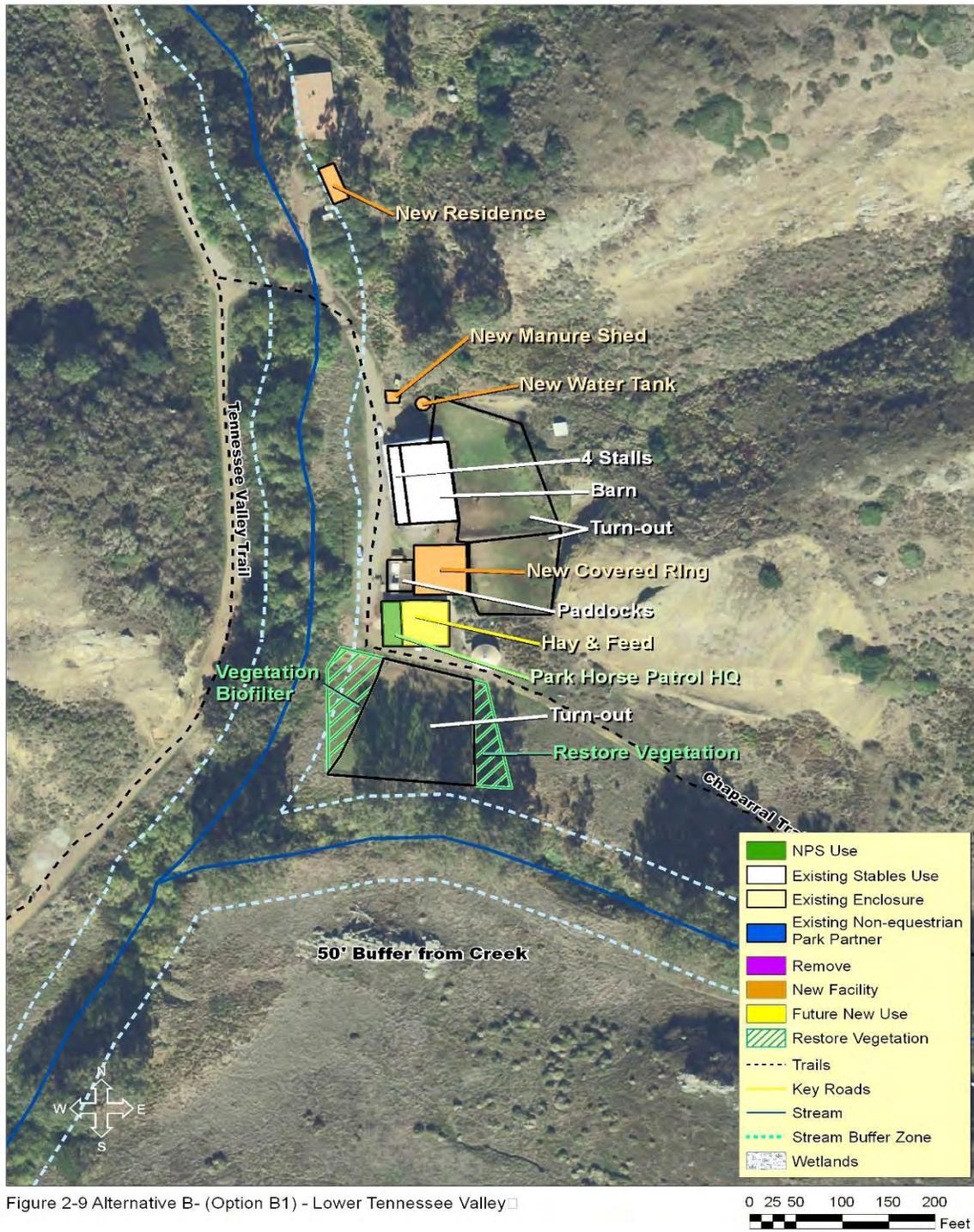


Figure 2-8 Alternative B - (Option B1) - Tennessee Valley □

# Lower Tennessee Valley Alternative B, Option B1



# Rodeo Valley Stables Alternative B, Option B1

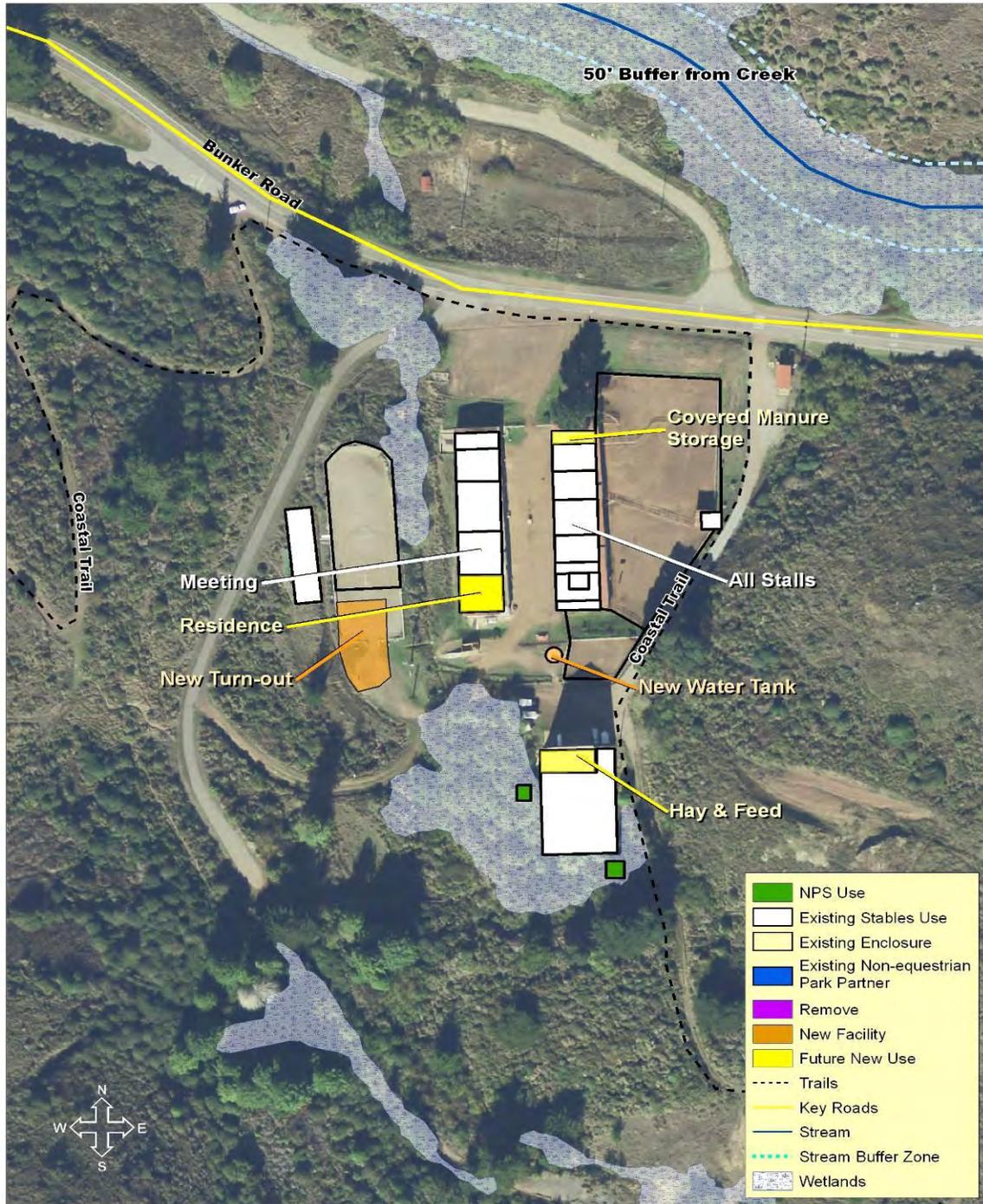


Figure 2-10 Alternative B - (Option B1) - Rodeo Valley

# Tennessee Valley Stables Alternative B, Option B2

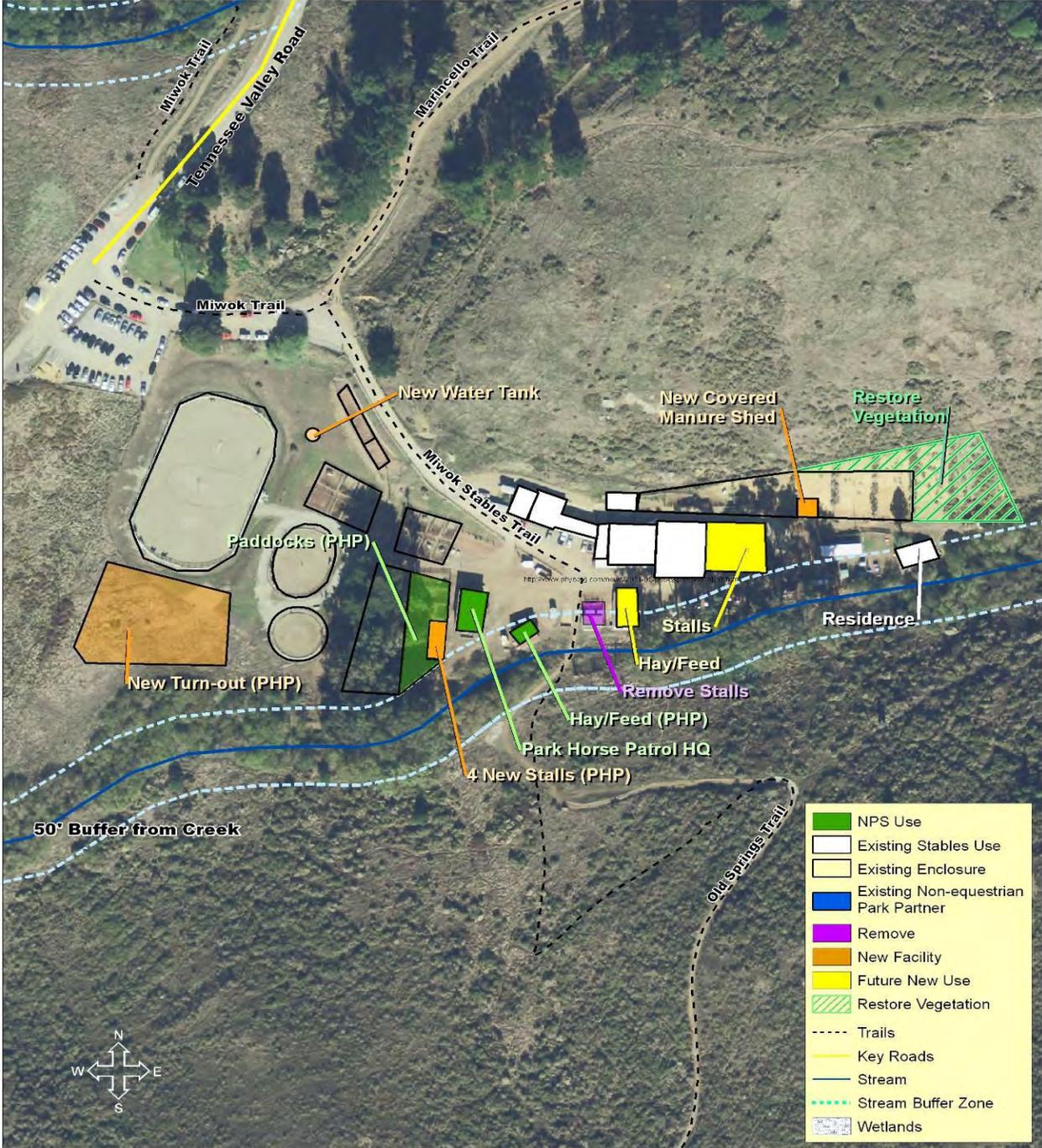
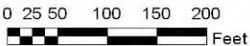


Figure 2-11 Alternative B - (Option B2) - Tennessee Valley (Preferred)



# Lower Tennessee Valley Alternatives B, Option B2, C and D

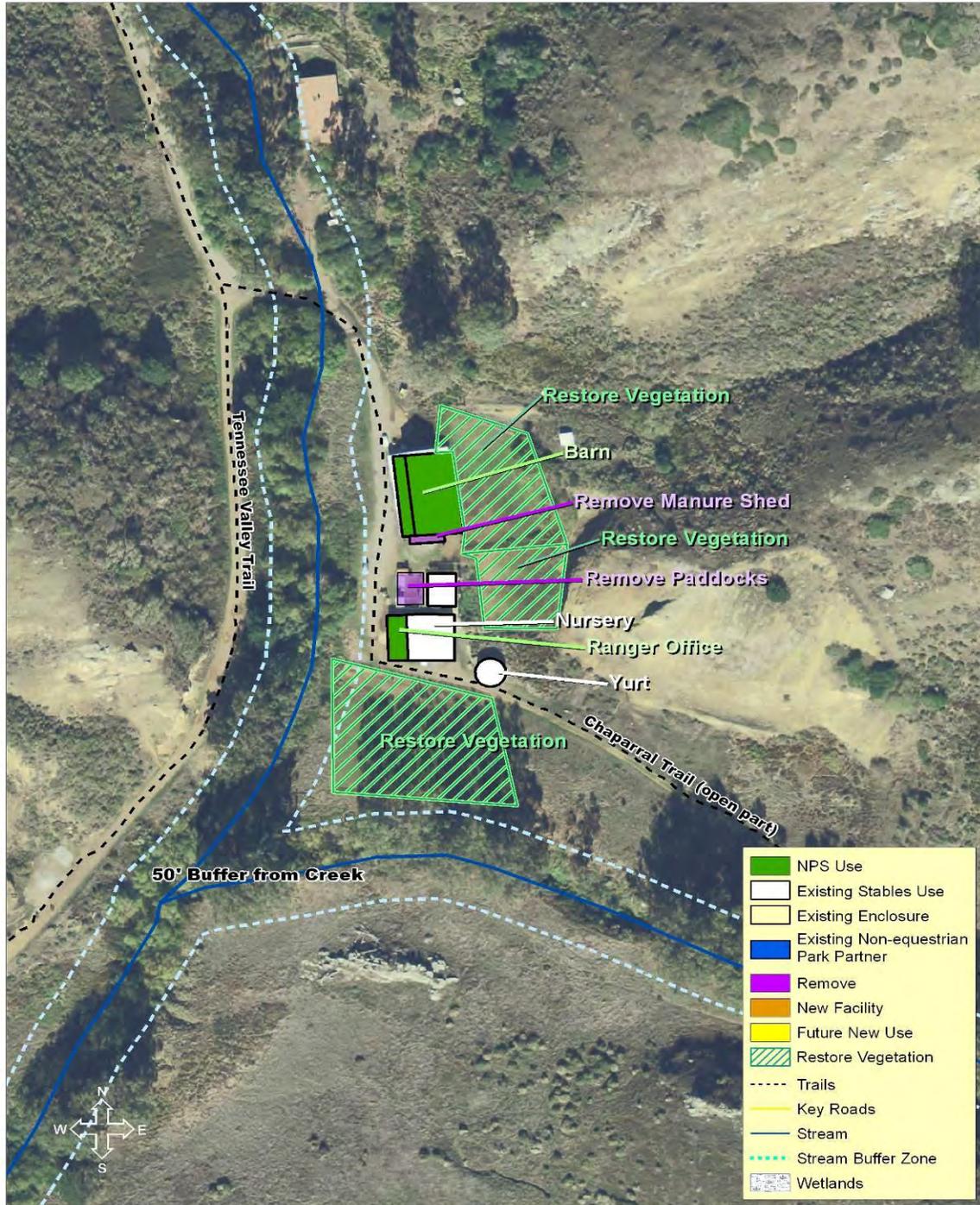


Figure 2-12 Alternative B - (Option B2) - Lower Tennessee Valley (Preferred), Alternative C, and Alternative D

# Rodeo Valley Stables Alternative B, Option B2

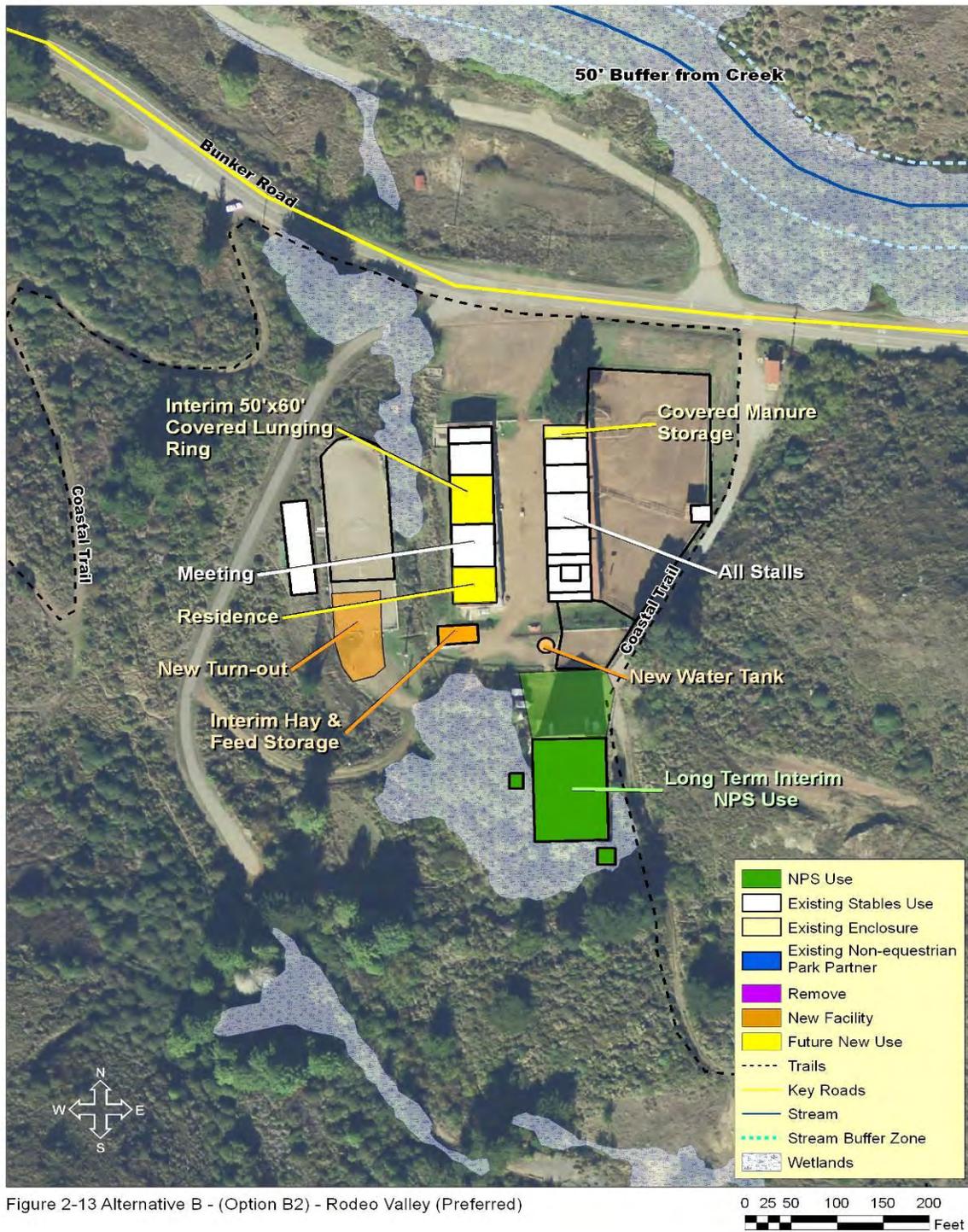


Figure 2-13 Alternative B - (Option B2) - Rodeo Valley (Preferred)

# Golden Gate Dairy Alternative C

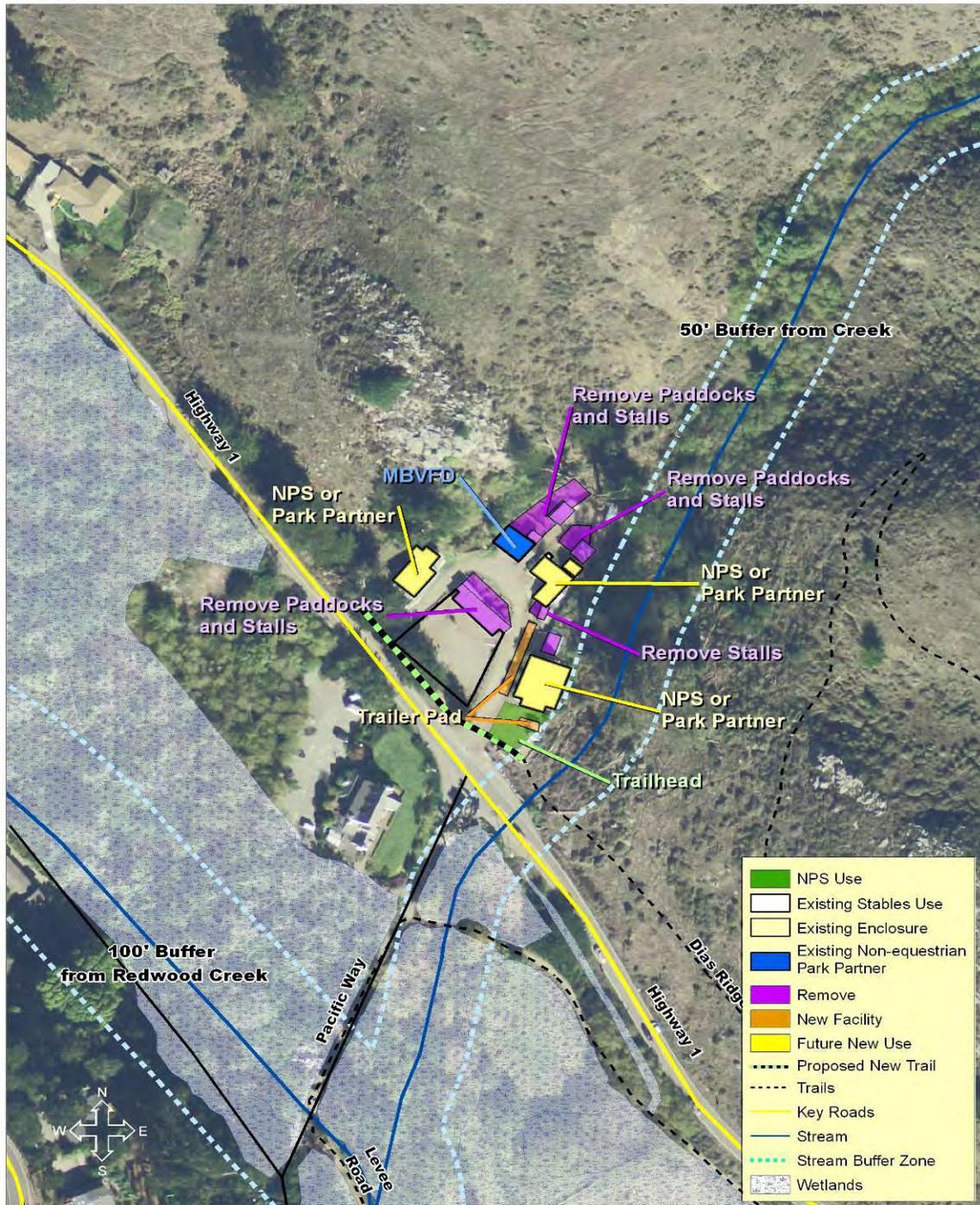


Figure 2-14 Alternative C - Golden Gate Dairy

# Tennessee Valley Stables Alternative C

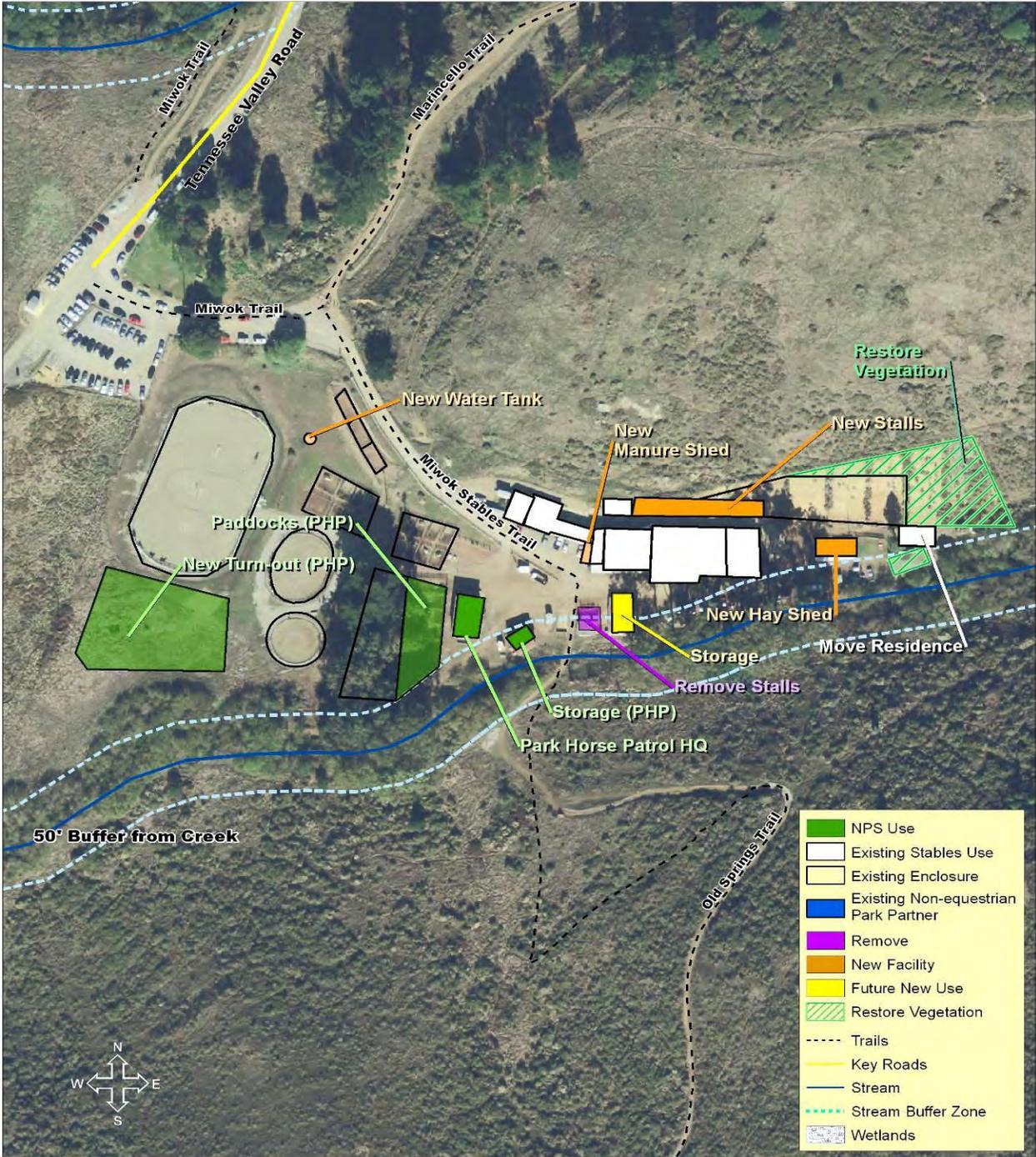


Figure 2-15 Alternative C - Tennessee Valley

# Rodeo Valley Stables Alternative C

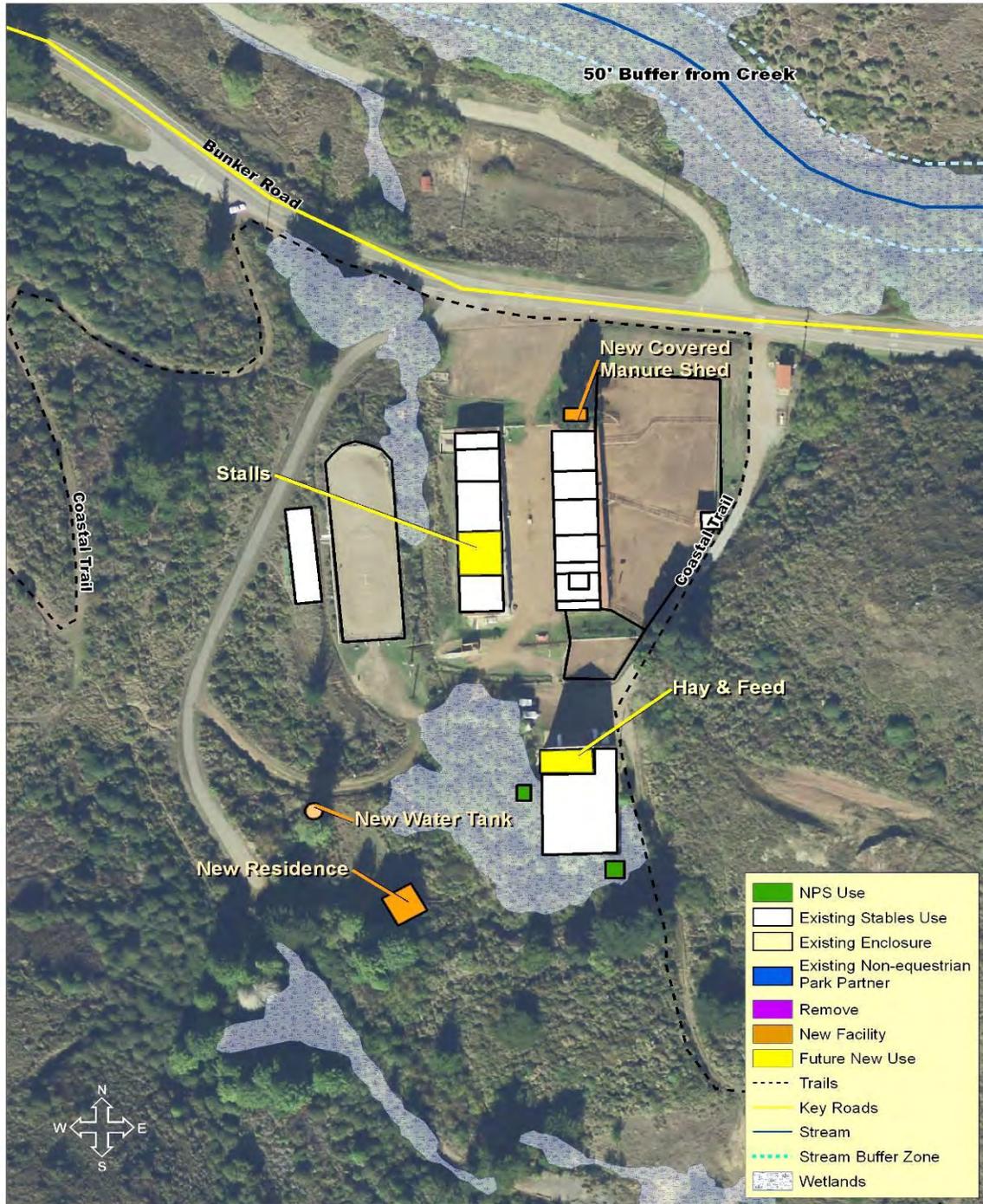


Figure 2-16 Alternative C - Rodeo Valley

# Golden Gate Dairy Alternative D

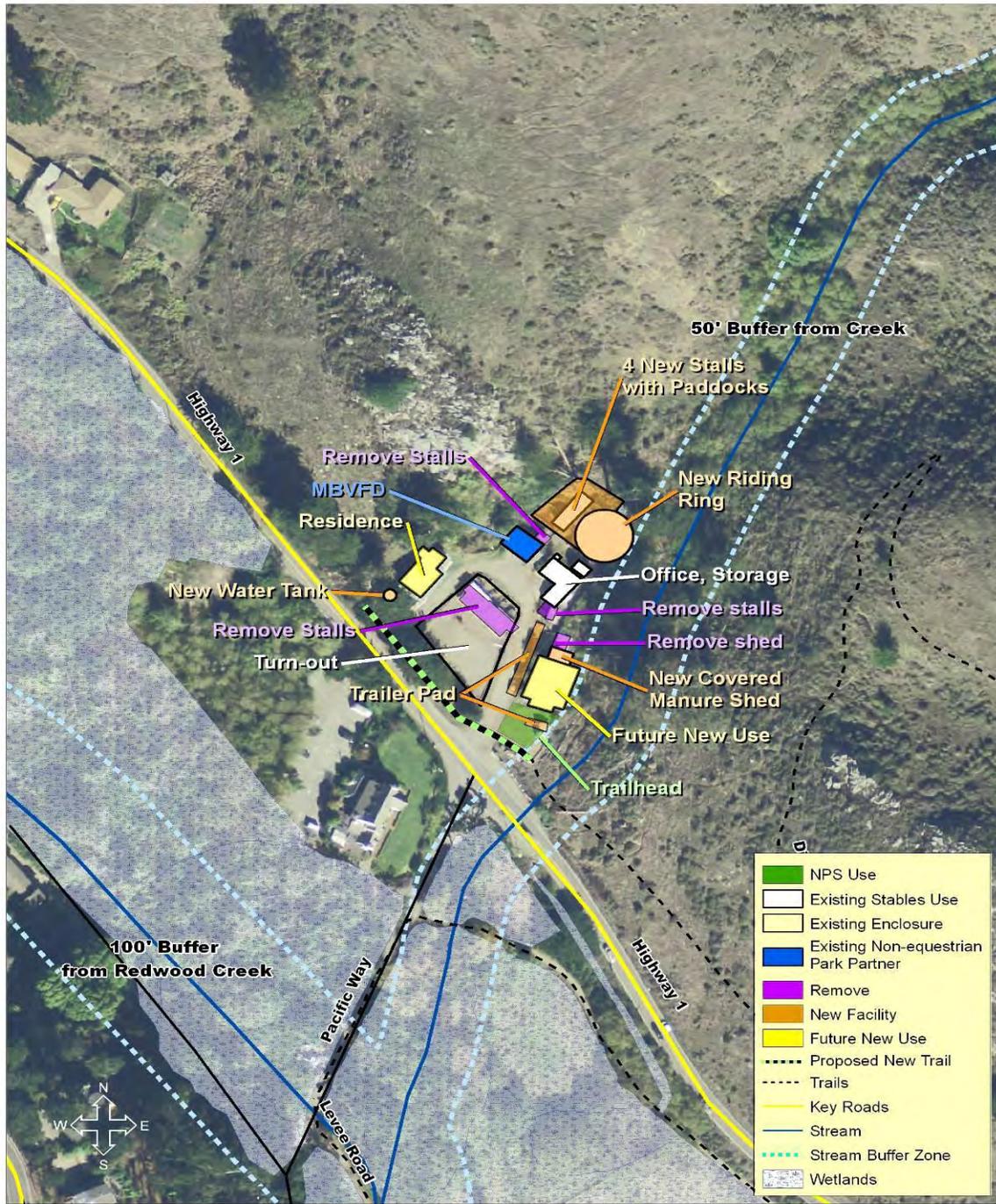
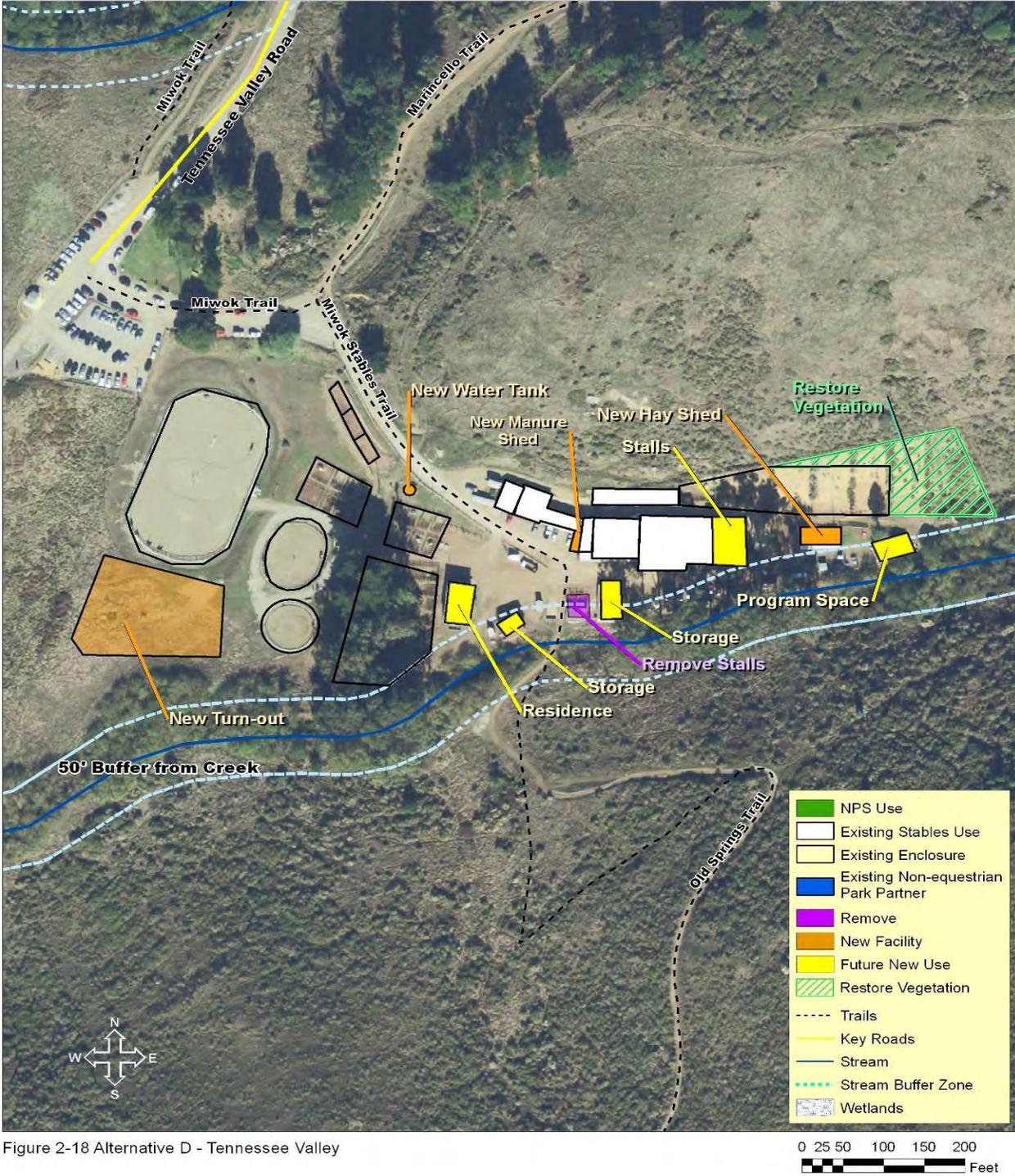


Figure 2-17 Alternative D - Golden Gate Dairy

# Tennessee Valley Stables Alternative D



# Rodeo Valley Stables Alternative D

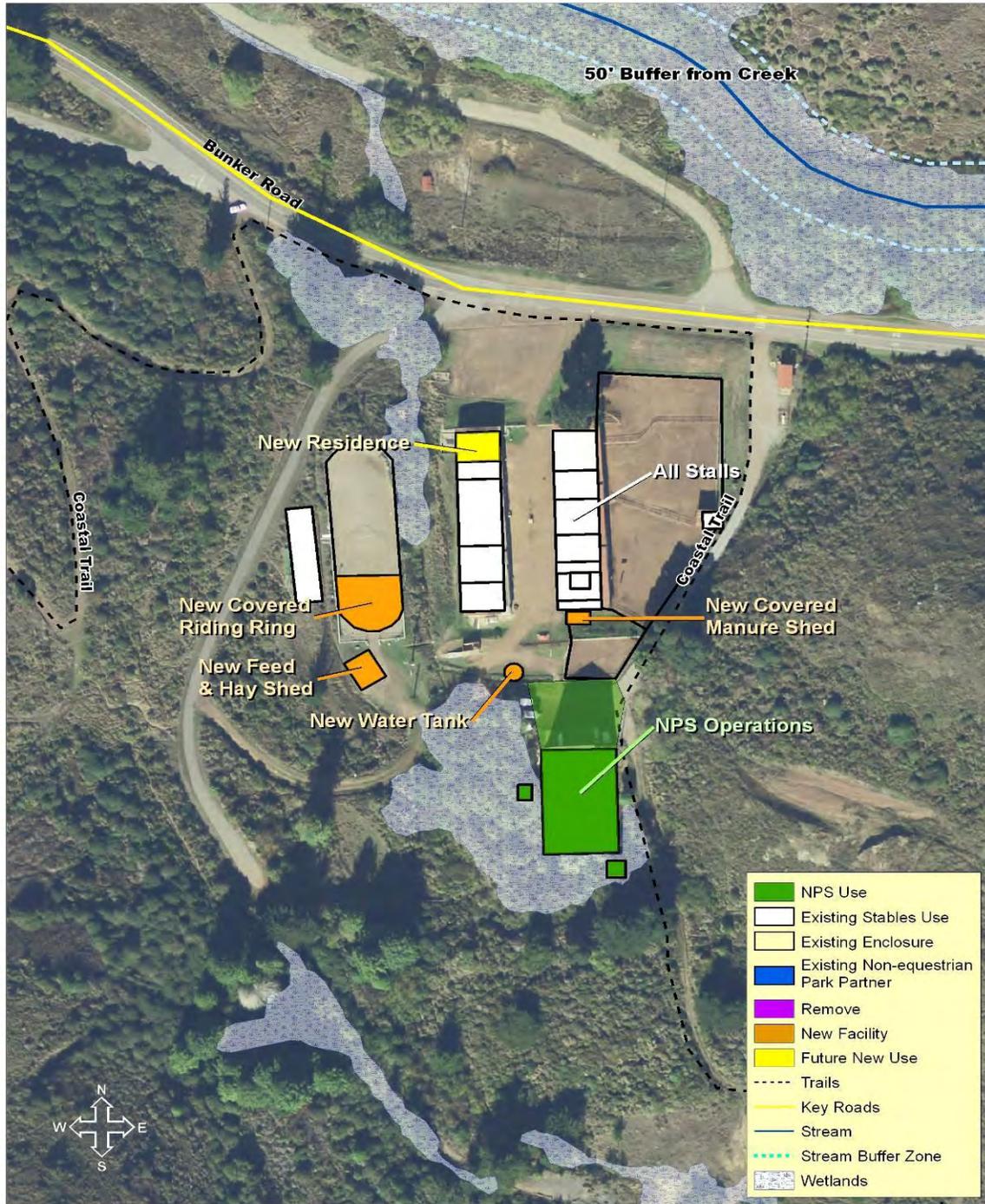


Figure 2-19 Alternative D - Rodeo Valley

# Lower Redwood Creek Alternative D

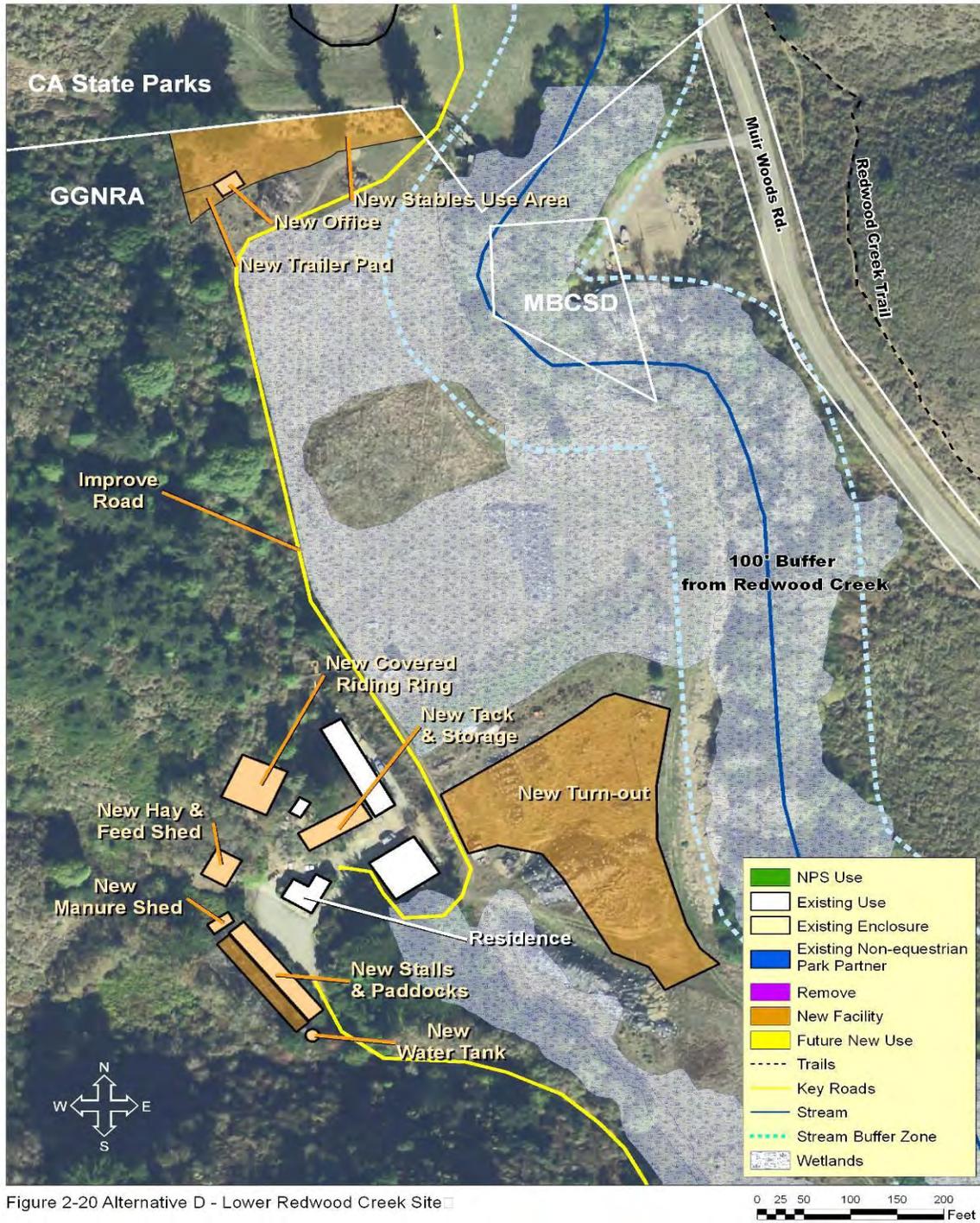


Figure 2-20 Alternative D - Lower Redwood Creek Site

# Marincello Trail Site Alternative D

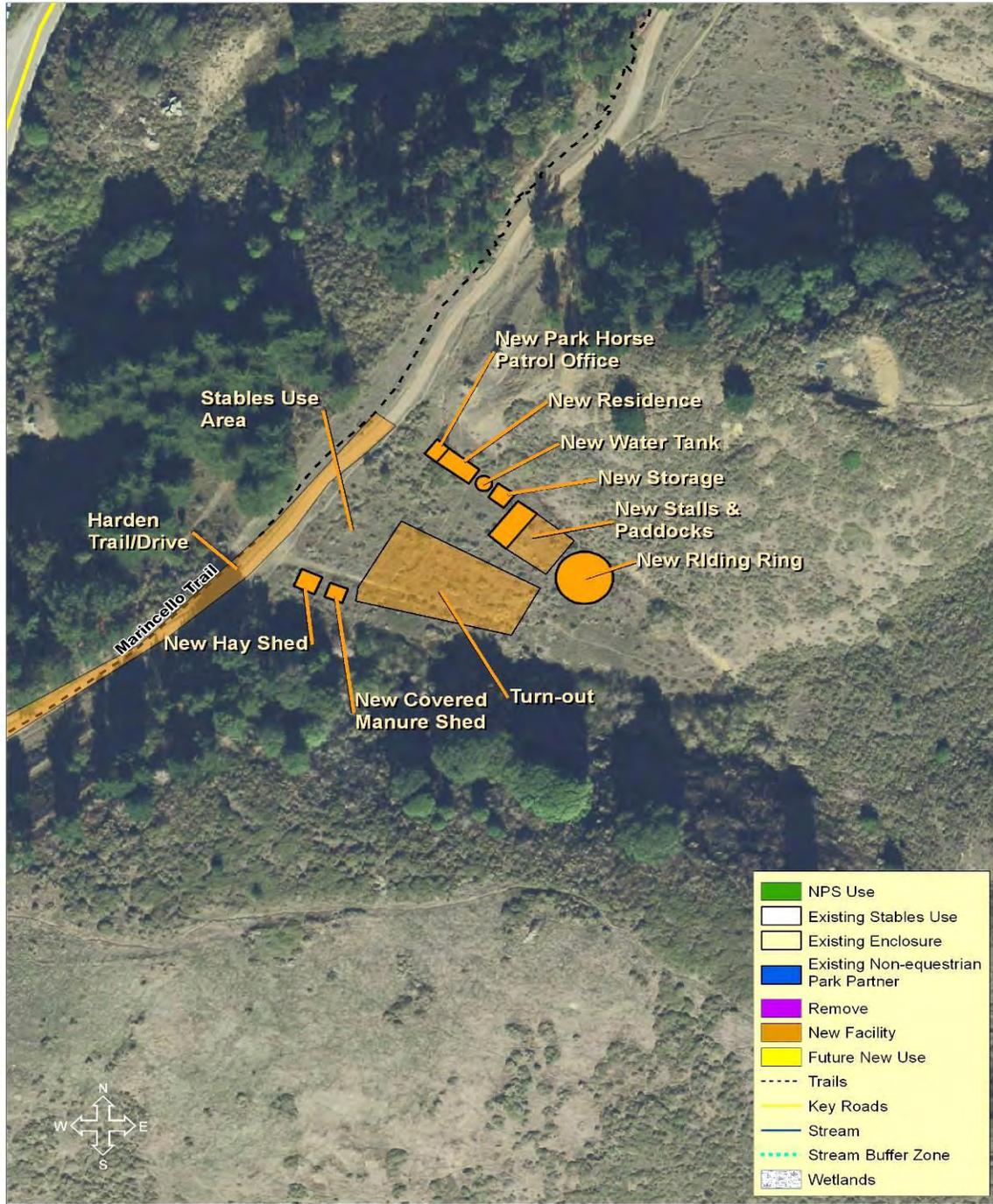


Figure 2-21 Alternative D - Marincello Site

## CHAPTER 3. AFFECTED ENVIRONMENT

The Marin Equestrian Stables Plan project area incorporates the lands which are permitted by the NPS for equestrian stables operations, the immediate vicinity surrounding the existing stables, and the area proposed for stables development at Marincello and Lower Redwood Creek. The project area supports diverse habitats including federal and state-listed species, unique historical resources and a variety of visitor experiences and activities. This chapter describes the existing environment in the project area and the resources under consideration as part of this analysis.

### 3.1 *Geology and Soils*

#### 3.1.1 Geology

The study area for geologic resources includes the project footprint at the four existing equestrian stables and proposed site locations at Marincello and Lower Redwood Creek. Where relevant, descriptions of the larger area are provided as background.

The existing and proposed equestrian sites are located within the Coast Ranges geologic province of California, part of a block of folded and faulted marine sedimentary and volcanic rocks. The region consists primarily of Mesozoic (248 to 65 million years ago [mya]) metamorphic and sedimentary rocks of the Great Valley complex, thrust upward when Cretaceous (145-65 mya) marine rock of the Franciscan complex was subducted underneath, deforming the rocks into the landscape present today. The Great Valley Complex is composed mostly of conglomerate, sandstone and shale, while the Franciscan Complex consists of metamorphosed sandstone, shale, limestone, chert, greenstone, serpentine, greywacke and various other metamorphic rocks (Marin County CDA 2005).

In Pleistocene times (1.8 mya to 10,000 years ago) sea water levels rose during interglacial periods and the resulting encroachment of water in and around San Francisco Bay deposited **thick layers of sediments known as "bay mud"**. Conversely, during glacial stages of the Pleistocene the local sea level dropped as much as 350 feet, causing significant incising of stream channels and valley headcutting as water retreated from the continent and toward the Pacific Ocean (Marin County CDA 2005).

In general, rocks at the surface within the Coast Range are Holocene-aged (10,000 years ago to present) sediments that are typically loose debris susceptible to seismic shaking, landsliding and liquefaction; these include bay mud, dune sand, marine and marsh deposits, landslide deposits, alluvium and colluvium. The older Pleistocene deposits consist of volcanic gravel, older beach deposits, and older alluvial/colluvial and marine terrace deposits that also have a potential for liquefaction and landsliding, especially when associated with seismic events (Marin County CDA 2005).

Geologic materials at the stable sites are primarily Quaternary (2.5 mya to present) sand dunes, alluvium (water-transported materials) and other deposits underlain by the Franciscan Complex, which consist mostly of metamorphosed Mesozoic (248-65 mya) sedimentary and igneous rock as described above (NPS 2007). There are also interspersed areas of colluvium, or slope failure deposits, which are discussed further in this section.

**Seismicity.** Seismic activity is a significant factor in the geology of the region. The San Andreas Fault Zone (SAFZ) is located offshore near the existing and proposed sites and forms the boundary between the northwestward-moving Pacific plate and the southeastward-moving North American plate. Many of the mountains and valleys in the area exhibit this NW-SE trend as the two plates slide past one another; studies in the western portion of the Point Reyes Peninsula located northwest of the equestrian sites have shown that rocks have been displaced approximately 94 miles over the past 11-12 million years (Marin County CDA 2005). In addition, a number of other active faults (defined by Alquist-Priolo as having ruptured during Holocene times) associated with the SAFZ also dissect the region; these include the Hayward-Rodgers Creek, Calaveras, San Gregorio, Concord-Green Valley, Greenville and Mount Diablo faults. All of Marin County is classified as within an Alquist-Priolo Earthquake Fault Zone (California Geological Society 2010) indicating that there is a significant likelihood of future earthquake activity. It is probable that the equestrian sites will be affected by such events, either directly through ground shaking or indirectly through landsliding, liquefaction or other geologic hazards. The numerous active faults associated with the SAFZ pose a significant threat to lives and property in the event of an earthquake and resulting potential for landslides and liquefaction (Marin County 1994).

Earthquakes can result in significant damage to man-made structures. The strength of an earthquake is generally measured two different ways. One method is based on actual energy released, or magnitude, for which the Richter scale is commonly used. The second method is an arbitrary measure based on observed damage resulting from a quake, or intensity, for which the Modified Mercalli scale (ranging from I-XII) is used to classify the quake. Historic records indicate that there have been several large earthquakes along numerous faults that have caused significant damage in the vicinity of proposed equestrian sites; these are outlined in **Table 3-1** below.

<b>Year:</b>	<b>Fault:</b>	<b>Richter Magnitude:</b>	<b>Mercalli Intensity:</b>
1836	San Andreas, Calaveras or Sargent	6.3	VII
1838	San Andreas	7.5	X
1852	San Andreas	unknown	VIII
1858	Hayward	unknown	VIII
1861	Calaveras	7+	VIII
1865	San Andreas	7+	VIII-IX
1868	Hayward	6.7	IX-X
1906	San Andreas	8.3	XI
1911	Hayward	6.6	VII-VIII
1954	San Andreas	5.2	VIII
1969	Healdsburg	5.7	VII-VIII
1989	San Andreas	7.1	IX-X

Source: Marin County CDA 2005.

Structural damage from large-scale earthquakes can be lessened by geotechnical evaluations on a site-specific basis to address the potential of seismic shaking, and compliance with all applicable design provisions of the International Building Code (IBC) will minimize the impact of this hazard (Marin County 2005). Additional hazards associated with seismic shaking (such as landslides and liquefaction) are outlined in the soils discussion of this document.

**Paleontological Resources.** Paleontological resources include fossil plants and animals as well as other evidence of past life, such as preserved animal tracks and burrows. Some sedimentary geologic strata in the region are known to contain fossils. According to a 2007 NPS study of paleontological resources for the Golden Gate National Recreation Area, three marine rock terrains of the Franciscan Complex have the potential to contain fossils: inter-bedded chert deposits, limestone from preserved seamounts and continental margin turbidities deposits of sandstone, conglomerate and shale (NPS 2007). However, a records search of the Berkeley Natural History Museum (BNHM) Paleontological Database did not identify any site-specific recorded fossil localities in or near the proposed equestrian sites (BNHM 2010). While the BNHM search does not negate the presence of paleontological resources in the proposed project sites, it does indicate that fossils of significance are unlikely to be present given the local geologic conditions and the lack of other noteworthy finds in the area.

**Mineral Resources.** California's Surface Mining and Reclamation Act of 1975 (SMARA) established policy regarding the conservation and development of mineral lands in California. The goal of the SMARA Act is to ensure that lands with the potential of mineral resource extraction are considered in the land use planning process. The California State Geologist classifies lands into Mineral Resource Zones (MRZ), the purpose being to delineate areas containing significant mineral resources as evaluated by the uniqueness or rarity of the mineral and the commodity type (metallic, industrial, or construction). While there are eight MRZs in Marin County, none are located in the vicinity of the existing or proposed equestrian facilities.

### 3.1.2 Soils

Soils in the low-lying areas of each site are classified by the Natural Resources Conservation Service (NRCS) as parts of the Blucher-Cole Complex and Rodeo Clay Loam, Humaquepts seeped and Xerothents fill soils. These are typically low-gradient (between 0 and 15%) soils developed on alluvial fans and valley bottoms. These are generally composed of poorly drained silt and clay loams and are derived from weathered sandstone, shale and granite. The Blucher-Cole, Humaquepts and Xerothents are all hydric, meaning that they meet the broad requirements of a wetland soil.

Soils in the drier and steeper areas are classified as part of the Cronkhite-Barnabe Complex and the Tamalpais-Barnabe variant very gravelly loams. These are found in the hillier uplands on slopes ranging between 30 and 50%. They are composed of a well-drained loamy mixture of weathered sandstone, shale and/or chert for approximately the top four feet of the soil profile until bedrock is encountered.

Erosion of hillside soils is problematic in the area, and several trails, roadways, and parking areas show signs of soil erosion. The following is a discussion of specific soil types and descriptions for each of the equestrian sites, as well as information regarding erosion potential, liquefaction potential, slope failure and expansive soils.

#### **Lower Redwood Creek and Golden Gate Dairy sites**

The existing Golden Gate Dairy facility and proposed Lower Redwood Creek sites are located approximately 0.6 miles from each other, both situated on Redwood Creek. Each one consists of an area of relatively flat lowlands associated with the creek and its tributaries, bounded by steeper topography above. Soil types as classified by the NRCS are the same for each site and thus will be combined in the discussion that follows.

The lower-elevation, riparian soils are classified as part of the Blucher-Cole Complex, 2-5% slopes. Soils of this type are commonly found on alluvial fans and basin/valley bottomlands. Parent materials are typically alluvium (e.g., earth materials that have been transported and deposited by water) derived from sandstone, granite and shale. These soils are comprised of silt and clay loams that are somewhat poorly drained.

The T-factor is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without adversely affecting conditions necessary for sustaining vegetation (NRCS 2010). T-factor ratings range from one to five, with one considered an unsustainable amount of loss and five being relatively stable. The Blucher-Cole complex soils are classified by **the NRCS as a "5", indicating a relatively low susceptibility of damage by erosional forces.** These soils are also classified as hydric, defined as forming under conditions of saturation or ponding long enough during the growing season that anaerobic conditions exist in the upper parts and one of the primary indicators of a wetland (NRCS 2007). Hydric soils do not necessarily confirm the presence of a wetland environment; other conditions, such as hydrology and hydrophilic (**"water-loving") vegetation are also necessary for accurate wetland delineation. Determination** of wetland conditions requires an on-site analysis.

The soils that exist in the hilly steeper terrain above the riparian area are part of the Cronkhite-Barnabe Complex, 30-50% slopes. The Cronkhite soils in the complex are a loamy mixture of weathered sandstone, shale and/or chert for approximately the top four feet of the soil profile until bedrock is encountered. They are moderately well drained and have a relatively high T-factor rating of **"4"**.

The Barnabe soils in the complex are shallower, with very gravelly loams encountered from the surface to roughly 16 inches deep until bedrock is encountered. Unlike the Cronkhite soils, the Barnabe soils are particularly susceptible to unsustainable losses by erosional processes, exhibiting a T-factor rating of **"1", the lowest possible ranking. Given the steeper topography** and drainage capacity, neither of the soils in the Cronkhite-Barnabe complex is considered hydric (NRCS 2007).

#### **Tennessee Valley and Marincello Sites**

The existing Tennessee Valley facility and proposed Marincello sites are located approximately 750 feet from each other, both located near the intersection of Tennessee Valley Road and Marincello Trail. The Tennessee Valley stables consists of an area of relatively flat or gently sloping valley topography associated with the Tennessee Valley bottom, bounded by hillier terrain and steeper topography above. The Marincello site is located on fill that was deposited in a small valley when Marincello Road was constructed in the late 1960s.

Soils near the valley bottom are classified as Rodeo Clay Loam, 2-15% slopes. These soils are derived from igneous, sedimentary and metamorphic rocks and are typically associated with interior valleys and basin floors. They are classified as poorly drained and meet the USDA-NRCS definitions of a hydric soil (as described with the Blucher-Cole complex above). Soils consist of a clay loam mixture from the surface to about 20 inches below, underlain by thick layers of clay. These conditions create a high potential for runoff from significant precipitation or other erosional events; however, these soils also exhibit a T-factor rating of **"5", indicating a relatively low susceptibility of damage by erosional forces (NRCS 2007).**

Also, in the upland areas surrounding the site, soils are classified as the Cronkhite-Barnabe Complex, 30-50% slopes (NRCS 2007). A description of these soils can be found in the previously discussed Lower Redwood Creek and Golden Gate Dairy sites.

### **Lower Tennessee Valley**

The existing Lower Tennessee Valley stables are situated on an area of relatively flat and gently sloping valley topography associated with the Tennessee Valley bottom, bounded by hillier terrain and steeper topography above.

The soils in the hillier areas surrounding the Lower Tennessee Valley site are classified as part of the Tamalpais-Barnabe Variant Very Gravelly Loams, 30-50% slopes. They are derived from residuum of highly weathered sandstone and chert, are well-drained and have relatively low to very low T-factors ("2" for the Tamalpais and "1" for the Barnabe variant) indicating that very low amounts of topsoil erosion are sustainable before adverse effects are present.

Soils near the valley bottom are classified as Rodeo Clay Loam, 2-15% slopes (NRCS 2007). A description of these soils can be found in the previously discussed Tennessee Valley and Marincello sites.

### **Rodeo Valley Stables**

The existing Rodeo Valley Stables are situated on an area of relatively flat/gently sloping topography bounded by hillier and steeper terrain above, approximately one mile north of Bonita Cove on the Pacific Ocean.

The soils that exist in the upland areas that surround the site are classified as the Cronkhite-Barnabe Complex, 30-50% slopes (NRCS 2007). A description of these soils can be found in the previously discussed Lower Redwood Creek and Golden Gate Dairy sites.

Also, in the upland areas surrounding the site, soils are classified as the Tamalpais-Barnabe Variant Very Gravelly Loams, 30-50% slopes (NRCS 2007). A description of these soils can be found in the Lower Tennessee Valley section of this document above.

In the valley bottom near the road on the north side of the stables, soils are classified by the NRCS as Humaquepts, seeped. These are found on very low-gradient (0 to 5%) stream valleys and drainages and are composed of weathered alluvial deposits from igneous, sedimentary and metamorphic rock. They are poorly drained soils and have high potential for runoff.

Other soils in the riparian zone are classified as Xerothents, fill. These are similar to the Humaquepts in gradient and earth materials; however, these are soils that have been disturbed by human activities such as construction of road beds or other graded areas. The Xerothents soils found in the vicinity of the Rodeo Valley Stables are located adjacent to the Humaquepts in the graded area along the road. These are not classified by the NRCS in terms of sustainable erosion rates (NRCS 2007).

Neither the Humaquepts nor the Xerothents soils are classified by the NRCS as hydric (defined as forming under conditions of saturation or ponding long enough during the growing season that anaerobic conditions exist in the upper parts and one of the primary indicators of a wetland). However, these do meet hydric criteria by the State of California based on the water table at or near the surface during the growing season as a function of poor soil drainage (NRCS 2007). These conditions do not imply the presence of wetlands; rather, only that the soil conditions necessary for wetlands are present. A determination of whether or not this area meets wetland requirements would also require analysis of the vegetation and hydrologic conditions present.

The discussion that follows outlines some of the potential associated with soil hazards and erosion for the proposed equestrian sites.

**Mass wasting.** One of the most common outcomes of earthquakes or heavy precipitation events is mass wasting, or slope failure. Mass wasting is generally defined as any process which causes a large volume of earth materials to move downslope under the influence of gravity (Van de Grift 2009). These are commonly referred to as landslides; however, they can take on various other forms defined by the fluidity, movement and type of earth materials. There are many contributing variables to mass wasting; these are usually dependent on slope, soil type, bedrock, vegetation, precipitation, proximity to erosive action, freeze/thaw cycles and human activities. Common triggers include, but are not limited to, ground shaking, erosive processes undercutting a slope, addition of weight to the top of a slide-prone area or heavy precipitation events. While most mass wasting events occur on slopes greater than about 15%, it can occur on almost any non-horizontal ground surface. Mass wasting often occurs on slopes that have been cut or filled in excess of their normal angle of repose.

Landslides, especially debris flows and debris avalanches are widespread and common throughout Marin County during times of heavy rainfall (Marin County CDA 2005). These are especially prevalent on steep slopes (greater than 27.5%), granular soil materials, shallow soils with bedrock contacts and/or changes on soil permeability and those closely associated with drainages. According to a 1997 study of the general distribution of slides and flows for Marin County, the six equestrian sites vary in terms of historical landslide locations. In general, the Rodeo Valley Stables, Upper/Lower Tennessee Valley and Marincello sites appear to be in an area of relatively low past slope failure areas, while the Golden Gate Dairy and Lower Redwood Creek appear to be located in an area of higher historic landslides regionally (USGS OF 97-745C).

Slope failure can be a significant geologic hazard due to the existing geologic conditions found in the vicinity of the equestrian sites. A detailed geotechnical analysis detailing conditions at each of the equestrian sites would be required to determine the potential of a mass wasting event influencing the area and for analysis of potential hazards associated with such an event.

**Liquefaction.** Earthquakes can also induce liquefaction, or the transformation of solid soil materials to those exhibiting fluid-like characteristics. Liquefaction primarily occurs in fine textured soils and its effects are most commonly observed in low-lying areas near water bodies. Upland soils that have large percentages of silt and substantial moisture, but are not saturated, can also liquefy. In general, the bay mud, dune sand, marine/marsh deposits, alluvium and colluvium found in the region are susceptible to liquefaction (Marin County 2005) which can result in landslides, broken utility lines, loss of soil bearing strength, ground fissures and building collapse.

**A soil's plasticity index (PI) is defined as the numerical difference between the liquid limit and plastic limit of the soil, typically expressed as a percentage, and for the scope of this Plan can be used to infer the liquefaction potential of an area.** Soils that have a high PI value have a wide range of moisture content in which the soil performs as a plastic material. In general, an increase in PI decreases the soil's liquefaction potential, and soils with PI values of greater than 15 percent seem to be non-liquefiable.

Most soils in the proposed project area have variably low to moderate PI levels, indicating that there exists potential in some soil units for liquefaction in an earthquake. The Blucher-Cole complex soils range between 10 and 25% based on soil texture and depth, with higher PI levels near the surface and lower levels as the soils are deeper; these are not as likely to liquefy. The

same is true with the Cronkite soils. However, the Barnabe soils found within the Cronkite-Barnabe complex are highly liquefiable, with PI values ranging from only five to ten percent. The Humaquepts soils have a relatively low potential for liquefaction, ranging from 13-34% based on soil depth. The remaining soils (Tamalpais-Barnabe variant and Xerothents) are not rated (NRCS 2007).

A precise geotechnical analysis would be required to identify the presence or absence of soil conditions conducive to liquefaction at each of the existing and proposed sites.

**Expansive Soils.** Some soils that are high in clay content increase in volume when wet and contract when drying. This phenomenon is known as soil expansion and has potential for damaging structures and utilities, as well as affecting slope failure in some cases. Many of the soils in Marin County have moderate-to-high potential for expansion; typically the potential for soil expansion increases during the wet winter months and the soil contraction during the dryer seasons (Marin County 2005).

Most soils in the proposed project area are classified by the NRCS as having high susceptibility for expansion; in particular, the Rodeo Clay Loam and the Cole and Cronkite soils are extremely prone to shrinking and swelling (NRCS 2007). However, engineering practices can reduce or eliminate potential damage by expansive soils to roads and structures, etc.

**Soil Erosion.** Erosion of hillside soils is problematic in the project area. Soil erosion can occur regardless of topography, including both relatively flat areas and slopes. Typically, steep slopes and large exposed areas are most at risk of severe erosion problems. Soils in the project area are susceptible to varying degrees of erosion based on several factors: soil type, depth, texture, slope, land use, vegetation cover and organic matter content, in addition to human modification of the landscape, can all affect the potential for soil erosion. The ability of the soil to store moisture and surficial drainage/runoff are extremely important factors that influence how much erosion will occur. Many of the issues of soil erosion are also tied closely to the discussion of mass wasting.

As outlined above, the T-factor is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without adversely affecting conditions necessary for sustaining vegetation. These ratings are highly variable between soils at each of the sites; the Blucher, Cole, Cronkite, Humaquepts and Rodeo soils all exhibit a low probability of damage by erosional forces, while the Barnabe and Tamalpais soils have erosion rates that are extremely unsustainable. Many other factors, such as modifications by grading or construction, slope failure and other circumstances can alter the T-factor ratings. **Table 3-2** below lists the T-factor ratings for each of the soils types (including those as part of a complex).

<b>Table 3-2 Soil T-factor Ratings</b>	
<b>Soil</b>	<b>T-factor Rating</b>
Blucher	5
Cole	5
Rodeo	5
Humaquepts	5
Cronkite	4
Tamalpais	2
Barnabe	1
Barnabe variant	1
Xerothents	Not rated

Source: Natural Resources Conservation Service (NRCS), 2007.

**Tables 3-3** through **3-6** below list some of the limitations of potential project-related activities as they relate to soil erosion. Limiting feature values range from 0.01 to 1.00, with larger values indicating greater limitations.

<b>Table 3-3 Hazard of off-road or off-trail soil erosion</b>		
<b>Soil:</b>	<b>Rating class:</b>	<b>Limiting features/value:</b>
Blucher-Cole	Slight	None
Cronkhite-Barnabe	Severe	Slope, soil erodability (0.75)
Humaquepts	Slight	None
Rodeo	Slight	None
Tamalpais-Barnabe variant	Severe	Slope, soil erodability (0.75)
Xerothents	Not rated	Not rated

Source: Natural Resources Conservation Service (NRCS), 2007.

<b>Table 3-4 Hazard of erosion on roads and trails</b>		
<b>Soil:</b>	<b>Rating class:</b>	<b>Limiting features/value:</b>
Blucher-Cole	Moderate	Slope, soil erodability (0.50)
Cronkhite-Barnabe	Severe	Slope, soil erodability (0.95)
Humaquepts	Moderate	Slope, soil erodability (0.50)
Rodeo	Severe	Slope, soil erodability (0.95)
Tamalpais-Barnabe variant	Severe	Slope, soil erodability (0.95)
Xerothents	Not rated	Not rated

Source: Natural Resources Conservation Service (NRCS), 2007.

<b>Table 3-5 Path and trail construction</b>		
<b>Soil:</b>	<b>Rating class:</b>	<b>Limiting features/value:</b>
Blucher-Cole	Limitations	Saturation < 12" depth (1.00); Dusty (0.50)
Cronkhite-Barnabe	Limitations	Slopes > 25% (1.00); Dusty (0.50)
Humaquepts	Limitations	Saturation < 12" depth (1.00); Organic surface layer ≤ 4" (1.00)
Rodeo	Limitations	Saturation < 12" depth (1.00)
Tamalpais-Barnabe variant	Limitations	Slopes > 25% (1.00); Dusty (0.50)
Xerothents	No limitations	None

Source: Natural Resources Conservation Service (NRCS), 2007.

<b>Table 3-6 Shallow excavation/grading</b>		
<b>Soil:</b>	<b>Rating class:</b>	<b>Limiting features/value:</b>
Blucher-Cole	Limitations	Saturation < 2.5' depth (1.00); Flooding (0.50); Caving potential (0.10)
Cronkhite-Barnabe	Limitations	Slopes > 15% (1.00); Caving potential (0.10); Bedrock < 40" (Barnabe: 1.00)
Humaquepts	Limitations	Saturation < 2.5' depth (1.00); Caving potential (0.10)
Rodeo	Limitations	Saturation < 2.5' depth (1.00); Caving potential (0.10); Slopes 8-15% (0.04); Clay 40-60% (0.03)
Tamalpais-Barnabe variant	Limitations	Bedrock < 40" (1.00); Slopes > 15% (1.00); Caving potential (Tamalpais = 1.00, Barnabe variant = 0.1)
Xerothents	No limitations	Caving potential (0.10)

Source: Natural Resources Conservation Service (NRCS), 2007.

## 3.2 Water Quality

The study area for water quality includes the watersheds and associated drainages in the vicinity of the project footprint at the four existing equestrian stables and proposed site locations at Marincello and Lower Redwood Creek. Where relevant, descriptions of the larger area are provided as background.

The National Park Service began a winter water quality monitoring program in 1998, targeting stable operations within the Park. Monitored water quality parameters have included discharge, temperature, pH, specific conductance, total suspended solids, dissolved oxygen, nutrients, and fecal coliforms (Stafford and Horne 2004). Key management issues facing the GGNRA are related to balancing recreational uses of the existing and potential stable sites with water quality requirements.

### 3.2.1 Watersheds

With the exception of Marincello site, the Marin Equestrian Stables Plan study area is situated within the boundaries of three small coastal watersheds: Redwood Creek, Tennessee Valley Creek, and Rodeo Creek. These drainages are independent, flowing east to west, and all three drain to the Pacific Ocean. The Marincello site is situated within the Nyhan Creek drainage, which drains to the San Francisco Bay. These watersheds are located in a recognized global biodiversity “hot spot” (one of only five in the continental United States) and are also within Golden Gate Biosphere Reserve. Watershed descriptions are presented below, from north to south. Watershed descriptions for Redwood and Tennessee Valley Creeks are excerpted from the Marin County Watershed Management Plan (2004). The Rodeo Creek – Big Lagoon description is excerpted from the Headlands Institute EA (2009).

**Redwood Creek Drainage:** 8.8 square miles (1,510 acres)

**Redwood Creek Channels:** Approximately 13 miles

The Redwood Creek watershed begins at the peak of Mt. Tamalpais and extends southwest to Muir Beach where it drains into the Pacific Ocean. The watershed encompasses an area of less than nine square miles. At the mouth of the watershed is Big Lagoon, an intermittent tidal lagoon. The watershed provides habitat for several sensitive species, including northern spotted owl, California red-legged frog, coho salmon, and steelhead. The main tributaries to Redwood Creek include Bootjack, Fern, Kent Canyon, Rattlesnake, and Spike Buck Creeks.

The Redwood Creek watershed contains a variety of habitat types including coastal chaparral, grassland, old growth redwood forest, mixed hardwood forest, seasonal wetlands, and riparian woodlands. Prior to the land use changes that followed European colonization of the watershed, a large intermittently tidal lagoon occurred at the mouth of Redwood Creek. This lagoon once covered an area of approximately 25 acres; only a remnant of the lagoon remains today. NPS is in the second season working with local property owners to develop and construct restoration for the Big Lagoon area.

The majority of land within the watershed (95%) is in public ownership. Within its boundaries lie portions of Mt. Tamalpais State Park, NPS GGNRA lands including Muir Woods National Monument and Marin Municipal Water District. Two private communities occupy a portion of the watershed including Green Gulch Farm and the Muir Beach community.

**Tennessee Valley Drainage:** 2.36 square miles (1,510 acres)

**Tennessee Valley Channels:** 2.53 miles

The creek is dammed prior to flowing to the ocean.

The coastal drainage to the south is the Tennessee Valley; located north of Point Bonita and south of the Muir Beach community and Coyote Ridge. Comprised of five intermittent stream channels and one perennial channel, the Tennessee Valley watershed is the smallest of the three, draining 2.36 square miles.

The Tennessee Valley watershed is largely composed of grassland and coastal scrub habitats with several wetland areas including a small freshwater marsh near the lower watershed.

Special status species within the Tennessee Valley Drainage include the saltmarsh common yellowthroat and monarch butterfly.

**Rodeo Creek and Lagoon Drainage:** 4.39 square miles (2,810 acres)

**Rodeo Creek and Lagoon Channels:** Approximately 6.8 miles

The lagoon is the predominant aquatic feature in the watershed; the two major tributaries to the lagoon are Gerbode Creek from the north and Rodeo Creek from the south. The brackish lagoon is variously measured as between 35 and 40 acres. In the winter, strong wave action and increased discharge from Rodeo Creek open a seasonal channel across the beach connecting the lagoon to the ocean. Gentler waves redeposit sand on the beach, closing the channel in the spring; remaining closed through the summer and fall. Just upstream of the lagoon, Rodeo Lake covers 5.5 acres of open water. The lake is an unnatural feature created in 1937 by building a causeway and weir to separate Rodeo Lake from the remainder of the lagoon.

Historic changes to water resources within the drainage have altered the hydrologic and chemical characteristics of the entire system. Changes to topography, vegetation and watercourses, as well as the construction of roads, parking lots, buildings, trails, and other built features, have altered the rates and volume of surface water drainage within this watershed.

Special status species recorded within the Rodeo Lagoon Drainage include California brown pelican, saltmarsh common yellowthroat, monarch butterfly, and tidewater goby (in the lagoon).

### 3.2.2 Regulatory Framework

Following the passage of the Clean Water Act (CWA) in 1970, the State Water Resources Control Board (SWRCB) became the state agency with the responsibility and regulatory authority to implement and enforce the CWA. **As provided for in the State's Porter-Cologne Water Quality Act**, the State Water Resources Control Board carries out its water quality protection authority through the application of specific regional basin plans. These plans designate the beneficial uses **of waters of the state and water quality objectives (the "criteria" under the CWA) to protect those uses**. The 2007 San Francisco Bay Region Water Quality Control Plan (RWQCB 2007) is the master policy document for the San Francisco Bay Region, which identifies beneficial use designations for most water bodies, water quality objectives to protect those beneficial uses, and a strategy to achieve designated water quality objectives.

Designated beneficial water uses depend on water quality from surrounding watersheds. Current beneficial uses of streams within the GGNRA include: agricultural supply (AGR); municipal and

domestic supply (MUN); freshwater replenishment (FRSH); water contact recreation (REC-1); noncontact water recreation (REC-2); wildlife habitat (WILD); cold freshwater habitat (COLD); warm freshwater habitat (WARM); fish spawning (SPWN); shellfish harvesting (SHEL); and preservation of rare and endangered species (RARE) (RWQCB 2007). Recently, an amendment to the 2007 Basin Plan proposed additional beneficial uses to the streams within the Recreation Area (RWQCB 2010a). These additional beneficial uses include several previously defined, in addition to fish migration (MIGR); ocean, commercial and sport fishing (COMM). The amendments to the Basin Plan were accepted and finalized on July 14, 2010 (RWQCB 2010b).

**Table 3-7** shows the current beneficial uses, and how they differ from earlier Board policy.

<b>Waterbody</b>	<b>Designated Beneficial Uses Prior To July 14, 2010.</b>	<b>Current Designated Beneficial Uses (new uses in bold)</b>
Redwood Creek	AGR, MUN, FRSH, SHEL, COLD, SPWN, WARM, WILD, REC-1, REC-2	AGR, MUN, FRSH, SHEL, COLD, SPWN, WARM, WILD, REC-1, REC-2, <b>MIGR, RARE</b>
Tennessee Creek		<b>WARM WILD, REC-1, REC-2 PRESUMPTIVE</b>
Rodeo Creek	COLD, MAR, RARE, SPWN, WILD, REC-1, REC-2	COLD, MAR, RARE, SPWN, WILD, REC-1, REC-2, <b>WARM PRESUMPTIVE</b>
Rodeo Lagoon	COLD, WILD, REC-1, REC-2	COLD, WILD, REC-1, REC-2, <b>COMM, MAR, RARE</b>

There are two types of water quality objectives: narrative and numerical. Narrative objectives present descriptions of water quality and tend to be general statements of attainable or attained conditions of biological integrity and water quality for a given use designation, while numerical objectives typically describe pollutant concentrations; physical or chemical conditions of the water itself, and toxicity to aquatic organisms. These objectives are designed to represent the maximum amount of pollutants that can remain in the water column without causing any adverse effect on organisms using the aquatic system as habitat, on people consuming those organisms or water, and on other current or potential beneficial uses (RWQCB 2007). **Table 3-8** presents water quality objectives developed under Section 303 of the CWA as they apply to beneficial uses within the Golden Gate National Recreation Area's watersheds.

<b>Parameter</b>	<b>Criteria</b>	<b>Reference</b>	<b>Notes</b>
TEMPERATURE ( COLD, WARM, SPWN, WILD, MIGR, RARE)			
Temperature	<5°F (2.8°C) above natural receiving water temperature	RWQCB 2007	Limit restricting increases to a receiving waterbody. Detailed temperature criteria are species specific.
pH (COLD, WARM, SPWN, WILD, MIGR, RARE)			
pH	6.5 – 8.5	RWQCB 2007	Ph range required to protect aquatic life
DISSOLVED OXYGEN (COLD, WARM, SPWN, MIGR, RARE)			
Dissolved Oxygen	7.0 mg/l 5.0 mg/l	RWQCB 2007	Cold water habitats Warm water habitats
BIOSTIMULATORY SUBSTANCES (NUTRIENTS) (COLD, WARM, RARE, MIGR)			
Nitrate – Nitrite (N)	0.16 mg/l as N	EPA 2000	EPA Ecoregion III reference value

<sup>1</sup> Adapted from Stillwater Sciences 2005.

<b>Table 3-8 Summary of Water Quality Objectives and Potentially Affected Designated Beneficial Uses in Golden Gate National Recreation Area Waterbodies<sup>1</sup></b>			
<b>Parameter</b>	<b>Criteria</b>	<b>Reference</b>	<b>Notes</b>
Total Kjeldahl Nitrogen (TKN)	0.36 mg/l as N	EPA 2000	EPA Ecoregion III reference value
Total Phosphorous (TP)	0.030 mg/l as N	EPA 2000	EPA Ecoregion III reference value
<b>TOXICITY (COLD, SPWN, RARE, MIGR)</b>			
Un-ionized Ammonia	0.025 mg/l as N	RWQCB 2007	Limit restricting increases to a receiving waterbody.
<b>BACTERIA<sup>2</sup> (MUN, REC-1, SHEL)</b>			
Fecal Coliform	<200 MPN/100ml	RWQCB 2007	Water contact recreation 30-day average Municipal water supply – surface waters Shellfish harvesting
	<20 MPN/100ml		
	<14 MPN/100ml		
Total Coliform	<240 MPN/100ml	RWQCB 2007	Water contact recreation 30-day average Municipal water supply – surface waters Shellfish harvesting
	<100 MPN/100ml		
	<70 MPN/100ml		
Escherichia coli (E. coli)	126 MPN/100ml 235 MPN/100ml	RWQCB 2007	EPA criteria for all freshwater areas EPA maximum criteria for designated beach
Enterococci	33 MPN/100ml 61 MPN/100ml	RWQCB 2007	EPA criteria for all freshwater areas EPA maximum criteria for designated beach

### 3.2.3 Physical and Basic Water Quality Parameters

Surface water quality objectives were developed by the state (RWQCB 2007) and the U.S. Environmental Protection Agency (EPA 2000) to provide in part for the protection and propagation of aquatic life. The objectives represent typical reference levels that can be used to determine if the water quality values in the GGNRA are higher, lower, or similar to those found at other locations within California with similar geologic and hydrologic characteristics. Sites within the Recreation Area have been monitored for various parameters since the 1950s. Many of these sampling events targeted specific areas, such as pastoral and horse stable operations, and were not intended to document basic water quality conditions. As a result, a large body of data exists, but it is of varying quality, and information regarding QA/QC is not easily accessible (Stafford and Horne 2004).

#### 3.2.3.1 Discharge

Stream discharge is measured by calculating the depth, width, and velocity at a given stream cross section and is expressed as unit per time (cfs = cubic feet per second). The width and depth determine the volume of flow, and flow volume and streambed gradient influence the velocity, or speed (Platts et al 1983). Stream discharge has a direct affect on several water

<sup>2</sup> Numbers are reported as MPN, or “most probable number of colonies.”

quality parameters, such as turbidity, temperature, dissolved oxygen, and nutrients, as well as characteristics of the streambed and stream channel such as the quantity, quality and connectivity (e.g. fish migration) of aquatic habitats. Typical discharge levels can vary widely, depending on the season, and the stream being sampled. Changes in precipitation, groundwater levels, springs, and water use also affect flows. Discharge data has been collected for streams within the Golden Gate National Recreation Area since 1990.

Typical of small, coastal watersheds, discharges amongst the three watersheds vary seasonally with precipitation events. Within Redwood Creek, low flows associated with summer and fall typically range from 0.0 to 0.03 cfs at the Highway One Bridge, while high flows associated with the wet season (winter and spring) are typically 1.0 and 10.0 cfs (Stillwater 2005). Annual Peak flows over a seven year period, 1999-2005 ranged from 112.0 to 804.0 cfs, with a mean of 508 cfs (Stillwater 2005).

Baseflow measured in August and September of 2004 in Rodeo Creek averaged 0.03-0.04 cfs, while discharges during February 2004 ranged from 5.55 to 34.8 cfs (HI EA 2009). No data could be found for Tennessee Valley Creek.

### 3.2.3.2 Temperature

Water temperatures influence many dynamic processes in the aquatic environment, from the concentrations of dissolved gases and productivity of aquatic biota; to the toxicity of contaminants. Additionally, from a biotic perspective, water temperatures affect fecundity (fertility), egg survival, growth at all life stages, rearing densities, susceptibility to disease, as well as the ability to compete for food and avoid predation. Factors which influence water temperature include air temperature, direct solar radiation, relative humidity, shade cover, turbidity, discharge, and inflows of groundwater, and stormwater. The median temperature of streams sampled within the GGNRA is 12°C, with an interquartile range (essentially the middle 50% of the data) of 10.4° to 14.8°C (Stafford and Horne 2004).

Comprehensive sampling was conducted as part of the Surface Water Ambient Monitoring Program (SWAMP) within the GGNRA. At each monitoring location, SWAMP performed continuous monitoring at 15-minute intervals over a course of six to twelve days during the late spring (May 2005), summer dry season (August 2005) and winter wet season (February 2006). Water temperatures within the Redwood Creek drainage generally range from 11° - 15°C, with occasionally higher temperatures up to 19°C in later summer or early fall (Stillwater 2005). The SWAMP effort sampled four locations in the Redwood Creek drainage. Sampling deployments estimating 7-day mean temperatures ranged from 12.08°C to 15.4°C, varying with season and location (RWQCB 2009, 2010c). The 14.8 °C criterion for coho salmon was exceeded in one out of 12 continuous sampling deployments during the dry season at the downstream-most location (RWQCB 2009, 2010c). As part of the Big Lagoon restoration site analysis report, Philip Williams and Associates (PWA 2003) reported peak summertime temperatures within non-shaded areas downstream of Pacific Way exceeding 20°C, clearly exceeding temperature criterion for coho and steelhead (17°C).

SWAMP monitoring conducted at one location on Tennessee Valley Creek reported the estimated 7-day mean temperature was 12.52°C in spring, 14.18°C during dry summer season, and 10.3°C during wet season (RWQCB 2009, 2010c). Monitoring conducted on Rodeo Creek, upstream of Rodeo Lake, reported the estimated 7-day mean temperature was 13.43°C in spring, 13.27°C during dry summer season, and 10.47°C during wet season (RWQCB 2009,

2010c). Neither watershed exceeded the 14.8°C criterion for coho salmon or 17°C criterion for steelhead (RWQCB 2009, 2010c).

### 3.2.3.3 pH

pH is the measure of how acidic or basic water is, and is measured on a scale of 0 to 14. Pure water is said to be neutral, with a pH close to 7.0 at 25 °C. Solutions with a pH less than seven (at 25 °C) are said to be acidic and solutions with a pH greater than seven (at 25 °C) are said to be basic or alkaline. Simply, pH is a measure of the relative amount of free hydrogen and hydroxyl ions in the water: water with more free hydrogen is acidic, while water with more free hydroxyl is basic, or alkaline (USGS 2010). The pH of water directly affects aquatic organisms by controlling the solubility, and biological availability (amount that can be utilized by aquatic life) of nutrients. Additionally, pH affects the toxicity of organic and inorganic constituents, such as metals, which tend to be more toxic at lower pH because they are more soluble.

Typical pH levels in central California coast streams range between six to nine, while the median value in GGNRA streams is 7.4 (range 7.0 – 7.8) (Stafford and Horne 2004). The 2007 RWQCB Basin Plan requires that pH levels must not fall below 6.5 or rise above 8.5.

SWAMP monitoring reported a pH range of 6.9 to 8.0 at Redwood Creek sites: 6.9 to 8.1 at the Tennessee Valley Creek location; and 6.4 to 7.4 at three locations within Rodeo Creek (RWQCB 2009, 2010c). Rodeo Creek fell below the minimum criterion once (at one location) during dry season monitoring, otherwise, the three drainages were all within the range required by the Basin Plan.

### 3.2.3.4 Total Dissolved Solids (TDS), Salinity, and Conductivity

Total dissolved solids refers to all dissolved (filterable) solids in the water column, such as minerals; metals, and organic matter, or other particles that will pass through a filter with pores of around two microns (0.002 cm) in size (EPA 1997). TDS gives the approximation of the amount of dissolved salts in water, while salinity is a measure only of the mineral salts fraction (Stafford and Horne 2004). Primary sources for TDS in receiving waters include agricultural and residential runoff, erosion, stormwater runoff, and point source water pollution discharge.

Conductivity measures the ability of water to conduct an electrical current, and is directly related to the concentration of dissolved ionized solids, such as salts, in the water. As a result, conductivity provides an easily measured approximate value for the TDS concentration. The conductivity of freshwater systems is directly influenced by geology, or in coastal areas, from saltwater intrusion into groundwater or tidal fluxes (Stafford and Horne 2004). The specific conductivity of water is measured and reported in micro Siemens, or  $\mu\text{S}/\text{cm}$ . Distilled water has a very low specific conductance (0.5 to 3.0  $\mu\text{S}/\text{cm}$ ), drinking water is typically less than 100  $\mu\text{S}/\text{cm}$ , and sea water has a very high specific conductance, on the order of 50,000  $\mu\text{S}/\text{cm}$  (EPA 1997). Most streams within the GGNRA have a specific conductance of 20 to 400  $\mu\text{S}/\text{cm}$ , with a few, near tidal influences of 600 to 8000  $\mu\text{S}/\text{cm}$  (Stafford and Horne 2004). The median specific conductance measured between 1997 and 2002 is 214  $\mu\text{S}/\text{cm}$ , with an interquartile range from 150 to 600  $\mu\text{S}/\text{cm}$  (Stafford and Horne 2004).

While TDS and specific conductance do not measure any single, specific ion, they do detect changes in the concentrations of ions in water, and can be used to detect changes in water quality (Stafford and Horne 2004). Water quality objectives (RWQCB 2007) state controllable

water quality factors shall not increase the total dissolved solids or salinity of a receiving water so as to adversely affect beneficial uses.

### **3.2.3.5 Total Suspended Solids (TSS) and Turbidity**

Total suspended solids are the amount of particulate matter, such as clay and silt that is suspended in the water and visually, it is what makes water appear murky, or turbid. In contrast to total dissolved solids, TSS includes silt and clay particles, plankton, algae, fine organic debris, and other particulate matter that will not pass through a 2-micron filter (EPA 1997). Higher concentrations of suspended solids decrease the passage of light through water. This limitation can slow photosynthesis by aquatic plants; and increase water temperatures by causing water to warm more rapidly and retain more heat.

Turbidity measures the degree to which suspended solids scatter light in the water column. Turbidity is an easily measured approximation of the total suspended solids in water, and is reported in nephelometric turbidity units or NTUs. As the intensity of scattered light increases, so does the turbidity. During low, or base flow periods, when very little to no precipitation occurs, turbidity levels tend to drop to a somewhat stable value for the stream, usually less than 10 NTUs (USGS 2010). Turbidity can often range higher than this, however, especially after heavy rain when water levels are high. Water is visibly turbid at levels above five NTU; the US EPA maximum limit for drinking water (US EPA 2000).

Turbidity readings from the Lendvay and Benning study reported turbidity ranges of 0 to 10 NTU; while 2005 data showed high turbidities at Lower Redwood Creek and Muir Beach, which ranged from 19.0 NTU to 25.1 NTU (2006).

According to the Headlands Institute EA, turbidity can range from 5.2 to 289 NTU in Rodeo Lagoon; as turbidity at the lake and lagoon may be affected not only by sediment inputs, but also by wind and turnover in benthic sediments as well as algal blooms (2009). No turbidity data was found for Tennessee Valley Creek.

Sediments in the water column affect water quality and the quality of aquatic habitats; whether measured as total solids, total suspended solids, or turbidity, the sediment load in a stream can be the result of multiple effects ranging from landscape, climate and weather (especially precipitation), to tectonic uplift, bedrock type, erosion, fire frequency, and land use practices (Lendvay and Benning 2006). Water quality objectives (RWQCB 2007) require waters shall be free of changes in suspended sediment load, suspended sediment discharge, or turbidity which cause nuisance or adversely affect beneficial uses.

## **3.2.4 Oxygen Related Parameters**

### **3.2.4.1 Dissolved Oxygen**

Oxygen is measured in its dissolved form as dissolved oxygen (DO). Dissolved oxygen is necessary to maintain aerobic conditions in surface waters and is considered a primary indicator when assessing the suitability of surface waters to support aquatic life. Over the course of a 24-hour period, or diel cycle, an aquatic system will both produce and consume oxygen. A waterbody gains oxygen from the atmosphere and from plants as a result of photosynthesis. Running water, because of its movement will dissolve more oxygen than still water. Respiration by aquatic animals, decomposition, and various chemical reactions consume oxygen. This

consumption is referred to as **"biochemical oxygen demand."** Influences on the dissolved oxygen content of natural waters include temperature, season, time of day, salinity, turbulence, altitude, photosynthetic activity of algae and plants, and atmospheric pressure.

DO is measured either in milligrams per liter (mg/l) or "percent saturation," which is the amount of oxygen in a liter of water relative to the total amount of oxygen that the water can hold at that temperature (EPA 1997). For maintenance of aquatic health, dissolved oxygen concentrations should approach saturation. RWQCB criteria levels for DO in inland fresh waters are set at 7.0 mg/l or above for cold water habitat, and 5.0 mg/l or above for warm water habitat (2007). Although there are no state or federal standards for estuaries, standards under consideration are suggesting levels >three mg/l as the minimum criteria for California Estuaries (Stafford and Horne 2004). DO was first measured in the GGNRA in 1978, and has been consistently monitored since 1983. During this period, the median concentration was 10.4 mg/l, with an interquartile range from 9.7 to 11.0 mg/l (Stafford and Horne 2004).

Monitoring conducted at four locations within Redwood Creek reported the seven day average minimum concentrations of dissolved oxygen were between 6.74 and 9.81 mg/L during the dry season; 9.03 and 10.72 mg/L during the spring, and 10.38 and 11.8 mg/L during the winter wet season (RWQCB 2009, 2010c). Minimum DO levels fell below the 7.0 mg/l water quality objective once during August of 2005, just upstream of the confluence with Green Gulch Creek, where minimum DO ranged from 4.74 to 7.95 mg/l (RWQCB 2009, 2010c). Low dissolved oxygen levels measured during summer and fall indicate nutrient enrichment is occurring in the lower watershed (Stillwater 2005). Water quality monitoring efforts throughout the 1990s also reported low DO concentrations in isolated pools during low flow conditions in lower Redwood Creek, and attributed this to a reduction in salmonid abundance and limited juvenile fish survival in the pools near Muir Beach (Schanz et al. 1995; Smith 1994, 1997, 2001; as cited in HI EA). Sampling conducted by the Park Service between 1998-2001, also identified low DO concentrations under low flow conditions downstream of the Muir Beach Community Service **District's pedestrian bridge** (GOGA 2002).

Monitoring conducted at a single location on Tennessee Valley Creek reported the seven day average minimum concentration of dissolved oxygen was eight mg/L during dry season, 10.26 mg/L during spring season, and 10.77 mg/L during winter wet season (RWQCB 2009, 2010c).

Monitoring conducted on Rodeo Creek, upstream of Rodeo Lake, reported the seven day average minimum concentration of dissolved oxygen was 8.83 mg/L during dry season, 9.08 mg/L during spring season, and 11.03 mg/L during winter wet season (RWQCB 2009, 2010c). As reported in the Headlands Institute EA (2009) dissolved oxygen levels varied from 4.5 mg/l in Rodeo Lake to 15.2 mg/l in Rodeo Lagoon: the highest dissolved oxygen levels found during an algal bloom in the summer (when the algae were photosynthesizing and producing oxygen), and the lowest when the algae die and bacterial decomposition consumes the DO.

All DO measurements on Tennessee Valley and Rodeo Creeks met the water quality objective of seven mg/L but were exceeded in Rodeo Lagoon.

### **3.2.4.2 Biochemical Oxygen Demand**

Biochemical oxygen demand, or BOD, measures the amount of oxygen consumed during respiration of aquatic organisms; decomposition of organic matter by microorganisms; and the chemical oxidation of inorganic matter (EPA 1997). BOD is an important predictor of decreased dissolved oxygen levels downstream (Stafford and Horne 200). BOD directly affects the amount

of dissolved oxygen in rivers and streams; the greater the BOD, the more rapidly oxygen is depleted, resulting in less oxygen available to higher forms of aquatic life (EPA 1997). High BOD (>two mg/l) in streams has a general relationship to poor water quality. Sources of BOD in the GGNRA include leaves and woody debris; dead plants and animals; animal manure; septic systems; and stormwater runoff. BOD has been measured in the GGNRA since 1999, as part of the stable studies. Most sites were below the detection limit of two mg/l, though a few sites had values approaching 30 mg/l, which is certainly impaired (Stafford and Horne 2004).

### 3.2.5 Nutrients

Certain elements are defined as nutrients because they are essential for sustaining life processes in aquatic organisms. Major nutrients include carbon, nitrogen, and phosphorous. Nutrients are present within the water column either as dissolved organic, dissolved inorganic, particulate organic (such as excretions or decomposition), or biotic (in living matter) forms. Nutrients are important when considering water quality for a number of reasons, primarily as an indicator of primary productivity, or algae growth. Only dissolved forms are directly available for algal growth: for nitrogen and phosphorus these include ammonia, nitrate, nitrite, and orthophosphate, in addition to dissolved carbon and silica (Deas and Orlob 1999). Aquatic plants, animals, and bacteria cycle nutrients between these forms as they eat, grow, die, and decompose. Nutrient levels documented in 2004 - 2005 sampling efforts by Stillwater Sciences are consistent with historical data and suggest a continuing contribution of nutrients above regional reference values within the Redwood Creek watershed (Stillwater Sciences 2005).

#### 3.2.5.1 Nitrogen, Nitrate and Ammonia

The combination of organic nitrogen, ammonia, nitrate, and nitrite is referred to as total nitrogen (TN). The combination of nitrate, nitrite, and ammonia is referred to as total inorganic nitrogen (TIN). According to the EPA's 2000 Ambient Water Quality report, total nitrogen levels in central/southern California typically range between 0.223 mg/l and 9.95 mg/l, with the median concentration equaling 0.5 mg/l. Within the Golden Gate National Recreation Area, nitrogen has been monitored in the form of ammonia, nitrate, and nitrite. Stafford and Horne (2004) report 60% of samples tested were below the detection limits of 0.01, 0.02 and 0.1 mg-N/L. The median value was 0.07 mg-N/L with an IQR from 0.02 to 0.1 mg-N/L. Nitrate has been monitored since 1986, with a median value of 0.8 mg-N/L and an IQR from 0.32 to 1.9 mg-N/L.

Lendvay and Benning (2006) report average nitrate concentrations from 2004 to 2006 below the EPA maximum threshold of 90 mg/l as N, (EPA 1986). Within Rodeo Lagoon, nitrate and nitrite were not detected above the reporting limit in either sediment or lagoon water samples (HI EA 2009). Ammonia concentrations varied between 0.02 mg/l (Rodeo Creek, Lake and Lagoon) to 0.18 mg/l (Rodeo Lagoon) (HI EA 2009).

#### 3.2.5.2 Phosphorus, Phosphate, Total Phosphorous (TP)

Phosphorus (P) can be present in either organic or inorganic forms within a stream. Phosphorus, like nitrogen, is a pollutant by accumulation rather than by performance, meaning that they are causal agents of impaired water quality (Stafford and Horne 2004). According to the EPA's 2000 Ambient Water Quality report, total phosphorus levels in central/southern California typically range between 0.0025 mg/l and 3.21 mg/l, with the median concentration equaling 0.03 mg/l.

Within Redwood Creek, the 2006 phosphate levels were all above the U.S. EPA guideline of 0.10

mg/L for freshwater aquatic habitats, and it was observed that in 2005 and 2004 most sampled levels were also above the guideline (U.S. EPA 1986, Lendvay and Benning 2006). According to the Lendvay and Benning report (2006), a number of potential sources could have contributed to the increase elevated levels, including the weathering of rocks, runoff of animal feces, and disturbed land areas.

Within the Rodeo Creek watershed, phosphate levels ranged from 0.015 mg/L to 0.404 mg/L in the lagoon, and one study contained concentrations of orthophosphate above the reporting limit (HI EA 2009).

### 3.2.6 Biological Indicators

There are four main types of fecal indicator bacteria that are frequently monitored in surface water investigations. These include total coliforms, fecal coliforms, *Escherichia coli* (E. coli) and enterococci. All but E. coli are composed of a number of species of facultative anaerobic rod-shaped bacteria that share common characteristics such as shape, habitat, or behavior; E. coli is a single species in the fecal coliform group (EPA 1997, Stafford and Horne 2004).

#### 3.2.6.1 Total Coliform, Fecal Coliform *Escherichia coli* (E. coli) and enterococci

Members of these bacteria groups are most often used as indicators of possible sewage contamination because they are commonly found in human and animal feces. Although they are generally not harmful themselves, these bacteria may indicate the possible presence of other pathogenic (disease-causing) bacteria, viruses, and protozoans, such as dysentery, hepatitis A, and cholera (EPA 1986, 1997). As a result, their presence in streams is considered to pose a health risk. Sources of fecal contamination to surface waters include wastewater treatment plants, on-site septic systems, domestic and wild animal manure, and storm runoff.

The bacteria groups have varying criteria levels. According to the California Department of Health, the maximum accepted level of coliform bacteria is 10,000 MPN/100 ml, based on a single water sample, for water contact recreation (DHS 2006). The EPA (1986) 7-day geometric mean E. coli criterion for water contact recreation, based on five or more samples per 30-day period, is 126 MPN/100 ml with a designated beach maximum of 235 MPN/100 ml. Enterococci concentrations in bathing beach waters should not exceed 61 MPN/100 ml (EPA 1986).

Numerous water quality assessments report bacterial concentrations in exceedance of water quality criteria. Available data demonstrate elevated levels of bacteria concentrations within the lower Redwood Creek watershed (Stillwater 2005, Lendvay and Benning 2006, HI EA 2009). Amongst the studies, it is accepted that the primary sources of bacteria contamination include human septic sources, stable operations, restroom facilities and frequent human use.

In the mid 1990s, the NPS implemented an intensive water quality monitoring program in the lower Redwood Creek watershed, focusing on stable operation and management practices at the Golden Gate Dairy (Vore 1997). During the 1997–1998 monitoring, waters were tested for fecal coliform at Muir Woods, Pacific Way, Muir Beach, Golden Gate Dairy, and Green Gulch Creek. In these tests, median fecal coliform at the upstream sites of Muir Woods and Green Gulch were within state criteria, while downstream samples at Pacific Way, Golden Gate Dairy, and Big Lagoon exceeded laboratory detection limits and exceeded health standards, indicating fecal coliform contamination (Stillwater 2005).

Lendvay and Benning (2006) reported 2006 fecal coliform measurements below the state maximum limit for fecal coliform of 400 colonies/100 ml. The highest bacterial count in the watershed was recorded at Muir Beach, the lowest elevational, and furthest downstream sampling site. As expected, Muir Beach also exhibited the highest number of E. Coli colonies (27 MPN/100mL  $\pm$  15.70), and highest enterococci count (117 MPN/100mL), both of which exceed state criteria limits (Lendvay and Benning 2006).

Recent follow-up analysis of data collected by NPS in 2004–2005 conducted by Stillwater Sciences (2005) suggests current land use practices at the stables and other locations continue to result in excess nutrients and bacteria to the lower watershed.

SWAMP monitoring conducted during the summer dry season, at a single location in Rodeo Creek reported E. coli concentrations of 120 MPN/100 ml (RWQCB 2009, 2010c). Sampling efforts reported in the Headlands Institute EA (2009) found Coliform counts in Rodeo Creek ranging between 240 and 900 fecal coliform units per 100mL; which exceeds surface water objectives. SWAMP monitoring in Tennessee Valley Creek did not include this parameter.

### 3.3 Vegetation

As noted above, the Plan area includes portions of three watersheds: Redwood Creek/Green Gulch, Tennessee Valley and Rodeo Valley. In general, when referring to the Plan area in the vegetation and wildlife sections, this document is considering an approximate two mile radius from equestrian sites considered in all alternatives. The vegetation is diverse in this area and is part of the central coast region of the California floristic province characterized by mild year-round temperatures and the presence of fog which extends the flowering period of many plants. Vegetation in some areas is influenced by sea spray and strong winds. In addition to a range of native vegetation communities, the Plan area also supports non-native weedy and ornamental plants resulting from planting and grazing, fire suppression, and military and Park development. Vegetation communities, including riparian and wetlands, are mapped on **Figure 3-1**.

The dominant vegetation types within or adjacent to the Plan area are coastal scrub/chaparral and grassland, with limited native hardwood forest, non-native evergreen forest, herbaceous wetlands, and riparian forest/shrubland.

#### 3.3.1 Coastal Scrub and Chaparral

The coastal scrub community is dominated by coyote brush (*Baccharis pilularis*), California sagebrush (*Artemisia californica*), bush lupine (*Lupinus arboreus*), and poison-oak (*Toxicodendron diversilobum*), with variations in dominant species based on moisture levels, soil types and slopes, and past land use history (GGNRA 2005). Other shrub species that may occur include coffeeberry (*Rhamnus californica*), California blackberry (*Rubus ursinus*), toyon (*Heteromeles arbutifolia*), and huckleberry (*Vaccinium ovatum*). Herbaceous species include cow parsnip (*Heracleum lanatum*) and bracken fern (*Pteridium aquilinum*) (NPS 2009).

The coastal scrub/chaparral community is found throughout the Plan area (GGNRA 2005). Chaparral communities are not abundant in the Plan area; however, they do contain a high number of locally to regionally rare species of concern for the park, and are contiguous with coastal scrub stands (GGNRA 2005). The chaparral in the Plan area is dominated by ceanothus and manzanita.

### 3.3.2 Grasslands

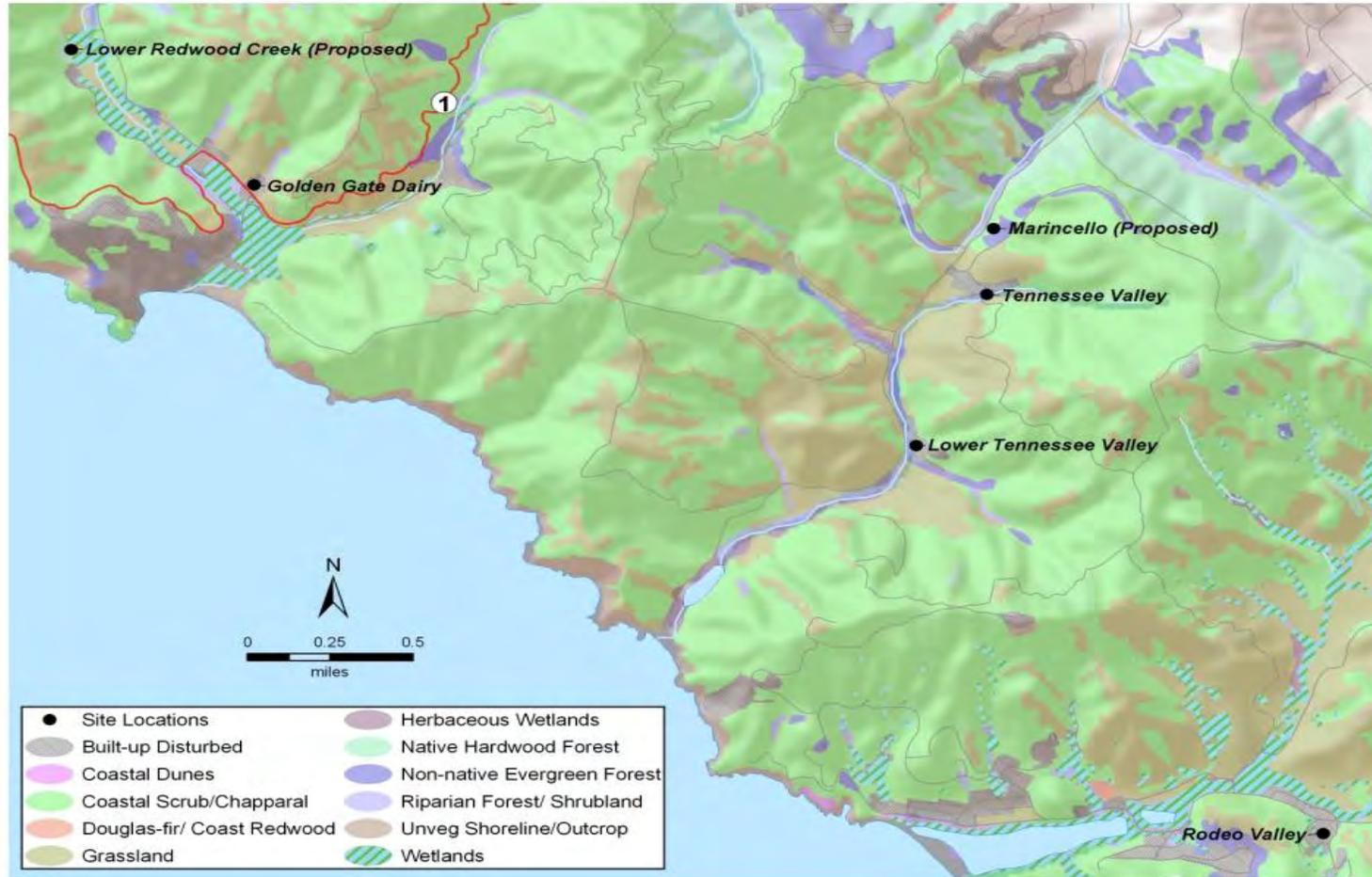
Grasslands in the Plan area form a dynamic mosaic with the coastal scrub community, and with evergreen forests (GGNRA 2005). The grasslands in the Plan area are dominated by non-native annual grasses. Common species include the invasive perennial purple velvet grass (*Holcus lanatus*), wild oats (*Avena fatua*), annual Italian wild rye (*Lolium multiflorum*), rattlesnake grass (*Briza major*), and soft chess (*Bromus hordeaceus*) (NPS 2009). Native grasses that are occasionally encountered include purple needlegrass (*Nasella pulchra*), California fescue (*Festuca californica*), California oatgrass (*Danthonia californica*), California brome (*Bromus carinatus*), and blue wild rye (*Elymus glaucus*) (NPS 2009). Forbs such as English plantain (*Plantago lanceolata*), mustard (*brassica* spp.), and Italian thistle (*Carduus pycnocephalus*) thrive, and native wildflowers such as California poppy (*Eschscholzia californica*), miniature lupine (*Lupinus bicolor*), and blue dicks (*Dichelostemma pulchellum*) are present as well (NPS 2009).

### 3.3.3 Native Hardwood Forest

The Native Hardwood Forest community occurs in small patches in the vicinity of the Lower Redwood Creek, Golden Gate Dairy, Tennessee Valley, and Marincello sites (NPS 1994). At these sites the native hardwood forest is dominated by coast live oak (*Quercus agrifolia*) and California bay laurel (*Umbellularia californica*) (NPS 1994). The Douglas-fir community tends to occur along the mesic boundary of this mixed evergreen forest, with coastal scrub and grasslands along the xeric boundary (NPS 1994, GGNRA 2005).

### 3.3.4 Non-native Evergreen Forest

Historical land use and development has either changed vegetation or permanently removed it in the Plan area. For example, building to accommodate military operations or Park visitors (trails, roads, parking lots, restrooms, visitor center, etc.) resulted in the permanent loss of vegetation at those sites. Native and nonnative vegetation was graded and removed to make way for these facilities. Deliberate planting of nonnative trees (Monterey pine [*Pinus radiata*], Monterey cypress [*Cupressus macrocarpa*], eucalyptus [*Eucalyptus* spp.], acacia [*Acacia* spp.], Douglas fir [*Pseudotsuga menziesii*], redwood and pine species) for shade and wind protection, ornamental shrubs, and other vegetation (turfgrass, European beachgrass and iceplant for example) to stabilize erosion or dunes has also resulted in the spread of these species and displacement of native plants. In addition to non-native invasive annual grasses described above, jubata grass (*Cortaderia jubata*), fennel (*Foeniculum vulgare*), iceplant, and French and Scotch broom (*Genista monspessulana*, *Cytisus scoparius*) all grow in disturbed areas, such as along roads and trails. This vegetation community is found near all sites.



**Figure 3-1. Vegetation in the Project Area**

Source: NPS Database: 1994 GGNRA vegetation map

### 3.3.5 Riparian and Wetland Vegetation

This Plan is designed with the following buffers from the center of the stream channel:

- 100 foot buffer zones along perennial streams.
- 50 foot buffer zones along intermittent streams.
- 25 foot buffer zones from wetlands.

The Lower Redwood Creek stable site is situated in proximity to Redwood Creek which is a perennial stream. Golden Gate Dairy and Rodeo Valley stable sites are directly adjacent to or include intermittent streams and wetlands. The Tennessee and Lower Tennessee Valley stable sites are adjacent to riparian intermittent streams. The proposed Marincello site is not in close proximity (e.g. within 300 feet) to a riparian area or wetland.

**Riparian Forest/Shrubland.** Riparian, or streamside, forests and shrublands are dominated by broad-leaved deciduous trees or shrubs, most commonly willows (*Salix lasiolepis* or *S. lucida* ssp. *lasiandra*) and occasionally red alder (*Alnus rubra*) (GGNRA 2005). The understory is typically dense, with a variety of shrubs including native salmonberry (*Rubus spectabilis*), thimbleberry (*R. parviflorus*), and California blackberry (*R. ursinus*), as well as non-native Himalayan blackberry (*R. discolor*) and Cape-ivy (*Delairea odorata*). Numerous herbaceous species including ferns, rushes, and sedges dominate the shrub understory. Non-native trees including eucalypts (*Eucalyptus* spp.) and Monterey cypress (*Cupressus macrocarpa*) have become successfully established within riparian forest strands in the Park.

**Herbaceous Wetlands.** Herbaceous wetlands are known as emergent wetlands in the Cowardin wetlands classification (Cowardin et al. 1979). They consist of a mix of low-growing species of sedges (*Carex* spp.), rushes (*Juncus* spp.), and other wetland-dependent species (e.g., *Scirpus microcarpus*, *Typha* spp. *Cyperus eragrostis*, *Equisetum* spp.), as well as some non-native species of grasses (especially velvet grass [*Holcus lanatus*] and Harding grass [*Phalaris aquatica*]) and forbs including Cape-ivy (*Delaria odorata*) and Vinca (*Vinca major* and *V. minor*) (GGNRA 2005). Wetlands within the Plan area occur along the shores of lagoons and ponds, as herbaceous strips of vegetation along perennial and ephemeral stream courses, and as isolated patches in depressions or where seeps spring from the hill slopes (GGNRA 2005).

The two largest wetland complexes adjacent to and downstream of the Plan area are Big Lagoon in the Redwood Creek watershed, and Rodeo Lagoon in the Rodeo watershed.

**Big Lagoon.** Big Lagoon is an approximately 2.2 acre marsh complex, at the confluence of Redwood Creek and Green Gulch (Fong *et al.* 2010). The Golden Gate Dairy site is just upstream of Big Lagoon, on Redwood Creek. Barring uncharacteristic hydrologic events, Big Lagoon is connected to the Pacific Ocean during winter and spring months and closed during the remainder of the year. Historically, Big Lagoon was a 30-acre wetland complex consisting of a freshwater lagoon, seasonal wetlands, dunes, and an intermittently tidal lagoon (Fong et al. 2010). This historic habitat was degraded through channelization, levee construction, filling, dune removal, and accelerated sedimentation (Fong et al. 2010). Currently, the historic wetland is overlain by the Muir Beach Parking Lot, picnic facilities, and an abandoned horse pasture. This pasture is flooded during the winter and spring by runoff from Green Gulch Creek. Extensive emergent vegetation dominated mainly by cattails is present. Small areas of open water bordered by emergent vegetation are found along drainage ditches.

**Rodeo Lagoon.** Rodeo Lagoon is the predominant wetland in the Rodeo watershed. Rodeo Lagoon is presently a 40-acre brackish water lagoon (Fong et al. 2010). Just upstream of the lagoon, Rodeo Lake covers 5.5 acres of open water, emergent vegetation, and mats of submergent vegetation (Fong et al. 2010).

Vegetation growing on the shores of the lagoon and lake fall into several categories of wetland, including palustrine emergent, palustrine scrub-shrub, and estuarine emergent. The lagoon itself is categorized as estuarine unconsolidated bottom and does not support emergent vegetation, but does serve as habitat for algae and single-celled plants. Palustrine wetlands are freshwater wetlands subject to various runoff and flooding regimes and are vegetated with either sedges and grasses (emergent) or shrubs (willow). Estuarine emergent vegetation is able to withstand a mix of fresh and tidal water. Species known to occur in the vicinity of Rodeo Lagoon include meadow barley (*Hordeum brachyantherum*), buttercups (*Ranunculus californicus*), rushes, horsetail, luzula (*Luzula comosa*), sedges, and soft rush (NPS 2009). Non-native velvet grass (*Holcus lanatus*), Harding grass (*Phalaris aquatica*), and capeweed may also occur.

In addition to the wetlands associated with Rodeo Lagoon, much of the Rodeo Creek valley floor is vegetated by wetlands (NPS 2009). Slope wetlands, in the form of seeps and springs, are also common in this area. The Rodeo Valley site is approximately 0.5 miles upstream of Rodeo Lake, and adjacent to Rodeo Creek.

## 3.4 Wildlife and Aquatic Resources

### 3.4.1 Terrestrial Wildlife

Terrestrial wildlife habitats in the project vicinity consist primarily of coastal scrub/chaparral and grasslands; but include riparian forests; non-native evergreen forest, and native hardwood forest. These habitats support a variety of species, as described below.

**Mammals.** Terrestrial habitats within the Plan area support a high diversity of mammals (GGNRA 2005, USGS 2005). Carnivores, including the gray fox (*Urocyon cinereoargenteus*), bobcat (*Felis rufus*), and the recently reestablished coyote (*Canis latrans*) inhabit coastal scrub and grasslands. Mountain lions (*Felis concolor*) have been sighted in some undeveloped areas of the Park (GGNRA 2005). These carnivores feed on a variety of small and large mammals such as the Pacific black-tailed deer (*Odocoileus hemionus columbianus*), broad-footed mole (*Scapanus larimanus*), pocket gopher (*Thomomys bottae*), deer mouse (*Peromyscus maniculatus*), western harvest mouse (*Reithrodontomus megalotis*), California vole (*Microtus californicus*), dusky-footed woodrat (*Neotoma fuscipes*) and brush rabbit (*Sylvilagus bachmani*). Badgers (*Taxidea taxus*) are also infrequently encountered. Some species, such as the western harvest mouse, appear to be restricted to areas where native perennial grasses persist. Other mammalian carnivores include the raccoon (*Procyon lotor*), striped (*Mephitis mephitis*) and spotted skunks (*Spilogale gracilis*), long-tailed weasel (*Mustela frenata*), and the recently returned river otter (*Lontra canadensis*). Domestic cats are kept at Tennessee Valley and Rodeo Valley stables (one at each stable) for rodent control.

At the Marin Headlands, several historic World War II structures were found to be occupied by the Townsend's western big-eared bat (*Corynorhinus townsendii*) and the Yuma myotis (*Myotis yumanensis*) (GGNRA 2005). The Brazilian free-tailed bat (*Tadarida brasiliensis*) forages over coastal scrub habitat within the Marin Headlands (GGNRA 2005) and many other bat species occur in the project area as well. The following bat species were detected at the Tennessee Valley stable site: Yuma myotis, fringed myotis (*Myotis thysanodes*), big brown bat (*Eptesicus fuscus*), silver-haired bat

(*Lasionycteris noctivagans*), red bat (*Lasiurus blossevillii*), hoary bat (*Lasiurus cinereus*), and Mexican free-tailed bat (*Tadarida brasiliensis*) (Fellers 2005).

**Birds.** Located along the Pacific Flyway, GGNRA provides habitat for a great diversity of breeding, overwintering, and migratory birds (Flannery et al. 2001, Stralberg and Gardali 2007). Nineteen species of diurnal raptors have been detected in migration over the ridges of the Marin Headlands (GGNRA 2005). Red-tailed hawks (*Buteo jamaicensis*), red-shouldered hawks (*Buteo lineatus*), and great horned owls (*Bubo virginianus*) nest in many of the large nonnative eucalyptus trees in the Park. A wide range of other raptors and owl species occur within the project area.

Numerous species of waterbirds also occur within the Park in marine and rocky intertidal habitats, cliffs, beaches, and tidal and wetland areas. Point Reyes Bird Observatory (now PRBO Conservation Science) encountered 83 bird species during 1997 breeding landbird censuses in coastal grassland, coastal scrub, riparian, and mixed hardwood habitats (GGNRA 2005). From point count censuses in 1999 and 2000, white-crowned sparrows (*Zonotrichia leucophrys*), red-winged blackbirds (*Agelaius phoeniceus*), savannah sparrows (*Passerculus sandwichensis*), and song sparrows (*Melospiza melodia*) were the most commonly detected species in grasslands (GGNRA 2005). The most abundant species in coastal scrub were white-crowned sparrows, spotted towhees (*Pipilo maculatus*), and wrentits (*Chamaea fasciata*) (GGNRA 2005). In forested habitats, bushtits (*Psaltiriparus minimus*), chestnut-backed chickadees (*Junco hyemalis*), dark eyed juncos, Pacific-slope flycatchers (*Empidonax difficilis*), and winter wrens (*Troglodytes troglodytes*) were commonly detected. Species detected in riparian habitat along Redwood Creek include the song sparrow, Swainson's thrush (*Catharus ustulatus*), warbling vireo (*Vireo gilvus*), and Wilson's warbler (*Wilsonia pusilla*) (Stillwater Sciences 2005). The brown-headed cowbird (*Molothrus ater*) is a nest parasite that negatively affects the reproductive success of open-cup nesting songbirds and occurs throughout the project area. In their investigation of nesting success of songbirds in riparian drainages of Redwood and Lagunitas creeks, Gardali et al. (1999) reported cowbird parasitism on 37-47% of Wilson's warbler nests in 1997-1998. Halterman and Laymon found relatively low overall rates of nest parasitism by cowbirds in GGNRA (Halter and Laymon 2000). Cowbirds are attracted to human activities such as horse corrals and pack stations where food is plentiful, and in GGNRA cowbirds were found foraging around horse stables and pastures in the spring and summer (Halterman and Laymon 2000).

**Amphibians and Reptiles.** Small populations of the federally threatened California red-legged frog (*Rana draytonii*) occur within the planning area (see section 3.5 for more detail). More common terrestrial amphibians in the planning area include ensatina (*Ensatina eschscholtzii*) and California slender salamander (*Batrachoseps attenuatus*) (GGNRA 2005). Common species spending a substantial amount of time for breeding or rearing at streams or ponds include California newts (*Taricha torosa*), rough-skinned newts (*Taricha granulosa*), Pacific treefrog (*Hyla regilla*), and California giant salamander (*Dicamptodon ensatus*). Common reptiles include the Western fence lizard (*Sceloporus occidentalis*), northern alligator lizard (*Gerrhonotus coeruleus*), Pacific gopher snake (*Pituophis melanoleucus*), and western terrestrial garter snake (*Thamnophis elegans*) (GGNRA 2005, USGS 2005).

**Invertebrates.** The coastal grassland/scrub habitat of the southern Marin NPS lands is known for high numbers and diversity of butterflies, including the federally listed endangered mission blue butterfly (*Icaricia icarioides missionensis*) (see section 3.5 for more detail). At least 44 species of butterflies occur in the southern Marin NPS lands including various species of skippers, swallowtails, hairstreaks, blues, ladies, admirals, and crescents inhabit these areas (GGNRA 2005). Monarch butterflies (*Danaus plexippus*) are found in clusters overwintering in many areas of the Park, including in the vicinity of the Golden Gate Dairy, Lower Tennessee Valley and Tennessee Valley stables, and the Rodeo Valley stables (CNDDDB 2010). Monarchs are often found in groves of nonnative trees.

Other terrestrial invertebrates in the project area have not been well documented, and there is only limited information available regarding the aquatic invertebrates present within the project area.

### 3.4.2 Aquatic Species

Aquatic habitats in the project vicinity consist primarily of riparian forests, freshwater and saline wetlands and wet meadows and estuarine, lacustrine, marine, and riverine aquatic habitats. These habitats support a variety of species as described below.

**Redwood Creek Drainage.** Coho salmon, steelhead, California red-legged frog, and northwestern pond turtle have been observed in the watershed.

**Tennessee Valley Drainage.** Western pond turtle and California red-legged frog have been recorded in the watershed.

**Rodeo Lagoon Drainage.** Western pond turtle, California red-legged frog, steelhead, and tidewater goby (in the lagoon) have been recorded in the watershed.

### 3.5 Special Status Species

Special status species include plants and animals that are officially listed or proposed for listing under the State and/or Federal Endangered Species Acts, are considered a candidate for listing under these acts, are named as being of special concern by a state agency, or are otherwise considered rare, unique, sensitive, or of management concern. Special status species with potential to occur in the project area were identified by conducting database searches (CNDDDB and CNPS), a review of existing literature, and comparison of published **habitat conditions in the project area with species'** requirements.

For purposes of evaluating presence of special status animal species, an area within a two mile radius of any of the stables considered under the project was considered.

#### 3.5.1 State or Federally Listed Animal Species

Six federally listed, and two state listed animals are known to occur in the vicinity of the project area. The federally listed species are the California red-legged frog, northern spotted owl, Mission Blue butterfly, tidewater goby, coho salmon, and steelhead. The state listed species are the California black rail and the little willow flycatcher. Potential habitat exists for the federal and state endangered California freshwater shrimp in the project area (Jones and Stokes 2007). However, surveys in March and August 1997 found no shrimp in lower Redwood Creek, and no sensitive invertebrate taxa were encountered during surveys in April 2002 (Jones and Stokes 2007).

No federal or state listed threatened or endangered plant species are known to grow in the project area.

**California Red-legged Frog.** The California red-legged frog (*Rana draytonii*) is listed by the US Fish and Wildlife Service (USFWS) as threatened species, and is a California species of special concern (CNDDDB 2010). USFWS designated critical habitat for this species in 2010 (USFWS 2010), but no critical habitat occurs within the Plan area.

The California red-legged frog occurs from sea level to elevations of about 1,500 meters (4,921 feet), primarily in wetlands and streams in coastal drainages of central California (GGNRA 2009). This frog requires a variety of habitat elements with aquatic breeding areas embedded within a matrix of riparian and upland dispersal habitats. Breeding sites are in aquatic habitats including pools and backwaters within streams and creeks, ponds, marshes, springs, sag ponds, dune ponds, and lagoons. The adults require dense, shrubby, or emergent riparian vegetation closely associated with deep (greater than 2 1/3-feet deep) still or slow moving water. The largest densities of California red-legged frogs are associated with deep-water pools with dense stands of overhanging willows (*Salix* spp.) and an intermixed fringe of cattails (*Typha latifolia*) (GGNRA 2009). California red-legged frogs aestivate (enter a dormant state during summer or dry weather) in small mammal burrows and moist leaf litter. They have been found up to 100 feet from water in adjacent dense riparian vegetation.

Recent studies have confirmed that Rodeo Lake/Rodeo Lagoon complex is used as a breeding site for red-legged frogs (Fong et al. 2010). Red-legged frogs and other amphibians have been found as road-kill along Bunker Road. Bunker Road bisects Rodeo Lake and Lagoon. Rodeo Valley stables occur on Bunker Road, approximately 0.5 mile east of this location.

Red-legged frogs currently occur in extremely small numbers in the Redwood Creek watershed (Fong et al. 2010). Lower Redwood Creek Pond was constructed in 2007 in this watershed to provide red-legged frog habitat. It is located in a floodplain between the Golden Gate Dairy and Lower Redwood Creek sites. In 2010, the NPS introduced red-legged frog egg masses into the Lower Redwood Creek pond. Subsequent to the action, juvenile frogs have dispersed into adjacent Redwood Creek.

Small populations of California red-legged frogs occur in the Tennessee Valley drainage. In 2004 three red-legged frogs were found on stream surveys along the main stem of Tennessee Valley Creek, adjacent to the Lower Tennessee Valley site (Wood 2004).

**Northern Spotted Owl.** The northern spotted owl (*Strix occidentalis caurina*) is a federally listed threatened species. Marin County supports a northern spotted owl population of possibly 75 pairs, the highest known density of northern spotted owls rangewide (GGNRA 2005). Spotted owls in Marin inhabit coniferous forest, including second growth and remnant stands of Douglas fir, bishop pine, coast redwood, and mixed evergreen-hardwood habitats comprised of tanbark oak, coast live oak, and California bay (Fehring et al. 2002 as cited in GGNRA 2005).

Spotted owls are known from Kent Canyon and Camino del Canon (nesting) as well as in Muir Woods, within two miles of Golden Gate Dairy (B. Merkle pers. comm. 2010).

Threats to spotted owls in the planning area include urbanization, intense recreational pressure, disturbance from wildlife photographers and birders, genetic isolation, West Nile virus, possible catastrophic wildfire, expansion in the range of the barred owl (*Strix varia*), and habitat changes due to Sudden Oak Death (Fehring et al. 2002).

**Little Willow Flycatcher.** The little willow flycatcher (*Empidonax traillii brewsteri*) is listed as endangered by the state of California. They breed in riparian and mesic upland thickets in the United States and southern Canada. Jones and Stokes (2007) report willow flycatchers (*Empidonax traillii*) were observed at the Big Lagoon restoration site, which is in the vicinity of the Golden Gate Dairy, but the subspecies was not found to be present.

**California Black Rail.** The California black rail (*Laterallus jamaicensis coturniculus*) is listed as threatened by the state of California. Prime black rail habitat is the thin ribbon of salt marsh vegetation that occurs between the high tideline and the upland shore, a gently sloping plain with very

little elevational rise (Evens 2000). CNDDDB (2010) shows a record for California black rail in Tennessee Valley, but no breeding habitat occurs there (B. Merkle, pers. comm. 2010).

**Mission Blue Butterfly.** The mission blue butterfly (*Icaricia icaroides missionensis*) is federally listed as an endangered species. Mission blue butterflies are closely tied to the lupine larval host plants *Lupinus albifrons*, *L. variicolor*, and *L. formosus*, with *L. albifrons* considered to be the preferred host (May and Associates 2005). These host plants tend to occur on grasslands on thin, rocky soils within broader coastal scrub habitats (May and Associates 2005). Adults have one generation per year, with a flight period from mid-March to mid-May at the Marin Headlands (May and Associates 2005).

Mission blue butterflies occur at the Marin Headlands and Tennessee Valley (May and Associates 2007; CNDDDB 2010). They have not been found immediately adjacent to the sites considered in the project area, but have been found within 0.5 miles (May and Associates 2007).

**Tidewater Goby.** The tidewater goby (*Eucyclogobius newberryi*) is a federally listed endangered species and state listed species of special concern. Critical habitat for tidewater gobies occurs in Rodeo Lagoon (73 FR 5920-6006). Habitats occupied by the tidewater goby include lagoons, estuaries, backwater marshes, and freshwater tributaries. These habitats represent dynamic environments subject to considerable seasonal and annual fluctuations. Tidewater gobies have been documented in Rodeo Lagoon where a sandbar across the mouth of the lagoon during the late spring, summer, and fall partially or completely closes the lagoon during the late spring, summer, and fall and provides for relatively stable conditions. Tidewater gobies occur where the water is fairly still but not stagnant; less than one meter (3.3 feet) deep; and salinities are less than 12 parts per thousand (USFWS 2005 Federal Register 2006a). Annual surveys conducted by the NPS at Rodeo Lagoon indicate variable densities of tidewater gobies from two to 63 individuals per square meter (Fong 2006). However, other sampling efforts (1996-1999) resulted in fairly consistent densities, ranging between 6.3 and 12.2 individuals per square meter, to densities of over 40 per square meter were recorded in the fourth year (Fong 2000 as cited in NPS 2009). In the 2005 sampling effort, Fong (2006) reported 9314 tidewater gobies were caught, resulting in a mean density of 63 per square meter in Rodeo Lagoon.

**Coho Salmon.** The coho (*Oncorhynchus kisutch*) is a federally and state listed endangered species, with critical habitat in Redwood Creek (64FR24049). Redwood Creek supports a genetically distinct sub-group of coho salmon (Garza and Gilbert-Horvath 2003) within the Central California Coast Evolutionarily Significant Unit (ESU; population or group of populations that is substantially reproductively isolated from other conspecific populations and that represents an important component of the evolutionary legacy of the species). Marin County appears to support a fairly consistent small run of coho in Lagunitas and Redwood creeks.

Because of their life history, coho exist in three distinct year classes in any given stream, either as juveniles, smolts, or spawning adults. In Redwood Creek monitoring efforts have documented the existence of one weak but consistent year class with an average redd count of eight redds (five to 12 redds annually), one highly variable year class that had increased in population size to a high of 93 redds, and one variable year class with redd counts ranging from a low of 21 redds to a high of 80 redds (Carlisle et al 2008).

From 1998-2008 coho densities and population estimates in Redwood Creek varied. Over the reported years, densities of coho ranged from a low of 0.073 coho per square meter in 2006, to a high of 0.693 coho per square meter in 2004 (Carlisle et al 2008). Coho population estimates ranged from a low of 1,050 ( $\pm$  486) juveniles throughout the drainage in 2006 to a high in 2005 of 8,594 ( $\pm$  1,652) juveniles in 2005 (Carlisle et al 2008).

**Steelhead.** Steelhead (*Oncorhynchus mykiss*) are federally listed as a threatened species with critical habitat in Redwood Creek (70FR170 54288-52627). Steelhead are also a California Species of Special Concern. The total steelhead population estimate for Redwood Creek in 1998 was 9,274 ( $\pm$  1,660), dropping to 1,580 ( $\pm$  553) per square meter in 2004; which translate to densities of 0.496 to 0.142 steelhead per square meter respectively (Reichmuth et al 2005).

Small numbers of steelhead have been identified during snorkel and electrofishing surveys in Rodeo and Gerbode Creeks (Fong 2005). Although overall steelhead densities are low in Rodeo Creek, the condition of similarly aged steelhead is better in the Rodeo watershed than in the Redwood Creek watershed (Fong 2005). It is unclear whether the fish are anadromous and naturally occurring. Past historical records have indicated that Rodeo Lake was stocked by California Department of Fish and Game under U.S. Army management of the Marin Headlands. In addition, Rodeo Lagoon is closed to the Pacific Ocean for much of the year, open from a few weeks to a couple months during the winter and late spring. Spawning habitat for steelhead in Rodeo Creek is limited due to a low abundance of sandy or gravelly substrates (Fong 2005).

### 3.5.2 Other Special Status Animal Species

Twelve special status animal species have potential to occur in the project area (**Table 3-9**; CNDDDB 2010). These animals are either listed by CDFG as Species of Special Concern or as Fully Protected. Appendix E provides the full results of the CNDDDB search.

<b>Species</b>	<b>Habitat</b>	<b>Federal/State<sup>1</sup></b>	<b>Potential to occur in Project Area</b>
<b>Reptiles</b>			
Western pond turtle <i>Actinemys marmorata</i>	Ponds, marshes, rivers, streams and irrigation ditches with aquatic vegetation	-/CSC/-	Known from Big Lagoon, Rodeo Lake and Tennessee Valley <sup>2,3,4</sup>
<b>Birds</b>			
Northern harrier <i>Circus cyaneus</i>	Nests in salt or freshwater marshes, forages over grassland	-/CSC	Known from GGNRA <sup>4</sup>
White-tailed kite <i>Elanus leucurus</i>	Agricultural areas, grasslands, marshes, savannas, other open land or sparsely wooded areas; nests in forks of trees in Rodeo Valley	-/FP (nesting)	Known from Rodeo Valley

<b>Table 3-9 Fully Protected Animal Species and Species of Special Concern Potentially Occurring in the Project Area.</b>			
<b>Species</b>	<b>Habitat</b>	<b>Federal/State<sup>1</sup></b>	<b>Potential to occur in Project Area</b>
Saltmarsh common yellowthroat <i>Geothlypis trichas sinuosa</i>	Freshwater, brackish, or salt marsh; coastal swales, riparian thickets, swamps; uplands with dense ground cover	-/CSC	Known from Rodeo and Tennessee valleys <sup>3</sup>
Yellow warbler <i>Dendroica petechia brewsteri</i>	Riparian woodlands, thickets	-/CSC	Known from GGNRA <sup>4</sup>
loggerhead shrike <i>Lanius ludovicianus</i>	Annual grassland, riparian or other woodlands	-/CSC	High-suitable habitat in Project Area
<b>Mammals</b>			
Townsend's big-eared bat <i>Corynorhinus townsendii</i>	Roosts in caves, mines buildings	-/CSC	High, known from GGNRA <sup>4</sup>
Western mastiff bat <i>Eumops perotis californicus</i>	Open, semi-arid habitats including coastal scrub, grasslands, woodlands	-/CSC	High, in GGNRA records <sup>4</sup>
Pallid bat <i>Antrozous pallidus</i>	Roosts in rock crevices, buildings, bridges in arid habitats	-/CSC	High, known from GGNRA <sup>4</sup>
Western red bat <i>Lasiurus blossevillii</i>	Roosts primarily in trees, often are in edge habitats adjacent to streams, fields, or urban areas	-/CSC	Known from Tennessee Valley <sup>4</sup>
Point Reyes jumping mouse <i>Zapus trinotatus orarius</i>	Bunch grass marshes safe from inundation	-/CSC	CNDDDB record in Rodeo Valley <sup>3</sup>
American badger <i>Taxidea taxus</i>	Scrub, grassland, woodlands, chaparral with friable soils	-/CSC	CNDDDB records in Rodeo Valley <sup>3</sup>

<sup>1</sup>Status codes are defined as follows:

California State Status: CDFG Listing CSC = California Species of Special Concern; FP = Fully Protected

Sources: <sup>2</sup>Jones and Stokes 2007, <sup>3</sup>CNDDDB 2010, <sup>4</sup>GGNRA 2005, <sup>5</sup>B. Merkle pers. comm. 2010

### 3.5.3 Special Status Plants

No federal or state listed threatened or endangered species of plants are expected to occur in the project area based on information in the GGNRA Fire Management Plan EIS (GGNRA 2005); and in the Marin Headlands, based on a 2005 survey conducted in association with the MHFB Transportation Improvement and Management Plan EIS (NPS 2009). The CNDDDB search identified 20 locations of special status plants within two miles of the stables (Appendix D). A list of special status plants which may occur within the overall project region based on habitat type, elevation, and known locations in Marin County is provided in Appendix E (CNPS inventory conducted June 2010).

### 3.6 Air Quality

All alternative sites are located in southern Marin in the GGNRA. In August 2009, existing air quality conditions within the project vicinity were described in an EA for the Headlands Institute Campus Improvement and Expansion Plan. Because the Headlands Institute is within the project vicinity, the air quality setting of the recent Headlands Institute EA is considered valid for the project and is summarized and updated below.

Air quality within the San Francisco Bay Area Air Basin is under the jurisdiction of the Bay Area Quality Management District (BAAQMD). BAAQMD is responsible for implementing emissions standards and administers air quality regulations developed at the federal, state, and local levels. BAAQMD operates a regional air quality monitoring network that regularly measures concentrations of major categories of air pollutants called "criteria" pollutants. These include carbon monoxide, nitrogen dioxides, ozone, sulfur dioxide, and particulates. The San Rafael Monitoring Station is the closest such station to the study area and provides data for ozone, carbon monoxide, and PM<sub>10</sub> (particulates greater than 10µm in size). (NPS 2009).

As reported in the Headlands Institute EA, air quality monitoring data for years 2002–2004 indicated that air quality is generally quite good, and that ozone or carbon monoxide standards had not been exceeded in the monitoring period. National particulate standards had also not been exceeded, but state standards of a maximum 24-hour dose of 50 µm/m<sup>3</sup> had been exceeded a total of four times (NPS 2009). In updating prior air monitoring data for this EA, subsequent review of 2005-2007 data from the San Rafael Monitoring Station indicated consistency with prior data. Particulate standards were violated only one time in 2006. (ARB 2010) (City of San Rafael 2010).

Regional flow patterns affect air quality in the southern Marin NPS lands by moving pollutants downwind, which is generally blowing from the west or northwest. Moderate winds disperse pollutants and reduce pollutant concentrations. An inversion layer traps pollutants, primarily in the summer. Normal precipitation occurs from November through February and totals an average of 35 inches. (NPS 2009).

### 3.7 Cultural Resources

The NPS recognizes five categories of cultural resources for management purposes: archeological resources, structures, cultural landscapes, ethnographic resources, and museum objects (NPS 1998). It is not expected that ethnographic resources and museum collections will be affected by this proposal; consequently, they are not discussed further. Archeological resources, buildings, and cultural landscapes that may be impacted are described in more detail below.

**The Area of Potential Effect (APE)**

The NPS established the Area of Potential Effect (APE) in order to define the area of analysis for the assessment of direct and indirect effects to historic properties. In this case there are six discontinuous APEs. In accordance with the 36 CFR 800.16(d), the APE is defined as the geographic area within which an undertaking may directly or indirectly cause alteration in the character or use of historic properties. For analysis of effects to cultural resources for the Marin Equestrian Stables Plan, the APE is comprised of geographical boundaries of analysis which vary depending on the associated resource and source of effect(s). The APEs for the Golden Gate Dairy stables (Ranch M/Golden Gate Dairy), Tennessee Valley stables (Ranch A/B), Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds) are defined in relation to the central core areas of these National Register listed or eligible properties containing all of the contributing features that could be directly affected by project activities, and a buffer area that allows for the analysis of broader visual impacts. The combined acreage of the six APEs is 182.90.

The Lower Tennessee Valley and Lower Redwood Creek sites have been determined ineligible for the National Register, and thus the APE includes the area in which there is the potential for impacts to archeological resources, since they are still considered sensitive for the presence of subsurface archeological resources. The APE for the Marincello site, which has not yet been evaluated for its potential eligibility for listing in the NRHP, encompasses the area that contains cultural landscape features and archeological resources that could be directly impacted by one or more of the alternatives.

**Figures 3-2** through **3-7** provide aerial views of the APE for each site.

**Golden Gate Dairy stables (Ranch M)**

Golden Gate Dairy stables was historically known as Ranch M and is located along California State Highway 1 in the southern Marin County town of Muir Beach, adjacent to Redwood Creek and the entrance to the Dias Ridge Trail. The Golden Gate Dairy Stables (Ranch M) cultural landscape is a small-scale, family-owned dairy that was operated between 1898 and 1953 by a series of Azorean Portuguese companies and families. The 32.97 acre APE consists of a cluster of human dwellings and livestock-related buildings and structures arranged around a core central open area, as well as pasture lands for grazing in the rear of the property, trails used to move cows within the ranch and to pasture lands, small-scale features such as fences, and historic vegetation important to the cultural landscape. Ranch M is eligible for the NRHP under criterion A as an historic cultural landscape and at the local level as a rare surviving Azorean Portuguese dairy in Marin County (SHPO 2008b). Its period of significance is 1898 to 1953, and it is one of only two such resources within the Park.

Contributing features of Golden Gate Dairy stables (Ranch M/Golden Gate Dairy) cultural landscape include the following:

- Main House (1898)
- Hay/Milking Barn (1920)
- Creamery (1899)
- Sanitary Barn (1945)
- Outhouse
- Shed (1899)
- Internal Ranch Road
- Concrete Ranch Road
- Dias Ridge Trail
- North Windbreak
- East Windbreak

- West Windbreak
- Kitchen Garden
- Fences: Split Redwood fences, Redwood picket fence, boot scraper
- Core central open area

In addition, there are two known historic period archeological features associated with the Golden Gate Dairy cultural landscape. These were documented as GOGA00052 and GOGA00145 in the NPS archeological inventory (ASMIS) during project specific surveys conducted in 2003 and 2008. The stables area is considered to have high sensitivity to the discovery of prehistoric and historic period archeological sites and features because of its historic uses and its location on an alluvial fan above the flood plain of the Redwood Creek. One precontact site, ASMIS GOGA00051 (CA-MRN-674), exists adjacent to the western edge of the Golden Gate Dairy stables APE. An intensive archeological survey has never been conducted of the 194 acres of the Ranch M/Golden Gate Dairy property.

### **Tennessee Valley stables (Ranch A/B)**

Ranch A/B, located in Tennessee Valley, west of the city of Marin City, is also a prior dairy farm complex that was run by the Azorean-Portuguese immigrant community. It is representative of a southern Marin County dairy ranch, and it retains the essential characteristics of agriculture in Tennessee Valley from 1903 to 1950. Tennessee Valley Stables (Ranch A/B) is a vernacular, small-scale, family-owned dairy that was operated between 1903 and 1955 by a series of Azorean Portuguese companies and families. The 48.86 acre APE consists of a cluster of human dwellings and livestock-related buildings and structures arranged around a core central open area, as well as pasture lands for grazing, trails used to move cows within the ranch and to pasture lands, small-scale features such as fences, and historic vegetation important to the cultural landscape.

Ranch A/B was converted to horse boarding and a riding operation in the early 1960s. Ranch A/B is eligible for the NRHP under Criterion A as an historic cultural landscape at the local level as a rare surviving Azorean-Portuguese dairy in Marin County (SHPO 2008a). Its period of significance is 1903 to 1955, the period of ownership by Azorean dairy ranchers, and it is the second of only two such resources within the Park.

Contributing features of the Tennessee Valley Stables (Ranch A/B) cultural landscape include the following:

- Dairy Buildings – Main Barn Complex (one building with three parts constructed at different times), Hay Barn (1920), Feed Barn (pre-1928, replaced in 2002), Sanitary Barn, House Barn **(also referred to as the “red barn”)**, Stable Annex, and Auxiliary Stable
- Residences – Main Residence 1935, Auxiliary Residence (pre-1928)
- Driveways
- Rudimentary Squares
- Ranch Entrance Road
- Internal Ranch Complex Road
- Pasture Access Road
- Concrete Alley
- Old Springs Trail
- Stables (south) windbreak
- Main house (west) windbreak
- Split redwood fence
- Concrete Pads/Ramps
- Core central open area

In addition, Tennessee Valley (Ranch A/B) is considered to have high historic and prehistoric archeological sensitivity due to the past historic uses of the ranch complex and due to the alluvial fan the stable complex resides on. An intensive archeological survey has never been conducted of either the 270 acres of Ranch A/B, or of the core area of the horse stables.

### **Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds)**

The cultural resource features in this area have not been individually listed in the National Register of Historic Places. Thus, as part of the Section 106 process for this EA, a consensus determination will be conducted with the SHPO.

Fort Barry Balloon Hanger and Motor Vehicle Sheds are located in Rodeo Valley, in the Marin Headlands and within the Forts Baker, Barry and Cronkhite National Register Historic District. The Fort Barry Balloon Hanger is the only survivor of three balloon hangers built in the Bay Area by the U.S. Army in 1921 for observation balloons. Two frame vehicle sheds located in front of the balloon hanger **are rare examples of "Series 700" design structures erected by the Army during WWII. The vehicle sheds were used as a motor pool facility for the Coast Artillery. The sheds and balloon hangar are important elements of the story of defense of San Francisco Bay during WWII and the Korean War.**

In 2005, the NPS prepared the *Fort Barry Balloon Hangar and Motor Vehicle Sheds Abbreviated Historic Structures Report*, which recommends the Balloon Hangar and Motor Vehicles Sheds as eligible for listing in the NRHP as contributing structures to the Forts Baker, Barry and Cronkhite National Register Historic District (NPS 2005). The Balloon Hanger is recommended eligible for listing in the NRHP under **Criterion A at the national level for its association with the U.S. Army's tentative yet important experiments following WWI utilizing aerial balloons for spotting enemy targets.** It is the only example of its type in the nation that housed an Army Air Service reconnaissance balloon. The Balloon Hanger is also recommended as eligible for listing in the NRHP under Criterion A at the local level for its service in two important defense-related missions for balloon use with important relevance to the local story of San Francisco harbor defense. Beginning in 1940, the hanger and vehicle sheds served as a central motor pool for vehicles assigned to the Coast Artillery units during WWII. During the Cold War, the hanger was converted into a central Ordnance Repair Shop that supported the two Nike launch sites constructed in Forts Barry and Cronkhite. Lastly, the Balloon Hanger is recommended as eligible for listing in the NRHP under Criterion C at the national level as an example for a rare surviving example of an Air Service airship Hanger. Its period of significance is 1917 to 1960. Significant features of the Balloon Hanger includes its semi-rural setting in the Marin Headlands, its gambrel shape, its large open interior space, its visible interior structures, and its corrugated siding and roofing.

The Vehicle Sheds are also recommended as eligible for listing in the NRHP under Criterion A at the local level for their association with San Francisco harbor defense. In 1940, the sheds and adjacent hanger served as a central motor pool for storage and maintenance of vehicles assigned to the Coast Artillery units during WWII. During the Cold War, the sheds continued as vehicle storage for the Air Defense Units and Nike sites in the Marin Headlands. The Motor Vehicle Sheds are recommended as eligible for listing in the NRHP under Criterion C at the regional level as a sole surviving example in the San Francisco area of a once-common style of military architecture. Its period of significance is ca. 1940 to 1960. Its character-defining features include its semi-rural setting in the Marin Headlands; its **long, shallow profile; its visible interior structure; and the eastern vehicle shed's (Vehicle Shed FA-905) open bay at the northern end.**

Together with the balloon hanger, the two vehicle sheds are also recommended as contributing elements to a potential National Historic Landmark District on the Harbor Defenses of San Francisco. Contributing features of the Rodeo Valley Stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds) cultural landscape include the following:

- Fort Barry Balloon Hangar
- Western Motor Vehicle Building
- Eastern Motor Vehicle Building

In addition, the Fort Barry Balloon Hangar historic military complex is considered sensitive for historic archeological resources related to its use as a bivouac and barracks area associated with the Fort Barry Firing Range between 1904 and 1917. During that time the pocket valley of the balloon hangar was used for encampments and later barracks associated with the regional use of the adjacent rifle and pistol ranges. The APE for the stables area is also on an alluvial fan above the Rodeo Valley Creek, making the area sensitive for the discovery of precontact archeological sites. An intensive archeological survey has never been conducted of the Rodeo Valley stables area.

### **Lower Redwood Creek**

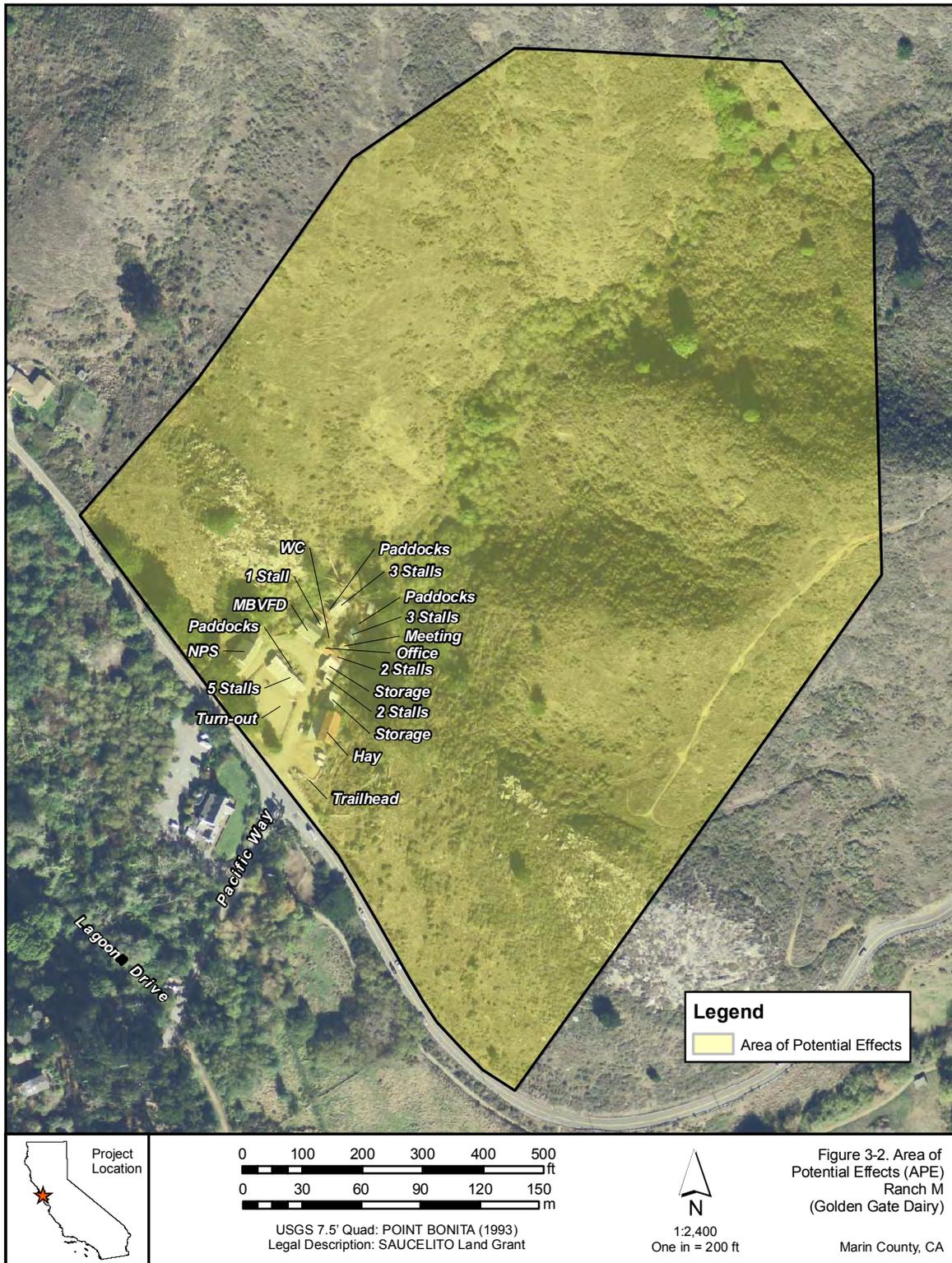
The Lower Redwood Creek site consists of the property historically known as Ranch S or Banducci Flower Farm. Located on a broad, fertile flood plain at Lower Redwood Creek, the property is bounded by Frank Valley Road and Redwood Creek to the north and by State Route 1 to the south, east, and west. It first housed a Portuguese dairy farm owned by Antone Silva around 1889 but was eventually sold to Amadeo Banducci Sr., an Italian flower grower, in the 1930s. Lower Redwood Creek was evaluated and found not eligible for the NRHP due to a lack of integrity (Osanna and Wulzen 2007: 27-29; Jones and Stokes 2007: 3-53). This APE encompasses 3.8 acres. An intensive archeological survey has never been conducted of the alternative area identified for possible Lower Redwood Creek stables.

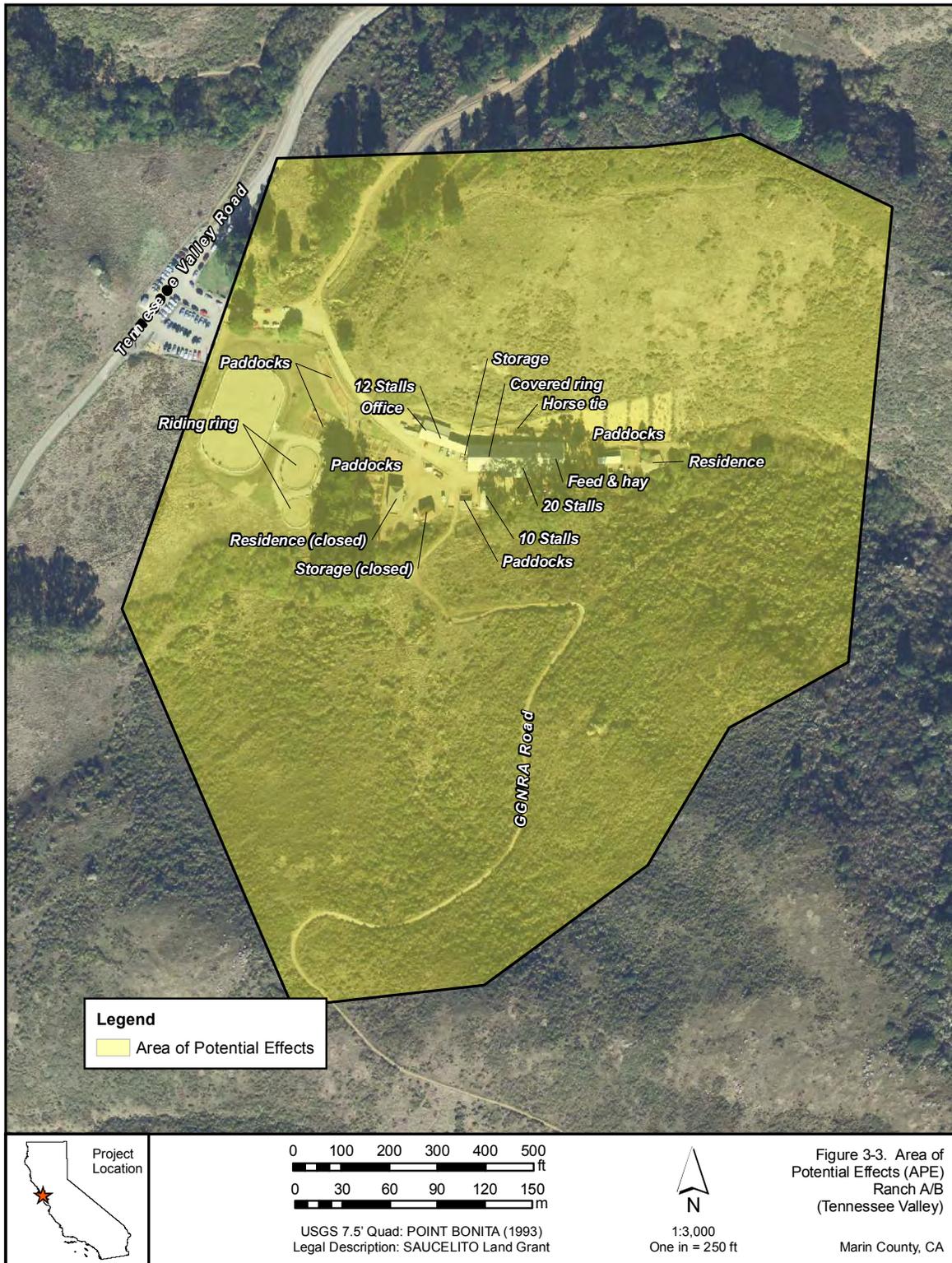
### **Marincello**

The Marincello APE encompasses 3.83 acres of open space on Marincello Trail about 0.2 miles north of the Tennessee Valley Trailhead Parking lot. This is a low-slope area that was created by fill from the creation of Marincello Road in the 1970s (personal communication from T. Williams, NPS Hydrologist, 2010). The road remnant now is called Marincello Trail and is a popular multi-use trail for hikers, runners, cyclists and equestrians. In 1964 a development called Marincello was proposed (**See "Land Conservation", below**) for 30,000 people on 2,100 acres in Rodeo and Tennessee Valleys. Marincello Road was constructed by the developers in the early 1970s as a two way road with a curbed median strip which is still visible today. An intensive archeological survey has never been conducted of the alternative area identified for possible Marincello stables.

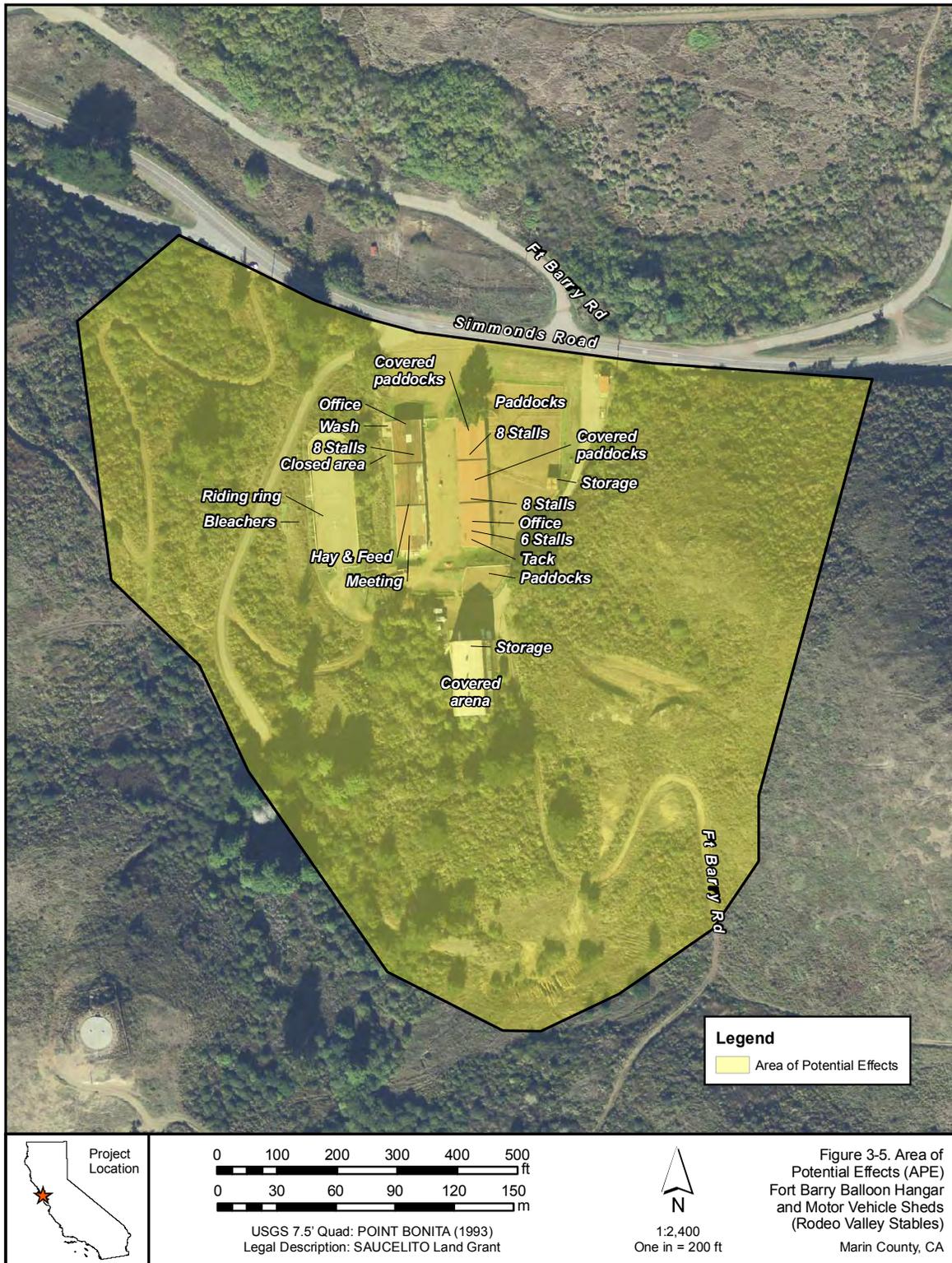
### **Lower Tennessee Valley stables**

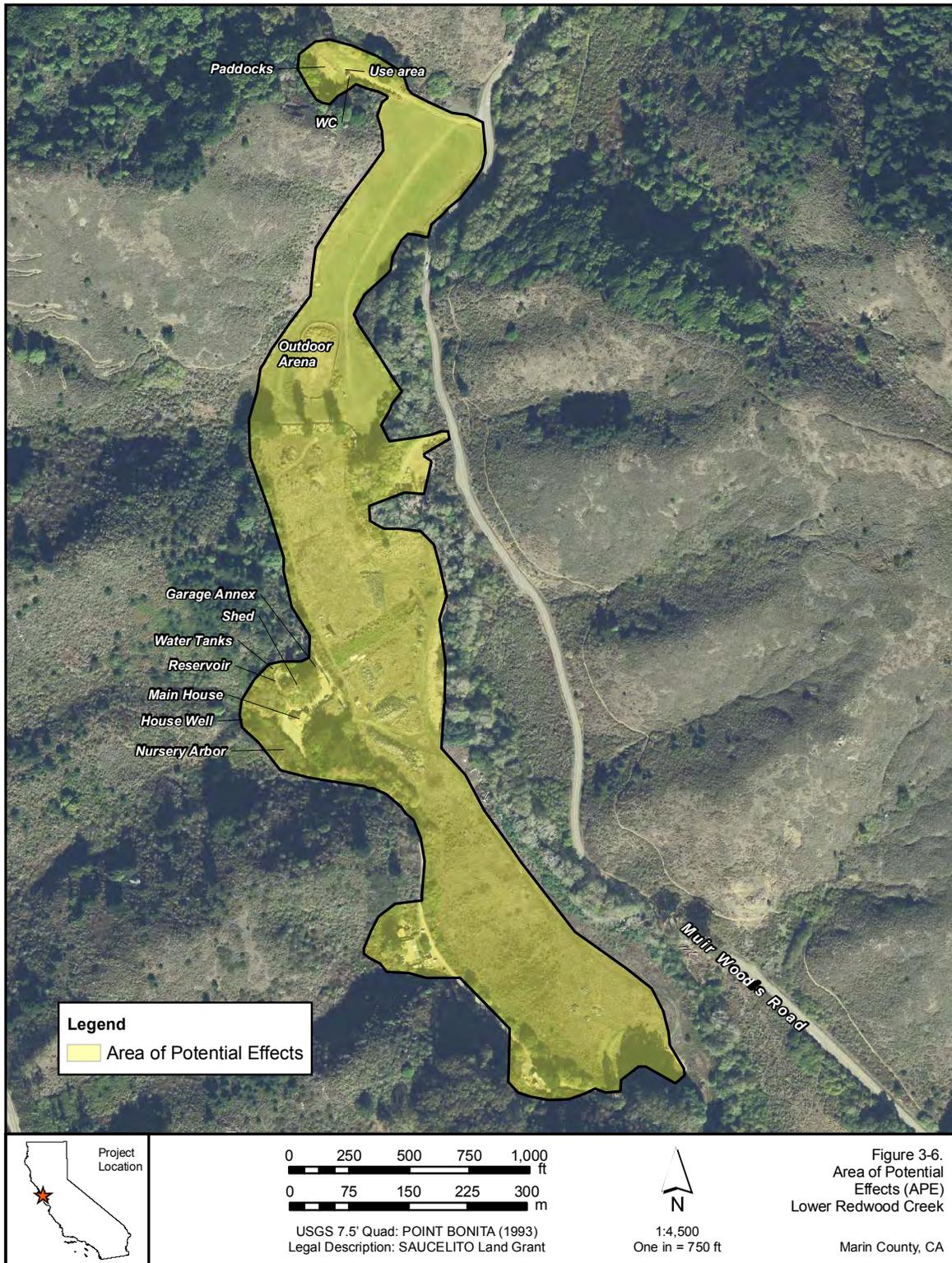
Located about .75 miles south of the Tennessee Valley stable is a former dairy farm complex similar in age and history to the Golden Gate Dairy and Tennessee Valley stables. The APE encompasses 3.81 acres. Historically known as Ranch C/D or Bettencourt Ranch, it was run by Azorean Portuguese immigrants in the late 1800s into the early 1900s. In the 1970s, Lower Tennessee Valley was converted to the Park Horse Patrol Program and the Native Plant Nursery. Aim High, a high school afterschool program, also operates a program there. There are two barns, paddocks, and sheds at the site. The ranch residence was demolished in 2010. Lower Tennessee Valley was evaluated and found not eligible for the NRHP (SHPO 2007). An intensive archeological survey has never been conducted of the alternative area identified for possible Lower Tennessee Valley stables.













## 3.7.1 Cultural Resource Context for Project Area

### 3.7.1.1 Pre-contact Archeology

The generally accepted pre-contact chronology for prehistoric archeological sites located within Marin County, specifically in coastal Marin, are based on the work of Richard Beardsley who conducted extensive studies throughout the Point Reyes National Seashore area and coastal Marin county. **Beardsley's** (1954) work resulted in the following chronological sequence for cultural adaptation as represented in the archeological record.

The McClure aspect which spanned from approximately 2500 to 1000 Before Present (B.P.);  
The Mendoza aspect, that spanned from 1000 to 500 B.P.; and,  
The Estero aspect that spanned from 500 B.P. to the Historic period.

There are three known pre-contact archeological sites in the Muir Beach area adjacent to, but outside of the Golden Gate Dairy APE. This cluster of pre-contact archeological resources may comprise an archeological district associated with the mouth of Redwood Creek since all sites appear to be eligible for listing in the NRHP individually. None of these sites is situated within the APE for the Golden Gate Dairy.

### 3.7.1.2 Indigenous Context

The indigenous people of Marin County, known as the Coast Miwok, may have lived in Marin County for as long as 8000 to 10000 years (Meyer 2005) prior to European colonization. Today, the Coast Miwok are represented by the federally recognized Federated Indians of Graton Rancheria.

The Redwood Creek watershed was controlled by the Huimen, the southernmost of about fifteen Coast Miwok tribes. The Huimen inhabited the Redwood Creek watershed area at the time of contact with European explorers and settlers (Milliken 2009). Pre-contact archeological sites, including at least three shell middens on the perimeter of the former Big Lagoon at Muir Beach, attest to its Coast Miwok heritage in the vicinity (Meyer 2003), and prominent nearby place names are derived from the Coast Miwok language.

Coast Miwok settlements were clustered around estuaries and low-lying areas (Meyer 2005). The earliest archeological record for Marin County is from a **site near Richardson's Bay, where sites dating** to as early as 5600 BP (Before Present) were found (Moratto 1984, cited in Barker 2005). The Frank Valley/Muir Beach area attracted native peoples due to its access to an abundance of resources such as food, water, fertile bottomlands and other resources (Barker 2005).

Coast Miwoks managed the land with fire, burning large areas to drive and kill game animals and to manage vegetation for grazing, travel, camping, the growth of desirable plant species, and the collection of acorns and seeds (Duncan 1989; Marin Municipal Water District 1995). Over thousands of years, these management practices shaped the distribution and species composition of native plant communities. Anecdotal accounts suggest that hillsides were dominated by native perennial bunch grasses, with trees and woody vegetation occurring mainly in ravines and canyons.

### 3.7.1.3 Historic Period

The era of Spanish exploration and settlement brought great disruption to the traditional native American ways of life and decimated native populations in the San Francisco area. In 1769 the Portola

Expedition discovered and claimed San Francisco Bay for Spain and in 1775-1776 the Anza Expedition brought settlers and founded a mission and a presidio (fort) in San Francisco (Hayes 2007).

Mexico became independent of Spain in 1822. The missions were secularized and the political center of power shifted to the land-owning elite. Regional land-use patterns still recognized today were set in place. Vast ranchos with large cattle herds became the basis for the economy. In Marin County settlers developed a large dairy industry in the 1850s. A number of the original dairy ranches continue to operate within the Park boundaries (Livingston 1995).

California briefly became an independent nation in 1846 and then joined the United States in 1850. Southern Marin County was recognized early in US history as a strategic military site for the protection of San Francisco Bay and the west coast.

The following section discusses the development of the Fort Barry Balloon Hangar and Motor Vehicle Sheds and the Azorean Portuguese dairy ranches in Tennessee Valley Ranch A/B and at Ranch M/Golden Gate Dairy. Due to their distinct historic contexts, the fort and dairy ranches are discussed separately.

### ***Fort Barry Balloon Hangar and Motor Vehicle Sheds (Rodeo Valley stables)***

The following historic context was excerpted from pages 17-25 of the National Park Service's *Fort Barry Balloon Hangar and Motor Vehicle Sheds Abbreviated Historic Structures Report* (2005) unless otherwise noted.

#### ***Pre-Hangar Era***

The site of the future Fort Barry Balloon Hangar was originally part of the sprawling Rancho Saucelito, a Mexican land grant given by the Mexican government in 1833 to William Antonio Richardson, a naturalized British citizen. In 1866 Richardson's successor owner, William Throckmorton, sold much of Rancho Saucelito to the U.S. Government for defensive purposes. The newly acquired military post was initially dubbed "Lime Point Military Reservation" but in 1892 the area was renamed Fort Baker in honor of Edwin Baker, a former senator and Union officer who had been killed during the Civil War. The boundary between the new military post and Throckmorton's land to the north was a zigzag boundary that roughly followed the course of the small stream that drained westward to today's Rodeo Beach.

The Balloon Hangar area was not developed for the first 38 years the army controlled Fort Baker. The site in its natural state was a U-shaped valley opening towards the north, drained by a small rivulet and sheltered from the prevailing westerly winds. The military first developed the unnamed valley in 1904-1905 as part of a large-scale project to establish a "Departmental Rifle Range" in Fort Baker. In December 1904 the army subdivided Fort Baker into two smaller forts — Baker and Barry — and the proposed rifle range became part of Fort Barry.

The future balloon hangar site initially served as the temporary camp site for enlisted men and officers assigned to the Departmental Range, and during the course of constructing the range the curving perimeter of the valley was carved into two parallel benches or terraces for the quarters. The upper terrace held permanent, crude, mess halls, latrines, and living quarters for officers while the lower bench held prepared platforms where enlisted men and NCOs would pitch tents for the duration of their stay at the range. By 1910, the temporary frame structures consisted of a barn, an office, a storehouse, a cookhouse, a post exchange, an officers' quarters, and six mess kitchens.

During World War I the range's housing areas were pressed into service as a fulltime cantonment for troops undergoing training at the Presidio and other nearby military posts before being shipped overseas. Following the war, the valley briefly assumed the additional role of housing ROTC cadets assigned to the San Francisco area.

#### ***Balloon Company Era***

On April 14, 1920, the 24th Balloon Company arrived at Fort Baker to begin its training and coordination activities with the Coast Artillery. Presumably, since there was no permanent hangar, the balloons were inflated for training missions such as this one and then deflated for stowage – a time consuming and probably frustrating situation for the soldiers. In late 1920 the army authorized the construction of permanent balloon hangars and Presidio of San Francisco; and Forts Worden and Casey on Puget Sound. In August and September 1920, the Construction Division of the War Department approved standardized plans for “Dirigible Balloon Hangars for Aviation Stations” to be used for the eight coast defense locations.

According to the Fort Barry “*Building Book*” maintained by the fort’s quartermaster, the Balloon Hangar was officially completed on 27 June 1921 and initially designated Bldg. No. 141. Total cost was listed as \$99,893.50.

In its original form, the Balloon Hangar was a rectangular building measuring 77’ x 120’ with sloping sides and a peaked roof, reaching an interior height of approximately 65’10”. The most notable feature of the building was a pair of sliding doors on its north façade, each measuring approximately 22’9” wide x 44’9” high, which slid open a supporting gantry to allow entry of an inflated balloon.

In addition to the hangar, the new balloon complex included a generator house located approximately 200 feet southeast of the hangar where the highly flammable hydrogen gas for inflating the balloons was located. The final element of the complex was a spacious “balloon field” located north of the hangar where the airships could be launched and retrieved, and their ground tackle laid out. The field encompassed a square area roughly 500 feet on a side that dropped in elevation roughly 40’ from south to north. The field was also crisscrossed by several roads and creeks, and does not appear to have been a prepared landing surface in the modern sense of an airfield. According to the *Air Service Newsletter* both the 24th and the 14th Companies had relocated to Crissy Field in the Presidio by November 1921.

#### ***Coast Artillery Use***

The looming but empty balloon hangar became a fixture on the Fort Barry landscape during the 1920s and ‘30s. In 1940 the United States began to mobilize its military forces for possible involvement in the expanding European war, and yet another coast artillery fort was established in the Marin Headlands to augment Forts Baker and Barry: Fort Cronkhite, located on the north side of Rodeo Lagoon. The old balloon field area north of the hangar became the site of two expansive vehicle sheds hastily constructed to house the growing fleet of vehicles assigned to the posts. These sheds were virtually identical, each measuring 46’ x 216’ and consisting of 18 covered bays arranged in three stair-stepped sections of six bays each. The sheds were constructed according to standardized drawing #700-329, and were completed in September 1940.

Midway through World War II, the hangar began to be modified from its original 1920 configuration as its use as a motor pool became firmly established. The first major alteration occurred in August 1943 when the sliding balloon doors were removed and their opening enclosed with materials salvaged from the doors. Vehicle access to the interior was now to be provided by two 10’x12’ sliding doors and personnel access was via two 3’ x 6’8” doors, one in each of the larger doors. As part of the remodeling, the steel gantry frames supporting the rolling doors, technically known as bents, were

also demolished. In November, a two-room office with adjacent latrine for the motor pool was constructed in the northeast corner of the building, just inside one of the new vehicle doors. In 1944 the vehicle sheds underwent their first alteration **when the southern third of today's Bldg. 901** was enclosed to create a paint shed.

#### ***Post-War and Cold War Eras***

The army records contain no information on uses of the balloon hangar following World War II but likely the structure was left empty. In 1951 the army began to re-arm the Headlands forts at the outbreak of the Korean War. In 1953 the army began to upgrade its anti-aircraft gun batteries with radar directed surface-to-air Nike missiles. As part of the support system for the new Nikes, the former **motor pool in the Fort Barry balloon hangar was converted into a "heavy armament repair shop" where the missiles could be serviced.** By 1954 a floor plan prepared on 21 May that year clearly **labeled the structure "Nike Assembly Area."** This drawing shows the interior of the hangar totally converted to missile servicing activities.

In 1955 the two permanent launch sites in the Marin Headlands were completed. The hangar continued to serve as a central maintenance facility for the two sites. It is not known exactly when missile repairs ceased to take place at the hangar, but it must have continued well after 1959 because in September that year, a small frame building was constructed on the south side of the hangar for an air compressor and two air receivers

#### ***Riding Stable Era***

In 1966 the Presidio Riding Stables assumed control of the balloon hangar complex. Operating under a permit from the Sixth U.S. Army, the stable members converted the former vehicle sheds into tack rooms and horse stalls, and constructed paddocks and corrals adjacent to the sheds. Inside the balloon hangar itself, a riding rink was created by lining the perimeter of the central open area with stout wooden planks and filling it with clean dirt and sand.

Throughout their occupancy of the hangar complex the Riding Stables have continued to carry out periodic upgrades to the structures, primarily to the former vehicle sheds, to deal with problems such as wood rot, poor drainage, sanitation, and security upgrades. These actions have included installation of a septic tank and leeching field in 1976; re-roofing the sheds and installing fire detector systems in 1984; installing additional wooden flooring in the stalls along with an exterior ramp to deal with bad drainage in the west paddock in 1985, and replacing the existing power distribution and electrical lighting systems in 1985. Many walls and posts in the vehicle sheds have been replaced.

In 1994 **the Presidio Stables formally incorporated themselves as the "Presidio Riding Club".** Following base closure of the Presidio, the stables were issued a permit by the Golden Gate National Recreation Area to carry out the programs.

#### ***Ranch A/B (Tennessee Valley stables) and Ranch M/Golden Gate Dairy (Golden Gate Dairy stables)***

The following historic context was excerpted from pages 21-34 of the *National Park Service's Ranch A/B (Miwok Stables), Golden Gate National Recreation Area Cultural Landscapes Inventory* (2008) unless otherwise noted.

#### ***Early History***

Ranching was introduced in the southern part of the peninsula that constituted Marin County, California, when it was subdivided as land grants, including that given to William Richardson in 1838. Richardson called the 19,571 acre holding El Rancho Del Saucelito. The Bear Flag Revolt of 1846 and

the subsequent American acquisition of California, however, eventually ruined Richardson in the frenzy of development and investment speculation that followed, so that following his death in 1856, his attorney Samuel Reading Throckmorton acquired the rancho. Throckmorton sold the southern portion of his property to the United States government as a military reservation and kept the bulk of the former rancho restricted as a hunting preserve. Following his death in 1883, the Tamalpais Land and Dairy Company acquired **3,800 acres of Throckmorton's land and developed Mill Valley, which became** a colony of the middle and upper class.

#### ***Southern Marin Dairy Ranches***

Dairy ranching had begun insignificantly in Marin County during the mission and early rancho period, when cattle raising was intended for the hide and tallow industry. The Gold Rush of 1849, however, created an immediate market for dairy products in the boomtown San Francisco. Marin County, with its cool moist climate, sufficient fresh water, and long growing season, came to be acknowledged in that period as the premier dairy region for California. Ranches developed along Point Reyes and in Olema Valley in the 1850s and 1860s are credited with being instrumental in the development of **California's dairy industry**. Although the more expansive ranches of Point Reyes Peninsula are recognized as models for dairying history in the San Francisco Bay Area, the smaller farms in the southern Marin peninsula situated closer to San Francisco also were early producers who predominantly shipped fresh milk to the city. During the 1880s, small dairy ranches appeared across the Marin landscape.

#### ***Portuguese Settlement of Marin County***

What most distinguishes the southern Marin County dairies is the history of Portuguese immigrants that owned the majority of these small ranch properties from the nineteenth century into the 1950s. Portuguese immigration to the United States extended from the mid-1800s into the late 1920s and concentrated in two areas historically: New England and California. In California large numbers of Portuguese immigrants historically settled on farms, which, in consideration of the importance of **agriculture in California's past, suggests the significance of this relatively inconspicuous community**. Whereas the Portuguese were among several groups that operated dairies as tenants throughout California, including the rest of Marin County, in southern Marin they were a clear majority presence and employed specific financial strategies and made use of family and ethnic connections to acquire and retain ranch property for generations. The relatively small scale of the ranches made them affordable to those with limited capital, and the Azorean immigrant was particularly adept at subsisting on terrain that was relatively more rugged and less fertile than the other dairying areas of Marin County.

For the period between 1910 and 1913 at the peak of Portuguese emigration, three times as many Azoreans emigrated as Continental Portuguese, in proportion with their populations. The initial emigration to the Americas developed as Azoreans hired on to whaling vessels. Like other sailors, they jumped ship for opportunities in the California gold fields. As they settled in California, the Portuguese predominantly became farmers and concentrated on the Central Coast in the 1860s, 1870s and 1880s.

#### ***Azorean Portuguese Dairies in Marin County***

The Azorean Portuguese dairying experience was representative of the periods of development within the general dairy industry. Most secondary sources indicate that the small southern Marin dairy farms operated between 1850s and 1860s may have been limited to 10 or 15 cows, were milked by hand, and were managed by tenant farmers under loose arrangement with the landowner, in particular Samuel Throckmorton. Dairy products, along with vegetables, grain, clams, wood, bricks, and hay were transported by flat-bottomed schooners to San Francisco from coastal towns like Tomales and Bolinas and landings on Richardson Bay by schooner and barge. By land dairy products travelled via a

Sausalito-Bolinas road built in 1870, and, beginning in 1884, by the North Pacific Coast Railroad stops serving these ranches. By the 1880s, the herds were averaging 100 milk cows. Some ranchers in the county leased or bought other lands in order to expand the dairy herds, and not to expand the ranch building complex. The buildings, in particular the residences, were rarely constructed as expressions of status.

Southern Marin Dairy ranchers sent 3,170,000 gallons of milk to market in San Francisco in 1889. During the 1880s and 1890s the campaign to improve sanitation standards presented further challenges to the small dairy operator. In the 1880s and 1890s public officials became alarmed over the safety of dairy products. Their concern was over the potential for milk products to transmit diseases such as tuberculosis, diphtheria, scarlet fever and typhoid. Concern focused on the location of dairies near towns, contaminated water, filthy barns, and unsanitary milking equipment. Dairies began to rebuild wooden structures with concrete flooring for easier cleaning. The use of milking barns replaced the practice of tying a cow to the corral and milking outdoors. Eventually the milking machine replaced hand-milking.

#### ***Decline of the Dairy Industry in Marin County***

Increased milk production also required that ranchers depend on extensive planting of alfalfa, which thrived in warmer climates and now was enhanced with irrigation technology. This began the shift of **focus to California's Central Valley** where the landholdings were larger and thus the investment in mechanized dairying provided a better return. Overgrazing, debt, and the 1929 stock market crash created further difficulties. The southern Marin dairy ranches in this period continued to be operated by the same families or were sold to other Azorean Portuguese. Their relatively small scale of operation undoubtedly limited their ability to implement extensive modernization. Yet, despite these challenges, the tenacity and self-sufficiency that enabled them to endure their modest beginnings sustained them through this period. The southern Marin ranches west of the suburban development along the bay shore generally continued to operate as dairies into the 1950s and 1960s.

#### ***Land Conservation***

By this time, however, southern and western Marin County was in transformation. The area had been a popular recreation destination as early as the 1870s. In 1912 hiking clubs around the Bay Area formed the Mount Tamalpais Conservation Club due to concern about the open space around the mountain and concern that they would be denied access to trails which crossed farmland. This movement inspired the creation of the Muir Woods National Monument. Eventually the whole of Mount Tamalpais became public land. The urbanization of the Bay Area following the Second World War increased public desires for recreational space. Public lands around the mountain were expanded in the 1950s and again between 1960 and 1972. Simultaneously, suburban development proposals targeted western Marin dairy ranching properties in the valleys north of the military installations at the Marin Headlands. In 1964 a development called Marincello was proposed to include fifty apartment towers interspersed with single-family housing for some 30,000 people on 2,100 acres in Rodeo and Tennessee Valleys. Vigorous public opposition eventually enabled the Nature Conservancy to purchase the majority of Marincello in the early 1970s. Legislation created the Golden Gate National Recreation Area (GGNRA) from the land acquired by the Nature Conservancy and Forts Cronkhite, Barry and Baker on the headlands. These properties, along with prospective acquisitions of rural parcels, created a link of state and federal parklands from the Golden Gate to Point Reyes. Some holdings, including **ranching properties in Rodeo, Tennessee, and Frank's Valleys, were purchased between 1972 and the early 1980s.**

The former ranch buildings in lower Tennessee Valley, as well as in Oakwood and Rodeo Valleys and along Dias Ridges, were demolished in the 1980s and 1990s. During the same period most of the ranch buildings once owned by the Brazil, Ponti, Souza and other families, and acquired for adjacent

**California State parklands in the upper Frank's Valley (the Redwood Creek watershed)** have been demolished. The Silva property, which survives at the north end of Tennessee Valley, is apparently the only remaining southern Marin County ranch compound on privately-held lands, although it lacks the barns and pasture lost to a road realignment and suburban development in the 1950s and is now overshadowed by adjacent newly-constructed large-scale residences. Only in Tennessee Valley and **Frank's Valley do two ranches remain as tangible expressions of the primary land use in southern Marin County**, despite a century of wind, fog, and changing times.

***Ranch A/B / Cunha Ranch / Tennessee Valley stables***

Ranch A/B in Tennessee Valley survives to represent the Portuguese dairy ranching in southern Marin County. The ranches in southern Marin did not generate written business or family histories, and, in particular, were largely invisible in public records during the tenancy period.

Tennessee Valley was evidently not occupied by Euro-Americans until the 1880s. One of the tenant ranch building compounds delineated was the core of the Cunha Ranch. It is the general location is the same as the current ranch complex, corral to the west, buildings clustered at the east side of the vale and set next to the creek.

Da Cunha, also known as Manuel Ferreira and Manuel de Cunha, was in Marin County as early as 1880. Born about 1849 he emigrated from the island of San Jorge (Saint George) in the Azores. Circa 1928 the owners of Ranch A/ B were identified as Manuel Ferreira Da Cunha and his wife Bella. Their holdings in Tennessee Valley consisted of 517.69 acres Ranch A, excluding the Oakwood Valley Tract, and 270.05 acres in Ranch B.

They sold the Ranch A/B property in Tennessee Valley in 1945 to John Rapozo, also of Portuguese descent. His tenants from 1947 onward were his in-laws, the Manuel and Laura Lopes. At the Cunha Ranch, as it was still called during this period, the Lopes and Rapozo either dismantled or moved the older house that was under the trees, according to later interviews with Laura Lopes. The Lopes's and Rapozo's also upgraded the barn, rebuilding it as a walk-through. The bunk houses were remembered as having burned down in the 1960s.

The Lopes family had one hundred and twenty-five head, with ninety-three milking cows. They did not raise chickens because of the sanitary regulations, but did tend a garden of potatoes, fava beans, peas, kale and cabbage, which was lost when Rapozo rented the property as a stable and constructed the paddocks. They kept three horses in the stable building. One was used for plowing and one was ridden for fence repair.

Ranch A/B no longer operated as a dairy by the 1960s, although the pastures were probably used under a lease with the tenants on the adjacent Ranch C/D where a dairy operated into the early 1970s. When the creameries switched to 2,000 gallon refrigerated stainless steel tankers they eventually dropped the smaller dairies from their route. The ranch land then nearly became a residential subdivision. When Rapozo sold 162.6 acres on October 15, 1963 to Gulf Oil, he withheld a 16.98 acre parcel where the ranch/stable was (and is still) located. Other deeds between Rapozo and Gulf Oil were recorded April 20, 1964 and July 19, 1966 completed the transfer of his property. Gulf Oil had purchased the property to augment holdings that were being planned for the massive Marincello subdivision. Before the plans were defeated by environmental activists, the developers constructed an entrance gate near the Ranch A/B. With the creation of the Golden Gate National Recreation Area, the federal government acquired the Gulf Oil property and negotiated for the property that Rapozo had retained. At some point during this period the Ranch A/B barns leased as a horse stable. In 1973 Laura P. Lopes and daughter Diane Lopes were tenants there, along with Gretchen and Marty Stone who managed the stables.

The stables at Tennessee Valley included the two extant houses, and barns, sheds, corrals, and fencing located essentially in the current footprint. The major buildings dated to the period of Cunha family ownership.

The following historic context was excerpted from pages 30-34 of *National Park Service's Ranch M (Golden Gate Dairy), Golden Gate National Recreation Area Cultural Landscapes Inventory* (2008) unless otherwise noted.

#### ***Ranch M / Bello and Company Dairy / Golden Gate Dairy stables***

In December 1898, just four days after the Tamalpais Land and Water Company (TL&W) filed a subdivision map for the bulk of Rancho Sausalito, Azorean Portuguese immigrant Constantino Bello purchased three adjacent parcels at the mouth of Frank's Valley on Marin County's Pacific coast. These included parcels were delineated as Ranch M, consisting of 194.96 acres. Except for the land purchased by William Kent to preserve the area that is now Muir Woods National Monument, all the TL&W "ranches" were purchased by men with Portuguese surnames. With the Bello purchase, a dairy complex was built in an area on the western border of Ranch M, sheltered by rocky outcroppings and on the east side of the road to Bolinas, near the conjunction of Green Gulch and Frank's Valley.

Dairying in Frank's Valley in the late 1890s, like elsewhere in southern Marin County, primarily produced milk for Sausalito, Mill Valley and San Francisco markets. In the 1900s, the ranch continued to operate during this period, most likely by Portuguese tenants. Around 1923 both the community and beach, earlier referred to as Bello Beach, were renamed Muir Beach, in honor of Muir Woods National Monument at the head of Frank's Valley.

Constantine Bello and Manuel Antonio Mattos' children, Joseph and Edith Mattos, were evidently the sole owners of Ranch M and K ca. 1928 Ranch M, was assessed as including the 28 by 40 foot thirty-year-old house, a shingled hip roof structure with six rooms. To its rear was located a 16 by 14 foot structure. To the right of that structure there was an open shed 14 by 16 feet and somewhat to the right and front of that building there was a 24 by 12 foot building. The property also included a 30 by 26 foot milk house with an 8 by 16 foot addition (the creamery measured in a 1973 NPS appraisal as a 34 by 25 shed), a 22 by 20 foot calf shed and a 90 by 40 foot milking barn, also estimated to be some thirty years of age. By 1936, Bello had leased the ranch to M.C.C. Lemos, who operated a small dairy on Ranch M with 49 milking cows. In July 1942, Bello's nieces sold the 194.96 acre ranch.

The new owners were Manuel V. and Maria Lopes, immigrants from the island of San Jorge. They upgraded, like other ranches in Frank's Valley, to a Grade A dairy with the construction of small sanitary barn and increased their herd of 30 cows to 80. In 1953, the Lopes family created a small parcel from their holdings at the northwest corner of Ranch M, at the boundary line with the State Highway on the west and Ranch R on the north. They retained this parcel. Several residences were constructed there in the 1950s where several members of the family lived. The Lopes stopped operating the dairy in this period.

Subsequently, the property, excluding the small parcel occupied by several Lopes family members, was acquired by Harvey and Helen Coverly who granted joint tenancy in Ranch M in 1968 to William D. and Dorothy Caddell, who later became sole owners. During this period the ranch was rented to Richard and Evelyn Purvier who stabled horses there from 1962 into the 1990s. Concurrently, conservationists had been working to expand the boundaries of public land in west Marin. Beginning about 1961, all the ranches upstream in Frank's Valley were acquired by California State Parks. The federal government started to acquire adjacent properties either directly or with the assistance of the

Nature Conservancy. These properties included Ranch S on the west side of the Valley, Slide Ranch to the north along Highway 1, and the Dias Ranch to the east. Caddell deeded his holdings to the National Park Service, in March 1974, and Manuel Lopes did the same in February 1976. The Caddell property included the original six room residence, out-buildings used for storage, an equestrian riding track and the former dairy building. Including the Lopes parcel, the boundaries of Ranch M were essentially intact, except for small 1948 boundary adjustment with the neighboring ranch to the south owned by George Wheelwright and a small parcel deeded to the State of California in 1954.

## 3.7.2 Cultural Resources by Category

### 3.7.2.1 Archeological Resources

Historic and precontact archeological sites within the NPS boundaries are recorded using both the California Historical Resources Information System (CHRIS), and the NPS Archeological Sites Management Information System (ASMIS). ASMIS is the NPS database for the basic registration and management of Park prehistoric and historic archeological resources. ASMIS records contain data on site location, description, significance, condition, threats to, and management requirements for known Park archeological sites.

Golden Gate Dairy stables (Ranch M/Golden Gate Dairy):

No intensive archeological survey has been conducted for the Ranch M/Golden Gate Dairy area; archeological sites identified have resulted from project specific discoveries in 2003 and 2008. There are currently two historic period archeological sites (GOGA00052 and GOGA00145) documented in the ASMIS database within the Ranch M/Golden Gate Dairy area of potential effects. These properties are directly associated with the historic uses of the Golden Gate Dairy site.

In addition, there are three documented precontact and historic period archeological sites located nearby the Ranch M/Golden Gate Dairy APE (CA-MRN-333/H, CA-MRN-674, and CA-MRN-684/H), and the stables area is considered sensitive to the discovery of precontact archeological sites because of its situation on an alluvial fan adjacent to the floodplain of Redwood Creek.

Rodeo Valley Stables:

No intensive archeological survey has been conducted for the Rodeo Valley stables area. Currently there are no documented archeological sites in this area, however its location on an alluvial fan above the Rodeo Valley Creek, and its use between 1904 and 1917 as a tent bivouac and barracks area for the adjacent Fort Barry Firing Range, make the location sensitive for the discovery of historic or precontact archeological sites.

Tennessee Valley (Ranch A/B):

No intensive archeological survey has been conducted for the Rodeo Valley stables area. The Tennessee Valley stables have been recorded in ASMIS as GOGA00373). This area is considered to have high historic and precontact archeological sensitivity due to its historic use and its location on an alluvial fan.

Lower Tennessee Valley:

No intensive archeological survey has been conducted of the alternative area identified for possible Lower Tennessee Valley stables. No archeological resources have been identified within the Lower Tennessee Valley APE. The locale is considered sensitive to the discovery of both historic and precontact archeological sites.

**Lower Redwood Creek:**

No intensive archeological survey has been conducted of the alternative area identified for possible Lower Redwood Creek stables. ASMIS site GOGA00146 (Banducci Site locale) is a predicted precontact site within this alternative area based on field collections by local residents. No site has been found, but the alternative site for the Lower Redwood Creek stables is considered sensitive to the discovery of both historic and precontact archeological sites.

**Marincello:**

No intensive archeological survey has been conducted of the alternative area identified for possible Marincello stables. No archeological resources have been identified within the Lower Tennessee Valley APE. The locale is considered sensitive to the discovery of precontact archeological sites.

**Summary**

While this section presents the known archeological resources documented within and close to the APEs for the Plan, it is possible that additional undiscovered sites exist throughout all of the APEs. Archeological resources from indigenous populations of Native Americans within the present boundaries of GGNRA typically consist of sites, such as village sites, camps, rock shelters, procurement sites such as food gathering and hunting spots or quarries for tool making, food processing sites such as shell middens, funerary sites, and trails. Isolated artifacts relating to many of the above functions may appear in areas with greater or lesser association to these sites. Historic archeological resources expected within and around military fort resources as well as historic ranching complexes would likely include privy pits, refuse deposits/dumps, and foundations.

**3.7.2.2 Cultural Landscapes**

Cultural landscapes are environmental settings that human beings have created. These effects of human activity reveal the fundamental ties between people and the land, reflecting the human need to grow food, to give form to settlements, to travel, to meet a need for recreation or work, or to bury the dead (NPS 1998). And most importantly, cultural landscapes are places where people live and reside. The NPS has identified three cultural landscapes that may be affected by the proposed project: Ranch M/Golden Gate Dairy; Ranch A/B; and Fort Barry Balloon Hanger and Vehicle Motor Sheds, which are part of the Forts Baker, Barry and Cronkite National Register Historic District.

**Golden Gate Dairy stables (Ranch M/Golden Gate Dairy)**

Ranch M/Golden Gate Dairy is a small-scale family-owned dairy that was operated between 1898 and 1953 by a series of Azorean Portuguese companies and families. The 194-acre property includes the one-acre stables, a cluster of buildings and structures arranged around a rudimentary central area, as well as the pasture lands for grazing and trails used to move the cows.

Cultural landscape features that define the character of the ranch include:

- 1) The building cluster/spatial organization of the main house, the creamery, the sanitary barn, the hay/milking barn, the outhouse and the shed that formed the body of the operational dairy around a core central area garden;
- 2) Historic circulation features including the internal ranch road, concrete cow path, and the Dias Ridge trail which was used by ranchers to access the steep pasture lands and to move the cows to the barn for milking;

- 3) Natural systems and features such as the large outcropping of rocks, the stream, and planned landscape features such as the windbreaks of cypress and eucalyptus trees and the kitchen garden;
- 4) Small scale historic features, including picket fences and split redwood fences; and
- 5) Less tangible characteristics, such as the spatial organization and the sense of feeling at the ranch.

Together these features help convey the overall design and function of the ranch and its association with early twentieth century dairy farming on the Marin Peninsula.

#### **Tennessee Valley stables (Ranch A/B)**

Ranch A/B is a vernacular small-scale family-owned dairy that was operated between 1903 and 1955 by a series of Azorean Portuguese companies and families. The 270-acre property includes a 10.3-acre core of a cluster of buildings and structures arranged around a loosely defined, core central area, as well as the surrounding pasture lands that were used for grazing.

Cultural landscape features that define the character of the ranch include:

- 1) The building cluster/spatial organization of the main house, the house barn, and the sanitary barn, which formed the body of the operational dairy around a core central area;
- 2) Historic circulation features including the ranch entrance road, internal ranch road, pasture access road, and concrete alley;
- 3) Planned landscape features such as the windbreaks of cypress and eucalyptus trees;
- 4) Small scale historic features, including split redwood fences; and,
- 5) Less tangible characteristics, such as the spatial organization and the sense of feeling at the ranch.

Similar to Ranch M/Golden Gate Dairy, these features help convey the overall design and function of the ranch and the association with early twentieth century dairy farming on the Marin Peninsula.

#### **Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds)**

Fort Barry Balloon Hanger and Motor Vehicle Sheds are located within the Forts Baker, Barry and Cronkhite National Register Historic District. The Fort Barry Balloon Hanger is the only survivor of three balloon hangers built in the Bay Area by the U.S. Army in 1921 for observation balloons. **The frame Motor Vehicle Sheds located in front of the balloon hanger are rare examples of "Series 700" design structures erected by the Army during WWII.**

Cultural landscape features that define the character of the site include:

- a. **The buildings' semi-rural setting in the Marin Headlands;**
- b. **The Balloon Hangar's gambrel shape and the Motor Vehicle Shed's long, shallow profile;**
- c. **The Balloon Hangar's large open interior space;**

- d. **The buildings' visible interior structure;**
- e. **The Balloon Hangar's corrugated siding and roofing;**
- f. **The eastern Motor Vehicle Building's (Vehicle Shed FA-905) open bay at the north end;** and,
- g. Less tangible characteristics, such as the spatial organization and the sense of feeling at the military site.

These features help convey the overall design and function of the Balloon Hangar and Motor Vehicle Sheds and their association with the defense of San Francisco Bay during WWII and the Korean War.

### **3.8 Visitor Experience**

The GGNRA is one of the most heavily visited National Parks in the United States, with the Marin Headlands being a particularly popular area of the Park, especially with local communities. The GGNRA lands surrounding the project area are unique not only in their diversity and quantity of natural and cultural features, but also in their proximity to a large population and major urban center with worldwide status as a tourist destination. This juxtaposition makes the resources and recreational opportunities readily accessible to a large number of people, and enhances the importance of the qualities for which it was set aside as a national park. Visitors can be local residents who have the **Park as part of their "backyard" as well as visitors from all over the world who have** traveled to San Francisco to see many different attractions as part of their visit. GGNRA is visited by over 16 million people annually (NPS 2009).

The project vicinity provides a variety of recreational activities including horseback riding, hiking, picnicking, walking, running, dog walking, biking, wildlife viewing, and painting. Popular trails in the area that are open to equestrians include the Miwok, portions of the Coastal Trail, Coyote Ridge, Dias Ridge, Marincello and Tennessee Valley Trails. Under current Park policy, equestrians are permitted to ride on all of these trails, as well as unpaved fire roads throughout the Park hills.

The four existing equestrian stables are operated year-round with heaviest visitation and horseback riding in dry months from May to October. Visitation at the stables is described further in the following paragraphs.

**Golden Gate Dairy Stables.** The Golden Gate Dairy is currently operated under permit by the Ocean Riders of Marin (501c7 non-profit). They have 32 members with additional sponsors, about 19 horses are stabled year-round in both wet and dry months by the club including 11 at Golden Gate Dairy and the balance nearby on private land at Green Gulch Farms. Currently, there are no formal public programs at the Golden Gate Dairy stables but the public is allowed to tie-up horses short-term. On occasion, the Golden Gate Dairy stables had child-oriented public programs and invitational programs such as pony-walk events or school days, an environmental program pilot, and **children's birthday parties**. These programs no longer occur due to NPS regulations, however, there is interest in operating a small licensed therapeutic riding program. The stables and horses are considered a valuable cultural asset by many residents and visitors in the Muir Beach community. The horses and stable are felt to provide **a valuable feature for artists and to contribute to the charm and character of the landscape.**



**Figure 3-8. Recreational Trails and Facilities in the Project Vicinity**

**Tennessee Valley Stables.** The current permittee of the Tennessee Valley Stables is the Miwok Stables Center for Preservation and Public Programs which is a non-profit 501(c)3 public benefit corporation. The operator stables 42 horses during the wet season from November to April and 52 in the summer. The Miwok Livery offers riding lessons; ring and trail classes, youth events, equestrian clinics, summer programs and boarding. These programs serve an estimated 1,108 visitors annually. Additionally, visitors are served through two public outreach programs including 1) a riding and horse care program that is during the school year and 2) riding lessons for members of the Marin General Breast Cancer Survivors Support Group. Approximately 40 special needs participants (1500 hours of services) and 80 school children take part in the outreach programs annually.

**Lower Tennessee Valley.** The Park Horse Patrol Program, located at Lower Tennessee Valley, is operated by the National Park Service. There are four horses stabled at this location. The program offers the services of 1.5 Law Enforcement rangers, more than 30 volunteers, with 12,000 visitor contacts and 8,500 volunteer hours.

Park Horse Patrol goals and activities include:

- Increase the visibility and presence of uniformed Park staff to promote the Park;
- Assist the public by answering questions about the GGNRA, provide maps, and render first aid and/or radio for assistance in emergencies;
- Support public safety and deter inappropriate activities through visible presence and by actively watching for and reporting unauthorized uses;
- Educate visitors about proper use of the trails;

- Accommodate families and visitors who want to greet the horses;
- Report trail maintenance needs;
- Maintain training and fitness of program horses to enable their use in search and rescue and other NPS law enforcement activities as needed; and,
- Provide operation and maintenance support including daily care of the horses (e.g., feeding, grooming, cleaning stalls and paddocks) and as-needed repairs to facilities.

**Rodeo Valley Stables.** The Rodeo Valley stables are operated under permit by the Presidio Riding Club with 19 horses stabled at the site in the wet months, and a capacity of eight additional horses at the horse hotel (overnight visiting horse facility). The Presidio Riding Club is a 501(c) 3 cooperative organization. The Presidio Riding Club does not offer public trail rides or lessons due to NPS regulations. Currently, there are no formal public or public outreach programs at the Rodeo Valley Stable. However, the club sponsors group events, informal horse trailer parking, picnic tables, and overnight, short-term “horse hotel” accommodations for up to eight visiting horses. The stables serve about 30 public visitors with horses per year.

**Marincello.** The site is located in an undeveloped valley approximately one-quarter mile from Tennessee Valley stables. A popular multi-use trail, Marincello Trail, provides access to the site which was developed as Marincello Road in the 1960s.

**Lower Redwood Creek site.** The site consists of a residence, mobile homes, and agricultural buildings and facilities. The overall impression is that the developed area is under private ownership which likely dissuades its use by the general public. The nearby California State Park lands have portable toilets, and a large public riding arena, and fields available for special events. Additionally about ½ mile north on the State Park lands there is a public horse camp with restroom, picnic tables, mounting ramp and paddocks.

### **Park Partners**

Partners in the Plan sites vicinity, listed below, offer a variety of recreational and educational opportunities for Park visitors.

- **Headlands Institute** - An environmental education program offering hands-on, field-based science programs, summer camp, and retreat facilities at Fort Cronkhite.
- **Aim High** - An outdoor education site that offers hands-on environmental stewardship programs for youth at Lower Tennessee Valley, in collaboration with GGNPC Native Plant Nursery.
- **Muir Beach Volunteer Fire Department** - has historically operated out of Golden Gate Dairy site.
- **Bay Area Discovery Museum (Fort Baker)**—provides educational exhibitions and programs for children focusing on the arts, humanities, science, and technology.
- **The Golden Gate Raptor Observatory (offices located at Fort Cronkhite)**—a cooperative program of staff members and volunteers offering public weekend programs.
- **The Headlands Center for the Arts (Fort Barry)**—hosts a variety of community and educational programs and private special events throughout the year.
- **The Marin Headlands Hostel/ Hostelling International** (Fort Barry) provides overnight accommodations and educational youth programs, and is available for private events and conferences.
- **Marine Mammal Center (Fort Cronkhite)**—a highly visited marine wildlife research and rescue organization providing educational programming and other events for school children and the general public. The Center’s headquarters were previously under re-construction and the visitor center, gift shop, classroom, and marine mammal hospital is now re-opened to the public.

- *The YMCA Point Bonita Outdoor Education and Conference Center (Fort Barry)*—a multi-purpose conference facility that accommodates overnight or extended stays and offers day camps, outdoor educational programs, nature hikes, picnic areas, and a dining hall.
- *Cavallo Point/ Fort Baker Conference and Retreat Center (Fort Baker)*—this conference and retreat center provides space for meetings, dining, and overnight accommodations (NPS 2009: 131-132).
- *Home Away From Homelessness (Fort Cronkhite)*—a program that provides educational destination areas for homeless youth and their families from Marin and San Francisco. One such destination is the “Beach House,” located in Fort Cronkhite. The Beach House operates five days a week and provides a relaxing nature experience for youths between the ages of five and 17.
- *Antenna Theatre (Fort Cronkhite)*—this is a non-profit arts organization which creates original work in many disciplines, sometimes in the Marin Headlands. The Antenna experience can take the shape of a carnival, an immersive maze, a performance piece, a radio program, a guided mystery tour, a sideshow or a giant walk-through sculpture. Antenna uses them all to put the audience member, or “audient,” into the middle of the action.
- *GGNPC Native Plant Nursery (Fort Cronkhite and Lower Tennessee Valley)*—the nursery supports the restoration of native plant communities in the Marin Headlands. It also grows plants for native landscaping around non-historic buildings. The nursery partners with the Headlands Institute (HI) and Aim High by providing hands-on educational programs for HI’s students along with hosting many field trips for middle and high school students.

### 3.8.1 Soundscape

In a Park setting, a natural soundscape is an area characterized by certain ambient acoustical and sound level qualities, absent the intrusion of sounds caused by humans or human technology. The natural soundscape is a component of any Park setting that is intended to be managed or appreciated as natural. The natural soundscape is viewed as a resource, as having value for its presence, and as a value to be appreciated by visitors. Many Park visitors have an expectation of seeing, hearing, and experiencing phenomena associated with a specific natural environment. The sounds made by wind, birds, ocean waves, deer, waterfalls, and many other natural phenomena are associated by visitors with unique features and resources of Parks (NPS 2004).

The natural soundscape of a Park, and visitors’ appreciation of it, is considered a component of the general visitor experience. Natural soundscapes include all natural sounds that occur within and beyond the range of sounds that humans can perceive. The NPS strives to preserve, to the greatest extent possible, the natural soundscapes of Parks (NPS 2006a, sec. 4.9). Components of the natural soundscape include such things as sounds produced by animals (birds, frogs, etc.) and those produced by physical processes (wind, water, etc.). The natural soundscape is considered the baseline condition against which current conditions are measured and evaluated.

Typical sources of human-produced noises that can intrude on a Park’s natural soundscape include vehicular noise, aircraft, construction activities, and human activity. When compared to backcountry areas, a Park’s developed area (equestrian sites, offices/residences, etc.) experiences higher noise levels as a result of, among other things, the elevated/concentrated human activity, and the concentrated vehicular traffic and mechanized noise associated with visitation and Park operations (maintenance, visitor services, etc.). Background noise in the Park is generally much lower than that expected or tolerated in developed areas in which federal noise guidelines are generally applied. Park and Park partner operations in and around the equestrian stables generate noise intermittently from personnel, vehicles, generators, hand tools such as hammers and power saws, heavy equipment such as backhoes and tractors, and smaller power equipment such as chain saws and weed-eaters. Noise from Park operations above ambient levels is currently confined primarily to daylight hours (NPS 2009).

The current ambient noise environment in the general project area is influenced by motor vehicles traveling on Highway 1 and nearby project roads. Occasional aircraft flights also contribute to the ambient noise environment.

### 3.8.2 Universal Access

The NPS strives to make **it's** programs and facilities universally accessible and to operate in compliance with the Rehabilitation Act of 1973, as amended section 504, the Architectural Barriers Act Accessibility Standards adopted May 6, 2006 and other legal requirements related to accessibility. In many cases, the NPS has adopted policies that go above and beyond these legal requirements. While the principals of universal design are not mandatory, they achieve an even greater level of accessibility than the legal minimums; therefore, the NPS encourages efforts to implement these measures whenever possible.

The NPS is also committed to creating accessible outdoor experiences. Under the Draft Final Accessibility Guidelines for Outdoor Developed Areas dated October 19, 2009, the NPS is committed to implementing accessible trails. As a historic military landscape, the Marin Headlands offers an array of trails that provide visitors with varying degrees of accessibility.

## 3.9 Transportation

The existing stable sites are currently accessed via public roads and generally provide adequate parking for equestrian visitors on site.

### 3.9.1 Roadways and Traffic

The GGNRA can be reached by vehicle via state highways 1, 101 and 280 from the north and south San Francisco Bay Area, and by highway 580 from the East Bay. Specific primary public access roads to the four existing equestrian facilities and two proposed new sites are as follows:

**Access to Golden Gate Dairy Stables.** The Golden Gate Dairy stable is accessed via State Route 1 at the southern end of Muir Beach.

**Access to Tennessee Valley and Lower Tennessee Valley Stables.** The Tennessee Valley stables and the Lower Tennessee Valley stables are accessed from State Route 1 just north of Marin City via the improved two-lane Tennessee Valley Road. Lower Tennessee Valley is 0.7 miles down a multi-use trail and is not accessible by private vehicles

**Access to Rodeo Valley Stables.** The Rodeo Valley stable is located on Bunker Road, an improved two-lane road in the GGNRA connecting with Alexander Avenue in Sausalito.

**Access to Lower Redwood Creek site.** Access to the Lower Redwood Creek site is available via State Route 1, is less than 0.5 mile north of the Golden Gate Dairy site and immediately west of the intersection of State Route 1 with Muir Woods Road. A narrow gravel road leads west from State Route 1 (parallel to Redwood Creek) for a distance of approximately 0.5 mile to the proposed site area.

**Access to Marincello site.** Access to the Marincello site is the same as for the Tennessee Valley stables. From a point just east of the Tennessee Valley stable parking area, the existing multi-use Marincello Trail leads about 1/8 mile uphill to the proposed site. The Marincello site is not accessible by private vehicles.

**Park Transportation Planning.** The Marin Headlands and Ft. Baker Transportation Infrastructure and Management Plan was approved by the NPS on August 11, 2009. The plan calls for improvements in the southern portion of the project area. Therefore, the only stable in the planning area affected by the transportation management plan is the Rodeo Valley stables.

A new trailhead and associated parking improvements are planned immediately north of the Rodeo Valley stables at Smith Road. The parking area will be designed to accommodate large vehicles, such as horse trailers, and to provide adequate space for pedestrians, bicyclists, and equestrians to safely move through this area. At the new trailhead, parking spaces will be provided on pavement for the trailhead and for special events to replace special event parking removed from the rifle range. Visitor amenities, such as information kiosks, benches, and vault toilets, would also be installed at the trailhead parking area. In addition, the perimeter of the Rodeo Valley stables parking area will be delineated (NPS 2009b).

Car-free days included in the transportation plan could affect access to the Rodeo Valley facility by increasing congestion seven days per year, when the car-free days occur.

**Transit Service.** The Golden Gate Channel and the San Francisco Bay separate Marin County from the City of San Francisco, the San Francisco Peninsula, and the East Bay communities. The Plan areas are difficult to access by persons not using private automobiles. Public transit service from San Francisco to the Marin Headlands is provided by the San Francisco Municipal Transit System (MUNI) only on Sundays and holidays. Golden Gate Transit (GGT) provides daily bus service along Alexander Avenue between San Francisco and Sausalito, but the stops are not connected to any of the Marin Headlands' primary attractions or facilities. As a result of limited transit service, 88 percent of visitors to the Marin Headlands and Fort Baker arrive by private automobiles (NPS 2009b).

**Tennessee Valley and Lower Tennessee Valley Stables.** There is no public transit service to the Tennessee Valley, Lower Tennessee Valley and Golden Gate Dairy stables.

**Rodeo Valley Stables.** Public transit service is provided to the Rodeo Valley stable by MUNI #76 bus with Sunday and Holiday service only. Buses provide service from 10 AM to 7PM on those days.

### 3.9.2 Circulation

The following describes existing vehicle and trail access to the stables and circulation within each existing stable area.

**Golden Gate Dairy Stable.** Trail access is provided via the Dias Ridge Trail. Within the site, traffic flows onto an unpaved dirt road in a semi-circular drive around the perimeter of the paddocks. A short unpaved access road extends from this semi-circular driveway to the north end of the site providing access throughout the facilities.

**Tennessee Valley Stables.** Trail access is provided via a number of trails including Tennessee Valley Trail, Marincello Trail, Old Springs Trail and Miwok Trail. An unpaved access road leads from Tennessee Valley Trailhead Parking Lot to the Tennessee Valley stables, providing a loop road through the facility. Improved trails within the site lead to various horse facilities.

**Lower Tennessee Valley Stables.** These stables are accessed via Tennessee Valley Trail along a partially paved stretch of the trail behind a locked gate. The Lower Tennessee Valley stable is about 0.7 miles south of the gate. Trail access is provided via a number of trails including Tennessee Valley Trail, and Chaparral trails. Parking is restricted and there is no vehicle circulation through the stables area.

**Rodeo Valley Stables.** Vehicle access to the stables is provided via Bunker Road. Trail access is provided via Rodeo Valley Trail and the Coastal Trail and Bobcat Trail and Bunker Trail located directly across Bunker Road. An unpaved parking area is situated adjacent to Bunker Road and access to the site can be obtained through a gate connecting the parking area to the stables or by a road along the east side of the site. A gravel service road extends about 500 feet to the south end of the facility near the hangar area providing access to the stables and paddocks area. This road loops through the site and access can also be obtained via the gravel service road on the west side of the site.

### **3.10 Visual Resources**

The study area for visual resources includes the viewshed from which the project area can be seen. This can include nearby roads, residential areas, and trails from which the sites can be observed.

The Plan vicinity is characterized by steep, coastal bluffs, rolling hills, and narrow valleys leading to Rodeo Beach, Tennessee Cove and Muir Beach. Manmade features include narrow roadways, military structures and fortifications including Fort Cronkhite, and other historic U.S. Army structures (Figure 15, NPS 2009: 124), and equestrian facilities, barns and houses of prior ranch sites.

**Golden Gate Dairy Stables.** The facilities are visible from State Route 1 and from the lower one-half mile of the Dias Ridge Trail. The stables are also visible from portions of the Pelican Inn located west of State Route 1. The site is considered an attractive visual resource, with its historic Hay Barn and other structures, equestrian uses, and natural features, such as the dramatic rock outcrops and mature native shrubs and trees. Rolling hills, an intermittent stream and associated vegetation, non-native and native trees, coastal scrub, and State Route 1 are visual resources surrounding the stables.

**Tennessee Valley Stables.** The site is characterized by stands of primarily non-native trees and grassland, surrounded by coastal scrub vegetation on rolling hills. The facilities are visible from the nearby public parking area and trailhead as well as from hiking trails in the nearby vicinity, such as:

- Tennessee Valley Trail, which passes along and within Tennessee Valley Road at the parking area and south toward the Lower Tennessee Valley stables area;
- Old Springs Trail along a hillside to the south and southeast and which passes through the stables; and,
- Marincello Trail, which heads uphill to the north from near the stables parking area.

**Lower Tennessee Valley Stables.** The site is separated from the Tennessee Valley Trail by the creek and a grove of trees. There is a screened view of the site from Tennessee Valley Trail, and more distant views to the site from Old Springs Trail and Chaparral Trail and the Coastal Trail. This site is generally remote and not visible from other public facilities and is bounded by a steep hill with a cut bank, paddocks, native trees, and views of distant rolling hills.

**Rodeo Valley Stables.** This site can be viewed from Bunker Road to the north and the Coastal Trail, which passes along the east side of the facility. Along the north side of the valley, these stables can be viewed from Rodeo Valley Trail, Bobcat Trail and Miwok Trail. The Marin Headlands and Fort Baker

Transportation Infrastructure and Management Plan calls for the Coastal Trail to connect with the Rodeo Valley Trail north of Bunker Road in the Smith Road area via a new pedestrian/horse/bike bridge. The transportation plan also calls for the development of a trail head and parking area at Smith Road. These actions will bring the public who use the trails into closer visual contact with the stables site. The interior of Rodeo Valley stables is generally devoid of vegetation and comprised of primarily stable-related uses. The balloon hangar and stable structures, which are vehicle pool structures that have been repurposed, are historic structures with aesthetic appeal. The stable facilities are immediately surrounded on the south by relatively dense stands of native trees interspersed with non-native grasslands and wetlands, and on the east and west by rolling hills.

**Marincello.** The site appears as a small valley visible from Marincello Trail. An old road is apparent through the center of the site to the east. The site, which is fill from the creation of Marincello Road in the 1960s, is covered primarily with upland vegetation and is surrounded by hills.

**Lower Redwood Creek site.** Views of the Lower Redwood Creek site from the northeast along Muir Woods Road are primarily obscured from public view by riparian vegetation along Redwood Creek, which flows between the site and the road. The interior of the site appears as a long, narrow valley with former flower-growing areas still apparent. The structures planned for reuse as stables facilities in Alternative D are elevated on a low shelf above the flood plain and creek-side fields. The valley is surrounded by upland vegetation on the south and the riparian vegetation of Redwood Creek on the north. There is visual connection to the north to the lands of the Mount Tamalpais State Park, which appear as a continuation of the Redwood Creek valley setting.

**Figures 4-1** through **4-12** provide aerial views of the proposed sites.

### **3.11 Park Operations**

A number of Park Operations could be affected to varying degrees by the alternatives. These operations include maintenance, Park outreach programs and Park Horse Patrol. Potential impacts to maintenance operations may result long-term from NPS operations sharing the use of a stables facility with a permittee. Park operations that could be affected during the demolition or construction of facilities (implementation phase) could include Park staff and programs, such as the existing GGNRA Park Horse Patrol functions located at Lower Tennessee Valley. These programs could be disrupted as part of construction.

There could be capital and operating cost impacts due to infrastructure and utilities improvements. Staffing and annual operating budgets may increase with increases in administrative oversight and site monitoring.

#### **3.11.1 Park Staff and Programs**

Park staff and programs such as GGNRA Park Horse Patrol could be disrupted or suspended short-term during relocation and construction. The following describes potentially affected staff and programs. See section 2.3.1 of this EA for more detailed information about the programs at each stable location.

**GGNRA Park Horse Patrol.** The GGNRA Park Horse Patrol operates out of the Lower Tennessee Valley stable. Two NPS Law Enforcement Rangers work part time on this program with approximately 30 volunteers and four horses. See section 3.8 that describes the operation.

**NPS Staff.** Currently, there are no full-time NPS personnel employed specifically for any of the stables sites. As described above, two Law Enforcement Rangers spend a part of their hours managing the Park Horse Patrol. Many Park staff are involved periodically in everything from managing leases and permits, testing water quality, vegetation management, and planning, to pest control, safety inspections and maintenance operations.

**Permittee/Lessee Staff.** There are 14 full time personnel employed at the existing stables and approximately 70 employees, volunteers or members who provide part-time to periodic work. All stable sites provide visitor services such as information and toilet facilities, if requested. Site-specific programs at the stables are described below:

**Golden Gate Dairy Stables.** Currently, there are no public programs offered at the Golden Gate Dairy stables. However, the public is allowed to tie-up horses short-term.

**Tennessee Valley Stables.** At this site, there are the following public programs and services:

- Overnight, short-term “horse hotel” accommodations for up to four visiting horses
- Two outreach programs including, 1) a riding and horse care program run during the normal school year and 2) riding lessons for members of the Marin General Breast Cancer Survivors Support Group
- School group visits
- Ring, trail classes and trail rides
- Youth events /open houses
- Equestrian clinics
- Summer programs

**Lower Tennessee Valley Stables.** Lower Tennessee Valley public facilities include tie-up and water for horses, and picnic tables. The Park Horse Patrol regularly interacts with the public by providing Park information, safety patrols, and education to groups they meet on the trails or that come by the stables.

**Rodeo Valley Stables.** Currently, there are no public or public outreach programs at the Rodeo Valley Stables. However, there are the following public programs/services:

- Informal horse trailer parking
- Picnic table
- Overnight, short-term “horse hotel” accommodations for up to eight visiting horses
- Group events

### 3.11.2 Infrastructure and Utilities

Infrastructure and utilities utilized at the stable sites include potable water service, sanitary sewage collection and treatment, stormwater collection, and electrical power. All these could be affected by the proposed project.

#### Potable Water

Water use is generally higher in the summer and lower in the winter, with a summer high of about 5,000 gallons per day (at 50 gallons per day for 100 horses) and 2,280 gallons per day in winter (at 30 gallons per day for 76 horses). Horses drink nonpotable water at Tennessee Valley and Lower Tennessee Valley.

<b>Site Name</b>	<b>Treated Municipal Water</b>	<b>Non potable Spring Water</b>	<b>Import Bottled Water</b>	<b>Sanitary Sewer</b>	<b>Septic System</b>	<b>Portable Toilet</b>
Lower Redwood Creek		x	x		x	
Golden Gate Dairy	Muir Beach CSD					x
Marincello						
Tennessee Valley		x	x		x	x
Lower Tennessee Valley		x	x			x
Rodeo Valley	Marin Municipal Water District			Used to have connection		x

**Rodeo Valley:** Potable water to Rodeo Valley stables is provided by the Marin Municipal Water District through a metered main near the intersection of Alexander Avenue and East Road. The distribution system is gravity fed from a reinforced concrete storage tank, where it is rechlorinated by the Park prior to distribution to the Marin Headlands. The Presidio Riding Club is metered and uses a summer average of 10,000 gallons a month.

**Lower Redwood Creek/Tennessee Valley/Lower Tennessee Valley:** Non-potable spring water and imported bottled water is used at the Lower Redwood creek site and the stables at Tennessee Valley and Lower Tennessee Valley. Tennessee Valley includes residential use for two people in one residence.

**Golden Gate Dairy:** This stable is serviced by metered water from the Muir Beach Community Service District.

### **Sanitary Sewage**

Sanitary sewage is currently managed at the existing equestrian stables via operator-provided portable toilets. However, the NPS maintains an existing residential sewage field septic system at the Tennessee Valley site to serve the Bunkhouse residence. The Lower Redwood Creek site has a septic system.

### **Stormwater**

At each site, stormwater either sheet-flows onto natural terrain or is collected in ditches or drains and discharged to surface waters.

### **Electricity**

Pacific Gas & Electric supplies electrical utility needs to the stable sites. The electrical distribution system is believed to be in fair condition. No power is readily available at Marincello site and the power infrastructure would need to be installed from 1,000 feet away.

### **Fire Suppression**

The Tennessee Valley site has two 500-gallon tanks supported by an emergency generator and fuel for fire suppression. Rodeo Valley and Golden Gate Dairy stables currently have pressurized treated water available.

## CHAPTER 4. ENVIRONMENTAL CONSEQUENCES

The National Environmental Policy Act requires the disclosure of environmental effects of proposed federal actions, and of any adverse environmental effects that cannot be avoided should the preferred alternative be implemented. The Environmental Consequences chapter analyzes both beneficial and adverse impacts that would result from implementing any of the four alternatives described in this Marin Equestrian Stables Plan Environmental Assessment. In addition, this chapter includes a **summary of laws and policies relevant to each impact topic, definitions of impact “thresholds”** (negligible, minor, moderate, major), explanations of methods used to analyze impacts, and the analysis methods used for determining cumulative effects. The most detailed information is presented under Alternative B with the subsequent analyses in Alternatives C and D referring back to Alternative B for more detailed descriptions.

As required by the Council on Environmental Quality (CEQ) regulations implementing NEPA, a summary of the environmental consequences for each alternative is provided in **Table 2-11**. The resource topics presented in this chapter, and the organization of the topics, correspond to those presented in Chapter 3, Affected Environment.

### **4.1 Summary of Laws and Policies**

Three overarching environmental protection laws and policies guide the actions of NPS in the management of the parks and their resources; the NPS Organic Act; NEPA and its implementing regulations; and the National Parks Omnibus Management Act. For additional information on relevant laws and regulations, please refer back to the *Summary of Laws, Regulations, and Policies* in Chapter 1, *Purpose and Need*.

The NPS Organic Act of 1916 (16 U.S.C. 1) commits NPS to making informed decisions that perpetuate the conservation and protection of Park resources unimpaired for the benefit and enjoyment of future generations. NEPA, passed in 1969, is implemented through regulations of CEQ (40 CFR 1500–1508). NPS has, in turn, adopted procedures to comply with NEPA and CEQ regulations **as found in Director’s Order 12: Conservation Planning, Environmental Impact Analysis, and Decision-making** (NPS 2001), and its accompanying handbook. The National Parks Omnibus Management Act (Omnibus Act, 16 USC 5901 et seq.) underscores NEPA in that both are fundamental to Park management decisions. Both acts provide direction for connecting resource management decisions to the analysis of impacts, and for communicating the impacts of these decisions to the public through the use of appropriate technical and scientific information. Collectively, these guiding regulations provide a framework and process for evaluating the impacts of the proposed alternatives for improvement/expansion actions within the Marin Equestrian Stables Plan and GGNRA.

### **4.2 General Analysis Methods**

The analysis of impacts follows CEQ guidelines and Director’s Order 12 procedures. This includes the application of results of relevant scientific research related to Park resources conducted within GGNRA and the Plan stables areas in particular. It also includes the use of other best available scientific literature applicable to the region and setting, the resources being evaluated, and the actions being considered in the alternatives.

All alternatives have been evaluated for their effects on the resources and values determined during the alternatives development and scoping processes. For each impact topic, impacts are determined with regard to thresholds of effect, context, intensity, duration, and timing. Impacts and cumulative effects are discussed in each impact (direct and indirect) topic. Definitions of intensity levels vary and are defined under each impact topic.

### 4.2.1 Assessment Methods

For each impact topic, thresholds are established to determine the magnitude, intensity and extent of effects. These thresholds are generally derived from best professional judgment and scientific literature. Assessment methods and specific thresholds are identified under each topic area.

### 4.2.2 Type of Impact

**Beneficial:** A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.

**Adverse:** A change that moves the resource away from a desired condition or detracts from its appearance or condition.

### 4.2.3 Context and Duration

**Local:** Occurs primarily within the immediate vicinity of any given Plan stable site and to a lesser extent in the southern Marin vicinity.

**Regional:** Occurs throughout the NPS lands in southern Marin, and/or in the surrounding Park lands and communities.

**Short term:** Impacts that would not continue beyond the action itself (e.g. would last only during construction).

**Long term:** Impacts would extend beyond the period of construction.

### 4.2.4 Geographic Analysis Area

The geographic boundaries of analysis vary depending on the location of affected resources and sources of effects (see **Figure 2-1**).

### 4.2.5 Cumulative Impact Scenario

CEQ regulations implementing NEPA require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as “impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions” (40 CFR 1508.7).

Guidance for implementing NEPA (Public Law 91-190, 1970) requires that federal agencies identify the temporal and geographic boundaries within which they would evaluate potential cumulative effects of an action and the specific past, present, and reasonably foreseeable projects that would be analyzed. Geographical boundaries of analysis vary (e.g., local, regional) depending on the associated resource and source of effect(s).

The projects considered for the cumulative impact analysis are described below. Some may or may not be relevant to specific topical subjects. While this information may be inexact at this time, major sources of impacts have been assessed as accurately and completely as possible using available data. Their relevance to specific resource topics is discussed or elaborated within the impact discussion of each topic. Cumulative impacts are addressed for all alternatives, including the No Action Alternative.

The following identifies applicable current plans and projects and completed plans and projects for the GGNRA, the nearby Mt. Tamalpais State Park, and communities in close proximity to the GGNRA. Projects too geographically distant from the Plan area or otherwise not considered likely to produce effects that could reasonably be expected to add cumulatively to the Plan effects are not included.

### ***GGNRA - Current Plans and Projects***

Plans and projects of the GGNRA that could have cumulative effects with the Plan and are in the planning and environmental stage or are otherwise not yet completed are described below.

Headlands Institute Campus Planning. The Headlands Institute, an environmental education park partner on the east side of Fort Cronkhite, has proposed to enhance the Fort Cronkhite campus. The renovated campus is to be a teaching model of stewardship and sustainable living with state-of-art learning facilities to match and make the most of the unique resources of the Marin Headlands. The current campus accommodates 10,000 students a year and the project would expand its programs up to 25,000 students a year. Increased visitor use at the Headlands Institute may take advantage of future public programming at the nearby Rodeo Valley stables.

Forts Baker, Barry & Cronkhite Historic Resource Study. NPS prepared a historic resource study of Forts Baker, Barry, and Cronkhite in November 1979. The document provides a historic context for the development and use of each fort and a list and description their historic structures. Additionally it provides recommendations for the preservation, restoration, or rehabilitation treatment of contributing structures as appropriate and for the removal of non-contributing structures. Equestrian facilities are located at within Fort Barry.

Marin Headlands and Fort Baker Transportation Management Plan. The purpose of the MHFB Transportation Plan is to provide improved access to and within the Marin Headlands and Fort Baker for a variety of users and to initiate these improvements in a way that minimizes impacts to Park resources. Specific components of the plan relevant to this equestrian Plan include:

- Bunker Road widening, intersection improvements (completion expected in 2012).
- Smith Road modifications north of Rodeo Valley Stables (completion expected in 2012).
- Parking lot improvements at Smith Road and Rodeo Valley Stables (completion expected in 2012).
- Trail improvements in the vicinity of Rodeo Valley Stables (completion expected in 2012).

Marin Headlands and Fort Baker Cultural Landscape Report - Draft. The purpose of the MHFB CLR is to determine treatment actions at historic properties. This ongoing study will be completed in 2012. The treatment for the Rodeo Valley stables which lies in this Historic District will be rehabilitation of an historic site and buildings for current Park use.

Marine Mammal Center Site and Facilities Improvements. The Marine Mammal Center (MMC), a park partner, is a marine wildlife research organization that rescues and rehabilitates injured, sick, or orphaned marine mammals for return to the wild. In 2002, NPS and the MMC prepared an environmental analysis for improvements; the scope of the project was to renovate the existing facilities and site to provide better care for marine mammals and to provide for improved visitor and

educational facilities. Construction was completed in 2010 and the facility has been reopened. Remaining phases are expected to be completed in 2011 - 2012. Increased visitor use at the facility may take advantage of future public programming at the nearby Rodeo Valley stables.

General Management Plan for the GGNRA and Muir Woods National Monument Update. A new GMP that builds on the 1980 GMP is currently underway. The Park anticipates completing the final plan and EIS in 2011 - 2012. This multi-year public planning process would result in a document that articulates the long range vision for the future of NPS-managed lands within the Park boundary. The new GMP would have a particular emphasis on lands that have been added since the 1980 GMP, including lands in San Mateo County, and lands where conditions or knowledge of resource sensitivity have changed since the 1980 plan was completed. As part of the GMP process, NPS would also study long-term locations for Park operational facilities, including needs for maintenance and public safety. NPS has been coordinating planning between the equestrian Plan and the General Management Plan update.

Wetland and Creek Restoration at Big Lagoon, Muir Beach. The Wetland and Creek Restoration at Big Lagoon is a joint project of NPS and the County of Marin. The project area is located at Muir Beach near Golden Gate Dairy stables at the mouth of the Redwood Creek Watershed. The project area includes 38 coastal acres encompassing the entire wetland, creek, and riparian area extending from just downstream of Highway 1 to the beach, including a small intermittent tidal lagoon at the beach. The project involves three components: (1) ecological restoration, (2) public access upgrades, including a reconfiguration of the existing parking lot, and (3) replacement of the Pacific Way Bridge. The project is under construction and is scheduled to be completed in 2012. There are construction-related impacts to Golden Gate Dairy stables operations; temporary paddocks have been built north of the stables site and offsite paddocks would be permanently removed.

### ***GGNRA - Completed Plans and Projects***

Plans and projects of the GGNRA that could have cumulative effects with the Plan and are completed are described below.

Dias Ridge Trail Restoration and Trail Improvement Program. GGNRA, in partner with California State Parks (CDPR), has completed the Dias Ridge Restoration and Trail Improvement project. The project realigns trail segments and restores degraded areas on Dias Ridge in the vicinity of Golden Gate Dairy. The project provides better quality trails that include horse use. Trailhead development would occur within equestrian stables area at Golden Gate Dairy.

GGNRA Fire Management Plan. NPS issued a Record of Decision for the Final Fire Management Plan EIS in February 2006. The project is a strategy for managing fire in the Park to reduce risks to the public, firefighters, sensitive resources, and Park facilities. Fire management policies that apply to the project area include prescribed burns to manage coastal scrub, prescribed test burns to enhance mission blue butterfly habitat, and the reduction of fuel hazards near historic structures and heavily developed areas that receive high visitation. The equestrian facilities are located within the Fire Plan area.

Limited Historic Structures Report for Balloon Hangar and Motor Vehicle Sheds. NPS prepared an abbreviated historic structures report for the Fort Barry Balloon Hangar and Motor Vehicle Sheds. The **report documents the buildings' existing conditions and provides for their maintenance and preservation.** It includes detailed physical descriptions of each building; an extensive historic context regarding the construction, development, use of the buildings by the U.S. Army; and a statement of significance and evaluation for their listing in the National Register of Historic Places (NRHP). Equestrian facilities are located at this site.

Lower Redwood Creek Floodplain and Salmonid Habitat Restoration. The purpose of this project is to restore natural hydrological processes to the project area for the benefit of aquatic and terrestrial fauna and for long-term creek recovery. Actions would continue to be implemented as funds become available. The project may affect mitigations in place to protect the Lower Redwood Creek site and Golden Gate Dairy stables and the project may enhance water quality.

#### ***Mt. Tamalpais State Park - Current Plans and Projects***

Plans and projects of the Mt. Tamalpais State Park that could have cumulative effects with the Plan and are in the planning and environmental stage or are otherwise not yet completed are described below.

Bootjack Trail Repair. Plans are being prepared for repairing two miles of Bootjack Trail between Panoramic Highway and Muir Woods. This project would involve a slide repair, a small number of rerouted sections, bridge replacements, step and retaining wall repairs and general tread and drainage repairs. Completion is expected in 2011.

Deer Park Fire Road Rehabilitation and Drainage Improvements. CDPR is planning rehabilitation and drainage improvements for Deer Park Fire Road to improve sustainability and limit sedimentation into the Redwood Creek watershed. CDPR would work with NPS on this project as the road is on both properties.

Dias Ridge Trail Restoration. CDPR has begun restoration of the State portion of the Dias Ridge Trail. Completion of the State Park section is anticipated in 2011.

Mt. Tamalpais State Park - Additional Plans and Projects. Twelve additional current and completed plans and projects administered by Mount Tamalpais State Park were reviewed including trails, parking lots and infrastructure projects. These projects were evaluated for potential cumulative effects and were found to have no effects associated with this equestrian plan.

#### ***Marin County Current Plans and Projects***

Twenty-six current and completed plans and projects administered by Marin County were reviewed including infrastructure projects, residential and institutional development. These projects were evaluated for potential cumulative effects and were found to have no effects associated with this equestrian plan.

## **4.2.6 Impairment Analysis**

NPS is required to evaluate the potential effects of proposals as to the likelihood they would cause “**impairment**” of Park resources and/or values. An action results in impairment when its impacts “**harm the integrity of Park resources or values**” (NPS 2006a). “**Whether an impact meets** this definition depends on the particular resources and values affected; the severity, duration and timing of the impact; the direct and indirect effects; and the cumulative effects of the impact in question and **other impacts**” (NPS 2006a).

Established by the 1916 Organic Act, one of the primary purposes of the national park system is the mandated conservation of Park resources and values. NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adversely impacting Park resources and values. Although NPS has the discretion to allow certain impacts within Parks, that discretion is limited by the statutory requirement that Park resources and values remain unimpaired unless a specific law directly provides otherwise. An impact to any Park resource or value may constitute impairment, but an

impact would be more likely to constitute impairment to the extent that it has a major or severe adverse effect upon a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the Park;
- Key to the natural or cultural integrity of the Park; or,
- Identified as a goal in the *Park's General Management Plan* or other relevant NPS planning documents.

An analysis of the potential for resource and/or value impairment has been included for the following topics: vegetation, wildlife, species of special concern (including threatened and endangered species), soils, water quality/resources, air quality, visual resources, and cultural resources. Visitor experience, Park operations, transportation, and seismic/landslide hazards are not considered Park resources or values and, therefore impairment statements are not provided for those topics.

### ***Unacceptable Impacts***

The impact threshold at which impairment occurs is not always readily apparent. Therefore, NPS would apply a standard that offers greater assurance that impairment would not occur. NPS would do this by avoiding impacts that it determines to be unacceptable. These are impacts that fall short of impairment, but are still not acceptable within a particular Park's environment. Park managers must not allow uses that would cause unacceptable impacts; they must evaluate existing or proposed uses and determine whether the associated impacts on Park resources and values are acceptable.

Virtually every form of human activity that takes place within a Park has some degree of effect on Park resources or values, but that does not mean the impact is unacceptable or that a particular use must be disallowed. Therefore, for the purposes of these policies, unacceptable impacts are impacts that, individually or cumulatively, would be inconsistent with a **Park's** purposes or values; or:

- Impede the attainment of a **Park's** desired future conditions for natural and cultural resources as identified through the Park's planning process; or
- Create an unsafe or unhealthful environment for visitors or employees; or
- Diminish opportunities for current or future generations to enjoy, learn about, or be inspired by Park resources or values, or unreasonably interfere with Park programs or activities, or an appropriate use, or the atmosphere of peace and tranquility, or the natural soundscape maintained in natural, historic, or commemorative locations within the Park, or NPS concessioner or contractor operations or services.

In accordance with *Management Policies 2006*, Park managers must not allow uses that would cause unacceptable impacts to Park resources. To determine if unacceptable impacts could occur to the resources and values of GGNRA, the impacts of proposed actions in this EA have been evaluated based on the above criteria. A determination on unacceptable impacts is made in the Conclusion section for each of the resource topics carried forward in this chapter.

## **4.3 Geology and Soils**

### **4.3.1 Guiding Regulations and Policies**

The NPS Management Policies 2006 (NPS 2006a) directs Parks to "...preserve and protect geologic resources as integral components of **Park natural systems,**" referring to both geologic features and geologic processes. The Service would assess the impacts of natural processes and human activities on geologic resources; maintain and restore the integrity of existing geologic resources; integrate geologic resource management into Service operations and planning; and interpret geologic resources

for Park visitors. In addition, section 4.8.1.3 (*loc cit*) states that the NPS would work closely with specialists at the United States Geological Survey (USGS) and with local, state, tribal, and federal disaster management officials to devise effective geologic hazard identification and management strategies. Other alternatives would be considered when planning in areas where natural processes are considered to be potentially hazardous. Geologic processes would be addressed during planning and other management activities in an effort to reduce hazards that can threaten the safety of Park visitors and staff and the long-term viability of the Park infrastructure (NPS 2006a).

NPS Management Policies 2006 (NPS 2006a) states that paleontological resources, including both organic and mineralized remains in body or trace form, would be protected, preserved, and managed for public education, interpretation, and scientific research. The Service would take appropriate action to prevent damage to, and unauthorized collection of, fossils. All NPS construction projects in areas with potential paleontological resources must be preceded by a preconstruction surface assessment prior to disturbance. For any occurrences noted, or when the site may yield paleontological resources, the site would be avoided or the resources would, if necessary, be collected and properly cared for before construction begins. Areas with potential paleontological resources must also be monitored during construction projects (NPS 2006a).

NPS Management Policies 2006 (NPS 2006a) directs Parks to “...prevent, to the extent possible, the unnatural erosion, physical removal, or contamination of the soil or its contamination of other resources.” When soil excavation is an unavoidable part of an approved facility development project, the Service would minimize soil excavation, erosion, and off-site soil migration during and after the development activity.

NPS Management Policies 2006 (NPS 2006a) states that the NPS would “...manage watersheds as complete hydrologic systems and minimize human-caused disturbance to the natural upland processes that deliver water, sediment and woody debris to streams. These processes include runoff, erosion and disturbance to vegetation and soil caused by fire, insects, meteorological events and mass movements.”

The Alquist-Priolo Earthquake Faulting Zone Act of 1972 was signed into law to identify existing active faults and to restrict development that may be threatened by future surface fault rupture. Specifically, the act prohibits the location of structures for human occupancy across the trace of active faults.

## 4.3.2 Assessment Methods

### **Thresholds**

The following impact thresholds were established to describe the relative changes in soils and geologic processes, or loss of geologic resources under the various alternatives being considered. Types of impacts (Beneficial, Adverse, and Cumulative) are defined in Chapter 4.2.2.

- |                    |  |
|--------------------|--|
| <b>Negligible:</b> | Changes in the rate of erosion, soil function, or loss of topsoil or native soils would be at the lower levels of detection.   |
| <b>Minor:</b>      | Changes in the rate of erosion, soil function, loss or gain of topsoil or native soils would be perceptible. Slight changes to geologic materials or processes would be measurable. Slight changes to soil chemistry/nutrients would be perceptible in localized areas. Important or unique soils could be affected, but the overall character in a particular area of the site would remain as it is now. |

**Moderate:** Changes in erosion, soil function or gain or loss of topsoil or native soils would be noticeable. Addition or depletion of soil nutrients would be altered. Geologic processes and materials would be disturbed. Important or unique soils could experience observable or measurable effects, and the character of the site may be perceptibly altered.

**Major:** Changes in geology, soil erosion, soil function, chemistry or gain or loss of topsoil or native soils would be substantial and highly noticeable, altering the character of the site in an obvious way. Important or unique soils could experience large-scale loss at the site.

### 4.3.3 Impacts of Alternative A - No Action

Alternative A (No Action) would be the retention of the four existing GGNRA stable facilities and their continued management and operations. No new equestrian facilities would be developed and no additional horses, stalls or other facilities would be added to the existing sites except for modifications for NPS ABAAG (Architectural Barriers Act Accessibility Guidelines) compliance as determined by the NPS. Current resource protection measures intended to lessen impacts on natural resources found near the equestrian facilities would remain in place; these include continued site maintenance, horse location, waste management, riparian buffers, animal exclusion from waterways, removal of animals from sloped paddocks in the wet season to control erosion, and dry-season wet-down of paddocks to minimize dust. All four stables have done drainage work with grading, ditches and storm drains, and have mulched and relocated paddocks away from streams to protect water resources and to allow vegetation to grow.

Continued adverse impacts to soils by erosion would be expected with selection of the No Action Alternative, since management and use of the equestrian facilities would continue largely as it is done currently aside from the aforementioned continuing site improvements. Erosion occurs mainly in bare soils in paddocks or unpaved horse program or parking areas within each stables site. Activities that typically produce some degree of soil erosion, such as vegetation removal, excavation and stockpiling soils, off road or off trail travel and others would be minimal and localized. Most of these activities would occur on soils that have previously been disturbed.

Retention of the existing GGNRA stable facilities, management and operation plans would contribute to existing impacts from soil erosion. The existing stables are located mostly in low to gently sloping, poorly drained sites. Under the No Action Alternative, stormwater runoff, surface water drainage, soil compaction and sediment transport from parking areas, trails and un-vegetated areas of the site would not be further mitigated. These factors would all contribute to increased potential for soil erosion, especially during heavy precipitation events. These impacts would likely be adverse, negligible to minor and localized.

In some cases a net positive impact to soil resources nearby the stables sites could result from other projects; for example, improved signage on trails and at trailheads could reduce off-trail traffic, thereby reducing vegetation removal, soil erosion and localized soil compaction. These impacts would be negligible to minor, positive and localized.

Since each of the existing sites has a long history of prior disturbance, selection of the No Action Alternative would probably not contribute to additional soil compaction to a quantifiable degree. However, additional compaction would be expected, with impacts ranging from negligible to minor, adverse and localized.

No further practices for controlling nutrient inputs would occur with selection of the No Action Alternative, the rate and intensity of alteration of soil chemistry would likely continue its present course due to manure and other organic waste material contamination. With sufficient time, these would likely lead to long-term, minor to moderate negative impacts to the soils in localized areas, and moderate impacts to aquatic and riparian habitats downstream.

The table below outlines the impacts of soil erosion, soil compaction and soil nutrient inputs at each of the equestrian facilities with selection of Alternative A.

<b>Table 4-1 Alternative A - Soil Erosion, Compaction and Nutrient Input</b>			
<b>Stable</b>	<b>Soil erosion</b>	<b>Soil compaction</b>	<b>Soil nutrients</b>
<b>Golden Gate Dairy</b>	Negligible to minor adverse impacts with current management practices; impacts ranging from short- to mid-term. Activities with potential to dislodge soil resources such as vegetation removal; excavation, augering and stockpiling of soils; and off-road or off-trail travel would occur in previously-disturbed areas. No further mitigation measures to prevent erosion from surface water or storm water runoff, un-vegetated or other exposed soil areas would be instigated.  Negligible to minor positive impacts to soil erosion could occur with improved signage on trails and trailheads reducing off-trail traffic, thereby reducing vegetation disturbance or removal.	Negligible to minor adverse impacts with current management practices; impacts ranging from short- to mid-term. Activities with potential to contribute to soil compaction (horse, vehicle and pedestrian traffic) would continue largely as they are currently. No further mitigation measures to prevent compaction would be instigated; this could lead to possible erosion increases due to increased potential of vegetation removal and the decreased ability for water infiltration into the soil, thereby increasing possibility of runoff.	Negligible to moderate adverse impacts with current management practices; impacts ranging from mid- to long-term. Infiltration of biological waste products (horse manure and urine) would continue with no further mitigation measures in place. Decreased ability for native plant utilization of soil nutrients and increase possibility of non-native plant colonization could contribute to soil erosion and possible reductions in aquatic habitat in streams. Increased potential for water pollution of waterways in immediate vicinity and downstream of stable areas.
<b>Lower Tennessee Valley</b>	Same as above	Same as above	Same as above
<b>Tennessee Valley</b>	Same as above	Same as above	Same as above
<b>Rodeo Valley</b>	Same as above	Same as above	Same as above
<b>Marincello</b>	Not applicable	Not applicable	Not applicable
<b>Lower Redwood Creek</b>	Not applicable	Not applicable	Not applicable

### **Cumulative Impacts**

The No Action Alternative would result in no cumulative impacts to soils.

### **Conclusion**

Impacts associated with selection of Alternative A, both positive and adverse, are likely to be localized and minor given the degree of prior disturbance to the soils and local geologic setting at the four existing equestrian facilities. Since no changes in soil usage or management would take place other than the incremental changes as required by law and NPS policy, minor negative impacts to soils would be expected with further degradation of the resources under the current management practices. In a regional context, cumulative impacts to soils from the selection of Alternative A would have highly variable degrees of impacts to the soils and geologic resources in the vicinity of the Plan sites.

No impairment of Park resources or values is anticipated under this alternative. Because the impacts previously described (1) are not inconsistent with the **Park's purpose and values**, (2) **do not prevent** the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the Park, and (5) do not unreasonably interfere with Park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to geological resources in the Park under Alternative A.

### **4.3.4 Impacts Common to All Action Alternatives (B-D)**

This section includes a discussion of impacts to soil and geologic resources that are common to all action alternatives and at each of the existing and proposed sites.

Most soils found at each of the four sites can tolerate relatively high amounts of erosion before the long-term damage would result. In particular, the Blucher, Cole and Rodeo clay loams all have highly sustainable rates of erosion (see Chapter 3.2 for a description). These are found in the lower elevations of each of the four existing stable locations. However, some soils that are particularly susceptible to erosion are the Barnabe, Barnabe-variant and Tamalpais soils, prominent in the hillier regions of all four sites. Any potentially ground-disturbing activities on these slopes would exacerbate the soil erosion potential.

Although nearly all ground disturbances would take place in previously disturbed areas at the existing sites, activities such as digging, augering and short-term stockpiling of soils would all have increased potential for soil erosion. However, stockpiled soils would be subject to erosion from wind and rain. In addition, areas left un-vegetated or unstabilized could lead to erosion and soil loss. Implementation of Mitigation Measure GS-1 (*Ground Disturbance Timeframe*), GS-2 (*Soil Erosion Prevention*), GS-3 (*Staging Areas*), GS-4 (*Soil Reuse*), GS-5 (*Runoff*), and GS-6 (*Planting and Revegetation after Landscape Treatment*) would reduce these impacts to minor levels. See section 4.3.8 for components of these mitigation measures.

Continual compaction of soils can change the physical properties of a soil. Compacted soils have reduced capacity to absorb water as the pore space between particles. In many cases this can have moderate long-term adverse effects for vegetation, often resulting in soils exposed to erosion by wind and water. The combination of compacted soil and reduction of stabilizing vegetation can cause increased runoff, especially during storm events and on steeper slopes.

Infiltration of biological waste products, such as urine and excrement from horses, can alter the chemical composition of the soil. These changes can dramatically alter the ability for plants to utilize soil nutrients as well as degrade water quality (see Chapter 4.4, "Water Resources" for a discussion regarding these effects to water quality and fisheries).

The only known paleontological resources in the project area are the abundant radiolarian fossils in the Franciscan chert. While there are chert outcrops in the vicinity of the stables, none of the alternatives involve the disturbance of the rock. Therefore, only negligible impacts to local geology and geologic resources would be expected under any of the alternatives.

It is likely that the facilities would be affected by future seismic activity, either directly through ground shaking and subsequent structure failure or indirectly through landsliding, liquefaction or other geologic hazards. These hazards would not be exacerbated by actions associated with selection of any of the alternatives; therefore, no impacts to these seismic hazards would be expected.

Given the high risk of landslides due to heavy wet-season precipitation, seismic activity and soil types, there exists a potential for slope failure to affect the existing and proposed equestrian facilities in the future, either directly or indirectly, regardless of the alternative selected. There exists the potential for construction activities to increase the potential for slope failure related to grading and drainage changes (such as overloading/oversteepening, removal of the toe of a slope or reactivation of a prior landslide); however, all construction-related activities would be designed to prevent or avoid such hazards. Therefore, none of the alternatives are likely to contribute to the possibility of slope failure to a significant degree.

However, a positive impact on soils would be the vegetation restoration at the east end of the paddocks. Vegetation serves to anchor soils from the effects of wind and water erosion, especially on steeper slopes. Revegetation of these areas would likely result in minor, localized and medium to long-term positive impacts to soil resources.

Some other site improvements, modifications to existing facilities and changes in management practices would occur regardless of the alternative selected as required by law, regulation and NPS policy; these are outlined in Chapters 2.3.1 and 2.3.2.

### ***Stable Management and Operations Activities***

Under all the action alternatives, expanded BMPs would be incorporated into routine management. For example, to protect water and soil resources at Rodeo Valley fenced vegetated strips, diversion ditches or other erosion control BMP would be added in the sloping east paddocks to reduce erosion and run-off. To the extent these reduce erosion and secondary impacts to soils and vegetation from management, operation and maintenance, this would constitute a beneficial impact (minor, local, long-term).

### ***Cumulative Impacts***

Marine Mammal Center (MMC). The first phase of construction was completed in June 2009; however, the new facility is located in an area of steeper slopes and erodible soils. Despite erosion control measures, soil erosion remains possible as a result of MMC activities. This could combine with the identified erosion impacts of the existing equestrian facilities, potentially resulting in adverse, negligible to minor cumulative impacts.

Coastal Corridor Enhancement Project (CCEP). The CCEP would result in the preservation and enhancement of 970 acres and the restoration of 30 acres of disturbed coastal habitat, primarily by removing non-native vegetation and replanting with native species. In addition, non-designated (social) trails would be closed and rehabilitated in many cases. Selection of any of the Plan alternatives combined with the CCEP would have cumulative regional benefits to soils due to practices and mitigation that reduce soil erosion.

Marin Headlands and Fort Baker (MHFB) Transportation Plan. The MHFB would have adverse, localized, temporary impacts to soil resources; however, with adherence to construction BMPs during and after construction, these effects would likely be negligible.

Hawk Hill/Hill 129 Site Rehabilitation. Some short-term, minor to moderate adverse impacts to soils resources are expected with implementation of the site rehabilitation plan.

Headlands Institute Campus Planning. Impacts, both adverse and positive, are likely to be negligible in terms of soil resources.

Other Park and Nearby Plans. The Park is also undertaking several additional planning processes, including dog and equestrian management, trails planning, long-range transportation and general management planning. Each of these may include changes in visitor or Park management activities that have impacts on soil conditions. Because each of these planning processes would in varying degrees respond to existing resource issues, it is likely that each would result in some beneficial and adverse impacts to soils, with degrees of significance ranging from negligible to moderate.

### **4.3.5 Impacts of Alternative B - Enhanced Existing**

Selection of Alternative B, Option B1 or B2, would include the components common to all action alternatives as described in section 4.3.4 and stable facilities would be brought in-line with NPS planning and policy objectives. In addition, changes specific to these alternatives are as described below and have the potential to affect soil resources, with both potentially positive and adverse impacts and of varying degrees and duration.

With selection of Option B1, the four existing stables would remain but facility improvements and operational changes would occur at all four sites (see Chapter 2.3.3 for a detailed list of proposed enhancements to the existing facilities). No new equestrian facilities would be developed at Marincello or Lower Redwood Creek. As many as 100 horses would be stabled at the facilities during the dry season, and the wet season total would retain the 76-horse capacity.

Option B2 would include all of the same improvements to the facilities as described in Option B1 except at Lower Tennessee Valley. Option B2 would remove equestrian facilities at Lower Tennessee Valley, and would provide facilities for the Park Horse Patrol at Tennessee Valley Stables.

**Golden Gate Dairy Stables.** Construction activities that have potential to dislodge or otherwise disturb soil resources at the Golden Gate Dairy site include relocation of stalls and paddocks, removal of old stalls and paddocks, installation of a new manure shed, installation of four trailer parking pads, reduction of front turnout area and addition of a covered ring onto a previously-disturbed and re-vegetated area.

Impacts associated with selection of either B alternative could initially have short-term negative impacts to the site, but could also be beneficial in the long-term. Relocation of stalls, reducing the front turnout and construction of the new covered ring could initially disturb soils in place and expose them to erosion of processes, especially when first exposed to wind and water. Furthermore, use of heavy machinery could remove or severely damage vegetation and might result in compaction of the soils in the immediate work area. These impacts would likely be adverse, minor, temporary and localized.

Installation of trailer pads could have the same adverse implications from heavy machinery traffic, and since the new parking pads would likely be constructed with a hardened surface this could result in

increased potential for localized runoff in heavy precipitation events. With close adherence to construction BMPs these impacts would likely be negligible to minor, temporary and localized.

However, some soil conditions could ultimately improve at the Golden Gate Dairy site as soils are reclaimed and new vegetation is established, and the covered exercise ring and new trailer pads would reduce erosion and compaction locally from vehicular and horse traffic. Construction of the new manure shed could also have a positive impact on soils due to decreased inputs of biological waste. These impacts would likely be positive, negligible to minor, localized but long-term.

All impacts associated with B1 and B2 at the Golden Gate Dairy Stables, both positive and adverse, would be mostly localized, with short to long-term implications. BMPs will minimize for the adverse impacts by reducing the soil erosion, compaction and nutrient input to minor levels.

**Tennessee Valley Stables.** Construction activities that have potential to disturb soil resources at the Tennessee Valley Stables include removal of sheds and manure pad, construction of a new turn-out, revegetation of paddocks in steep areas and construction of a new covered manure shed.

Removal of the sheds and manure pad would have similar implications to those outlined for the Golden Gate Dairy in terms of exposing soils to erosive processes, compaction and vegetation removal by heavy machinery. Construction of the new turn-out would also disturb soils in the short-term. Close adherence to construction BMPs should mitigate these impacts to negligible to minor, temporary and localized levels.

However, a positive impact on soils would be the revegetation of the paddocks in the steeper areas of the Tennessee Valley Stables. Vegetation serves to anchor soils from the effects of wind and water erosion, especially on steeper slopes. Revegetation of these areas would likely result in minor, localized and medium to long-term positive impacts to soil resources.

Additional positive impacts to soils would occur with the construction of the new manure shed and the reduced input of biological waste materials. These impacts would likely be positive, negligible to minor, localized but long-term.

**Lower Tennessee Valley Stables.** Option B1 would include the removal of nursery facilities, construction of new residence, construction of new covered ring, reduction in size and grading of turn-outs, with steep portions fenced off. Option B2 would remove the stables facilities; paddocks, turn-outs, manure shed and stalls at Lower Tennessee Valley to allow for site restoration.

Construction activities associated with both of the B Options (such as relocation and removal of paddocks and manure sheds) would involve positive changes to the current management practices for manure storage and disposal. These would likely lead to long-term, minor positive affects to the soils, especially near the riparian areas.

Selection of Option B1 would generally have the same adverse impacts as described for the Golden Gate Dairy Stables. Removal of nursery facilities, construction of new residence and construction of new covered ring would all have short-term, minor to moderate, localized negative impacts with exposure of new soils to erosive factors and compaction from heavy machinery; however, these negative impacts would be mitigated by BMPs as outlined in section 4.3.7.

A positive impact with Option B1 would also include the improvement of drainage, fencing off and revegetation of the steeper portions of the turnouts at the Lower Tennessee Valley site.

Option B2 would initially adversely affect the soils in the area with removal of facilities. These activities would likely disturb the soils and vegetation at the site, resulting in increased potential for soil erosion and compaction by use of heavy machinery. However, the soils at the site would ultimately improve as equestrian use ceases; no further activities that contribute to compaction and soil nutrient inputs would exist, and over time the site would be reclaimed. These impacts would be positive and long-term in the immediate vicinity.

**Rodeo Valley Stables.** Construction activities that have the potential to impact soil resources at the Rodeo Valley Stables include reduction of the arena, installation of 5,000 ft<sup>2</sup> turn-out, relocation of stalls, and construction of three trailer pads. Impacts to soils would be similar to those at the Tennessee Valley and Golden Gate Dairy Stables, with both positive and negative implications.

Installation of trailer pads could have some adverse implications from heavy machinery traffic, and since the new parking pads would likely be constructed with a hardened surface this could result in increased potential for localized runoff in heavy precipitation events. These impacts would likely be negligible to minor, temporary and localized.

Additional short-term impacts associated with the construction of the large new turnout would initially be adverse with exposed soils and compaction from heavy machinery, but with BMPs in place these would generally be minor in scope and duration.

The reduction of the arena footprint would initially expose soils to erosion of forces, exacerbating the potential for localized soil erosion; however this reduction is offset by adding a turnout. Ultimately, however, this would have a long-term benefit with less equestrian use and the resulting damage to vegetation, reduction of compaction and less nutrient input from horse manure. These impacts would be minor and localized, but positive and long-term.

The table below outlines the impacts of soil erosion, soil compaction and soil nutrient inputs at each of the equestrian facilities with selection of Alternative B, Options B1 or B2.

<b>Table 4-2 Alternative B - Soil Erosion, Compaction and Nutrient Input</b>			
<b>Stable</b>	<b>Soil erosion</b>	<b>Soil compaction</b>	<b>Soil nutrients</b>
<b>Golden Gate Dairy</b>	Negligible to minor adverse impacts, ranging from temporary to mid-term in duration. Relocation of structures, construction of new structures all have potential to temporarily increase soil erosion potential by exposing soils to erosive processes and removal of vegetation.  Minor long-term, positive impacts would occur with reclamation of previously-disturbed areas as structures are removed and equestrian use is decreased.	Negligible to minor adverse impacts, short-term and localized. Compaction by heavy machinery could also occur in localized areas during construction phases.	Negligible to minor positive impacts, long-term and localized. Construction of new manure shed would decrease toxic biological waste inputs locally which could result in increased water quality and aquatic habitat, and decreased invasive plant species.
<b>Tennessee Valley</b>	Minor, short-term adverse impacts associated with removal of sheds and manure pad and construction of a new manure shed. Area impacted would be	Minor short-term, localized impacts caused by compaction from heavy machinery in work areas.	Minor positive impacts, long-term and localized, due to construction of the new manure shed

<b>Table 4-2 Alternative B - Soil Erosion, Compaction and Nutrient Input</b>			
<b>Stable</b>	<b>Soil erosion</b>	<b>Soil compaction</b>	<b>Soil nutrients</b>
	<p>confined to construction area.</p> <p>Minor to moderate, short-term adverse impacts associated with construction of new turn-out, localized in the construction area.</p> <p>Minor to moderate, long-term positive impacts associated with the re-vegetation of the steeper paddocks.</p>		<p>and associated reduction of biological waste materials. Minor to moderate positive impacts could occur downstream with reduction of soil nutrient inputs.</p>
<b>Lower Tennessee Valley (B1)</b>	<p>Negligible to minor adverse impacts, ranging from temporary to mid-term in duration. Relocation of structures, construction of new structures, construction of trailer pads, modifications to turn-outs all have potential to temporarily increase soil erosion potential by exposing soils to erosive processes and removal of vegetation.</p> <p>Minor long-term, positive impacts would occur with fencing off and re-vegetation of the turnouts.</p>	<p>Negligible to minor adverse impacts, short-term and localized. Compaction by heavy machinery could also occur in localized areas during construction phases.</p>	<p>Negligible to minor positive impacts, long-term and localized. Construction of new manure shed would decrease toxic biological waste inputs locally which could result in increased water quality and aquatic habitat, and decreased invasive plant species.</p>
<b>Lower Tennessee Valley (B2)</b>	<p>Negligible to minor adverse impacts, ranging from temporary to mid-term in duration. Removal and construction of structures all have potential to temporarily increase soil erosion potential by exposing soils to erosive processes and removal of vegetation.</p> <p>Minor to moderate long-term positive impacts due to removal of equestrian facilities and restoration of the site.</p>	<p>Negligible to minor adverse impacts, short-term and localized due to removal of structures from compaction by heavy machinery.</p> <p>Minor positive impacts, long-term and localized, could occur due to the removal of equestrian facilities at the site and restoration of the site, although the impacts would be minimal due to the degree of prior disturbance of the soil.</p>	<p>Minor positive impacts, long-term and localized, due to removal of equestrian facilities and associated influx of biological waste materials into the soil. Minor to moderate positive impacts could occur downstream with reduction of soil nutrient inputs.</p>
<b>Rodeo Valley</b>	<p>Minor short-term, localized adverse impacts due to the reduction of the arena, construction of the turn-out and trailer pads. These would all be minimal and temporary with adherence to BMPs.</p> <p>Negligible to minor, short-term and localized adverse impacts associated with the hardened surface at the turnout that could result in increased runoff in heavy precipitation events.</p>	<p>Minor short-term, localized adverse impacts due to the compaction of soil with heavy machinery during construction of the turn-out and trailer pads and reduction of the arena.</p> <p>Negligible to minor, positive long-term impacts due to construction of the</p>	<p>Minor positive impacts, long-term and localized, due to relocation of stalls and associated reduction of biological waste materials. Minor to moderate positive impacts could occur downstream with reduction of soil nutrient inputs. Additional localized, negligible positive impacts could</p>

<b>Table 4-2 Alternative B - Soil Erosion, Compaction and Nutrient Input</b>			
<b>Stable</b>	<b>Soil erosion</b>	<b>Soil compaction</b>	<b>Soil nutrients</b>
	Minor long-term, localized positive impacts with less equestrian use and resulting damage to vegetation.  Minor, long-term, localized positive impacts associated with construction of the turnout, resulting in less off-road or off-trail use at the site	turnout and trailer pads, which could result in less compaction from vehicle and equestrian use off-road or off-trail.	occur with reduction of the size of the arena.
<b>Marincello</b>	Not applicable	Not applicable	Not applicable
<b>Lower Redwood Creek</b>	Not applicable	Not applicable	Not applicable

### **Cumulative Impacts**

Cumulative impacts under Alternative B, Option B1 and B2, are similar to those described under section 4.3.4; Impacts Common to All Alternatives, however, some additional adverse impacts are anticipated due to construction activities. However, the long-term benefits from the site enhancements, structure construction/removal, trailhead and stable improvements would be beneficial, and despite the slight increase in the short term adverse impacts associated with this alternative, the long-term beneficial cumulative impacts are higher under this alternative than with selection of Alternative A.

### **Conclusion**

No impairment of park resources or values is anticipated under this alternative. Because the impacts previously described (1) are not inconsistent with the **park's purpose and values**, (2) **do not prevent** the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to geological resources in the park under Alternative B.

### **4.3.6 Impacts of Alternative C - Consolidated**

Selection of Alternative C would include the components common to all action alternatives as described in section 4.3.4 as well as to the changes specific to this alternative as described below. In addition to all impacts to soils discussed above, several planned activities with selection of Alternative C have the potential to affect soil resources, with both potentially positive and adverse impacts and of varying degrees and duration. All construction BMPs outlined under 4.3.4 that minimize impacts to natural resources, including corrective measures to remedy environmental impacts identified during periodic monitoring and cooperative measures to mitigate impacts to natural resources, would still be in place. These measures, required by Alternative C, are the same as those described previously.

Alternative C would reduce the number of stables in the Park by consolidating the four existing stables into two existing sites: Tennessee Valley and Rodeo Valley. The removal of stables at Lower Tennessee Valley and Golden Gate Dairy would reduce the footprint of equestrian activities within the

Park, lessen the impacts to Redwood Creek, and allow the sites to be used for other NPS or park partner uses. No new equestrian facilities would be developed at Marincello or Lower Redwood Creek and the maximum number of horses stabled year-round would be reduced, from 76 with selection of Alternative A and both of the B Alternatives, to 72 under Alternative C.

**Golden Gate Dairy Stables.** Selection of Alternative C would result in the removal of 11 year-round horses from the Golden Gate Dairy stables. This would result in negligible to minor positive impacts to soil compaction with decreased equestrian activities. This could also result in decreased soil erosion due to less vegetation damage created by horses trampling and grazing. These impacts would likely be localized and minor but long-term.

Under Alternative C, all existing non-historic structures would be removed. Site design features also include the installation of up to three parking pads for horse trailers, and modification of the existing horse turnout for day use at the Dias Ridge Trailhead. This would initially disturb soils in place and expose them to erosion of processes, and use of heavy machinery would remove or severely damage vegetation and would compact the soils in the immediate work area. These adverse impacts would be minimal and short-term, since construction activities would utilize BMPs that deter soil erosion and compaction.

However, improvements to the existing turnout and the Dias Ridge trailhead would also have positive impacts. Construction activities would include utilization of BMPs that would deter soil erosion and compaction and ultimately improve soil conditions at the site. Since the soils have been previously disturbed, however, positive impacts would be minor and localized, but long-term in duration.

Installation of trailer pads could have the same implications from heavy machinery traffic, and since the new parking areas would be constructed with a hardened surface this could increase the potential for localized runoff in heavy precipitation events. Mitigation measures to avoid or lessen the damage to resources would include SE-1 through SE-6, outlined in section 4.3.7. These adverse impacts would be minor, temporary and localized; however, the positive impacts associated with these activities would be long-term.

**Tennessee Valley.** Construction activities at Tennessee Valley would be the same as those outlined in Alternative B, except the number of horses boarded would expand from 42 to 48 horses as a result of relocating the NPS Park Horse Patrol program. Up to four stalls and paddocks, two parking spots, tie-ups, and outdoor use areas would be developed to accommodate the Park Horse Patrol program. New stalls would be built along the north side of the existing stalls, to replace those that were removed from within the stream buffer and from Lower Tennessee Valley. The existing caretaker house would be relocated and renovated 25 feet to the north, outside of the stream buffer.

Horse capacity at the site would increase with selection of Alternative C, which could lead to minor increases in soil nutrient inputs, soil compaction and erosion; however, this increase would probably be negligible given the degree of prior disturbance. Development of the turnout, stalls, parking spots, paddocks and tie-ups for Park Horse Patrol use would also have minor, localized soil disturbance with construction machinery. These practices would be mitigated to a sufficient degree by using the BMPs described in section 4.3.7.

**Relocation of the caretaker's house and of the stalls that are currently inside the stream buffer would** have short-term adverse effects with the soils that are exposed initially, but would have positive impacts in terms of reduced soil erosion and input of biological waste materials. These activities, especially removal of the stalls from the stream buffer, would result in positive, long term minor-to-moderate benefits to the soils locally.

**Lower Tennessee Valley.** Alternative C would remove four horse and all equestrian activities at the site. Once the Lower Tennessee Valley stables are vacated, the existing paddocks, other stable facilities, turn-outs and manure shed would be removed.

Removal of the Lower Tennessee Valley stables would have short-term, negative impacts to the soil but would ultimately have a long-term positive impact. Soil disturbance, compaction and vegetation removal during the process of removing structures and reclamation of resources would initially have minor-to-moderate, temporary adverse impacts. With adherence to BMPs during and after work completion soil erosion and compaction issues would likely be reduced to tolerable levels. However, upon grading and replanting of native vegetation soils at the site would gradually improve, thereby resulting in positive, moderate long-term improved conditions.

Ultimately, removal of the Lower Tennessee Valley stables would result in beneficial impacts to soil resources at the site after work has been completed. Once equestrian activities have been removed and the area has been reclaimed by grading and replanting, the soil would not be exposed to the factors that contributed to erosion, compaction and nutrient inputs. This would result in long-term, localized, positive impacts to the soil.

**Rodeo Valley.** Selection of Alternative C would result in a slight increase from a maximum 19 horses to 24 horses. This Alternative would also result in an increase in the footprint of the Rodeo Valley Stables site with the construction of a new caretaker residence, manure shed, and water tank. Overall the effects of construction activities would be similar to those described for Alternative B, while the construction of new buildings under this alternative would have potential to increase the intensity of impacts.

Construction activities would amount to short-term, moderate, adverse impacts to soils. Excavation would expose or otherwise disturb soil resources where the new caretaker house and water tank would be constructed, result with construction equipment and excavation, but with BMPs in place these impacts would be mitigated to minimal levels once the spoil piles have been utilized and the vegetation is re-established.

The table below outlines the impacts of soil erosion, soil compaction and soil nutrient inputs at each of the equestrian facilities with selection of Alternative C.

<b>Table 4-3 Alternative C - Soil Erosion, Compaction and Nutrient Input</b>			
<b>Stable</b>	<b>Soil erosion</b>	<b>Soil compaction</b>	<b>Soil nutrients</b>
<b>Golden Gate Dairy</b>	<p>Minor, long-term positive impacts due to reduction in horses boarded at the site, installation of parking pads and improvements to existing turnout and trailhead.</p> <p>Short-term, minor, adverse impacts due to soil disturbance during construction, heavy machinery traffic, vegetation damage or removal and removal on non-historic structures.</p>	<p>Minor, long-term positive impacts due to reduction in horses boarded at the site, installation of parking pads and improvements to existing turnout and trailhead.</p> <p>Short-term, minor, adverse impacts due to compaction with heavy machinery in work sites.</p> <p>Possible negligible to minor, localized adverse impacts due to</p>	<p>Minor, long-term positive impacts due to reduction in horses boarded at the site.</p>

<b>Table 4-3 Alternative C - Soil Erosion, Compaction and Nutrient Input</b>			
<b>Stable</b>	<b>Soil erosion</b>	<b>Soil compaction</b>	<b>Soil nutrients</b>
		increased runoff at the trailer parking pads and turnout during heavy precipitation events.	
<b>Lower Tennessee Valley</b>	Short-term, minor, localized adverse impacts during removal of facilities as soils are exposed.  Long-term, localized positive impacts once equestrian activities have stopped and site has been reclaimed.	Short-term, minor, localized adverse impacts during removal of facilities with compaction by heavy machinery.  Long-term, localized positive impacts once equestrian activities have stopped and site has been reclaimed.	Long-term positive impacts once equestrian activities have been removed from the site.
<b>Tennessee Valley</b>	Negligible to minor, long-term adverse impacts associated with increase of horses boarded.  Minor, short-term adverse impacts associated with construction of stalls, paddocks, tie-ups and parking spots <b>and removal of caretaker's residence.</b> Area impacted would be confined to construction area.  Minor to moderate, short-term adverse impacts associated with construction of new turn-out, localized in the construction area.	Minor short-term, localized impacts caused by compaction from heavy machinery in work areas and increased of horses boarded.	Negligible, localized long-term adverse impacts associated with increased equestrian use.
<b>Rodeo Valley</b>	Short-term, minor, localized adverse impacts during construction of <b>caretaker's residence and water tank</b> as soils are exposed.	Short-term, minor, localized adverse impacts during <b>construction of caretaker's residence and water tank</b> with compaction by heavy machinery.	Minimal to no effect on soil nutrient inputs.
<b>Marincello</b>	Not applicable	Not applicable	Not applicable
<b>Lower Redwood Creek</b>	Not applicable	Not applicable	Not applicable

### **Cumulative Impacts**

Cumulative impacts under Alternative C are similar to those described under section 4.3.4; Impacts Common to All Alternatives, however, some additional adverse impacts are anticipated under Alternative C due to construction activities. However, the long-term benefits from the site enhancements, structure construction/removal, trailhead and stable improvements would be beneficial, and despite the slight increase in the short term adverse impacts associated with this alternative, the long-term beneficial cumulative impacts are higher under this alternative than with selection of Alternative A.

**Conclusion**

Some localized, negligible to minor, temporary to permanent, negligible and positive impacts to park soils and geologic resources would be expected under Alternative C. No impairment of park resources or values is anticipated under this alternative. Because the impacts previously described (1) are not **inconsistent with the park's purpose and values**, (2) **do not prevent the attainment of desired future** conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to geological resources in the park under Alternative C.

**4.3.7 Impacts of Alternative D - Dispersed and Expanded**

Selection of Alternative D would result in the utilization of three of the existing stable locations and the development of two new stable locations with a maximum capacity of 88 equestrian stalls. Tennessee Valley, Golden Gate Dairy, and Rodeo Valley stables would remain as equestrian sites, while Lower Tennessee Valley stables facilities would be removed. New stables would be developed at the Lower Redwood Creek and Marincello sites. A total of 18 additional horses would be stabled with selection of Alternative D relative to the No Action Alternative; however, they would be disbursed over five stable locations rather than the four existing sites.

Selection of Alternative D would include the components common to all action alternatives as described in section 4.3.4, in addition to the changes specific to this alternative as described below. In addition to all impacts to soils discussed above, several planned activities with selection of Alternative D have the potential to affect soil resources, with both potentially positive and adverse impacts and of varying degrees and duration. All construction BMPs outlined under section 4.3.4 that minimize impacts to natural resources, including corrective measures to remedy environmental impacts identified during periodic monitoring and cooperative measures to mitigate impacts to natural resources, would still be in place. These measures, required by Alternative D, are the same as those described previously.

**Golden Gate Dairy.** Selection of Alternative D would involve the removal of all non-historic equestrian structures (stalls, paddocks, manure shed and other facilities) at the Golden Gate Dairy Stables. Some facilities, such as the barn, residence, and front turn-out would be remodeled or renovated. New facilities would also be constructed (paddocks, trailer parking pads, stalls, turn-out and a covered ring).

Positive impacts to soils at the Golden Gate Dairy Stables with selection of Alternative D would include a reduction in the amount of horses at the site from 11 to 4, thereby reducing soil compaction with a reduction of equestrian activities. Also, the existing turnout would be modified and the Dias Ridge trailhead would be improved; these would both involve BMPs during and after construction that would deter soil erosion and compaction and ultimately improve soil conditions at the site. Since the soils have been previously disturbed, however, positive impacts would likely be very localized and minor but would also be long-term.

Other impacts at the Golden Gate Dairy Stables would have short-term negative impacts to the site but would be beneficial in the long-term. Removal of structures and the existing turnout, construction of new paddocks/stalls and the covered ring would initially disturb soils in place and expose them to erosional processes. Furthermore, use of heavy machinery would remove or severely damage vegetation and would compact the soils in the immediate work area. Installation of trailer pads and the new turn-out could have the same implications from heavy machinery traffic, and since the new trailer pads would be constructed with a hardened surface could increase the potential for localized

runoff in heavy precipitation events. Mitigation measures to avoid or lessen the damage to resources would include SE-1 through SE-6, outlined in section 4.3.7. However, installation of the new trailer pads would reduce erosion locally from vehicular traffic on more permeable surfaces. All of these impacts would be localized with short to long-term implications, and BMPs to mitigate for the adverse impacts would reduce the soil disturbance to minimal levels.

**Tennessee Valley.** Soil disturbing activities associated with Alternative D would include renovations to the residential house, and new manure and hay sheds would be installed.

Installation of the new pump and water tanks would have minor ground-disturbance, and construction of the stalls, parking spots, paddocks and the new turn-out use would also have minor, localized soil disturbance from construction machinery; these practices would be mitigated to a sufficient degree by using the BMPs described in section 4.3.7. Adverse impacts would therefore be negligible to minor, localized and short-term.

**Lower Tennessee Valley.** Alternative D would remove all equestrian activities at the site, the same as Alternatives B, Option B2, and C. Once the Lower Tennessee Valley stables are vacated, the existing paddocks and other stable facilities would be removed.

Removal of the Lower Tennessee Valley stables would have short-term, negative impacts to the soil but would ultimately have a long-term positive impact. Soil disturbance, compaction and vegetation removal during the process of removing buildings and reclamation of resources would initially have minor-to-moderate, temporary adverse impacts. With adherence to BMPs during and after work completion soil erosion and compaction issues would likely be reduced to tolerable levels. However, upon grading and replanting of native vegetation soils at the site would gradually improve, thereby resulting in positive, moderate long-term improved conditions.

Ultimately, removal of the four horses and horse facilities at Lower Tennessee Valley stables would result in beneficial impacts to soil resources at the site after work has been completed. Once equestrian activities have been removed and the area has been reclaimed by grading and replanting, the soil would not be exposed to the factors that contributed to erosion, compaction and nutrient inputs. This would result in long-term, localized, positive impacts to the soil.

**Rodeo Valley.** Selection of Alternative D would involve modifications to the Balloon Hanger and Motor Vehicle Shed in addition to a new feed/hay shed, water tank, and new manure shed. These activities would all have short-term, moderate, adverse impacts to soil erosion and compaction with construction equipment and excavation, but with BMPs in place these impacts would be mitigated to minimal levels once the spoil piles have been used and the vegetation at the site is re-established.

**Marincello (new site development).** Selection of Alternative D would involve construction or installation of a Park Horse Patrol office, residence, parking areas, turn-outs, stalls/paddocks, hay storage facility, manure shed, tack/storage shed and a covered ring. BMPs would be used during and after construction that would confine the impacts to the area of construction to the roads and structures.

The new stable facilities would occur in previously disturbed areas. Grading, excavation, boring and other earth work would cause disturbance of the soils, exposing them to erosion of processes such as wind and water. Use of heavy machinery would also cause minor, short-term compaction issues. Adverse impacts would range from negligible to moderate, short to long-term but localized.

Once equestrian facilities have been established, there would initially be adverse, minor-to-moderate, long-term localized impacts to erosion, compaction and biological waste inputs to the soils. Adherence to construction BMPs would ensure that these issues were minimized to tolerable levels.

A positive impact to selection of Alternative D would consist of re-grading and paving a section of the existing multi-use Marincello Trail to restore a more natural drainage pattern and reduce erosion. Initially this could result in negligible to minor, short-term adverse impacts to soil erosion during the work phase with exposure of soil resources to erosive factors. However, the long-term result would be positive with the decreased soil erosion from the road, especially in heavy precipitation events.

Because the construction is located on previously disturbed soils and given the degree of construction activity necessary to erect the structures and install infrastructure and equipment, adverse impacts to soils would range from negligible to moderate, short to long-term, but also localized. However, adherence of the mitigation outlined in section 4.3.7 would likely reduce adverse construction impacts to minor, localized and short-term levels.

**Lower Redwood Creek (new stable site development).** Certain existing facilities would be reused (see **Table 2-10**). An existing small pond would be drained and filled, and the nursery shade structure also removed. The existing **residence would be remodeled to be used for a caretaker's** residence. The driveway through the facility would be improved with grading and gravel. Stalls, paddocks, pump/generator, hay/feed facilities, manure shed, tack/storage sheds and a turnout would all be installed or constructed. Also, a covered ring, parking area, turn-outs, new office facility and additional trailer parking lots would be constructed.

The new stable facilities would occur in previously disturbed areas. Grading, excavation, boring and other earth work would cause significant disturbance of the soils, exposing them to erosion of processes such as wind and water. Use of heavy machinery would also cause compaction short-term compaction issues. Adverse impacts would range from negligible to moderate, short to long-term but localized.

Once equestrian facilities have been established, there would initially be adverse, minor-to-moderate, long-term localized impacts to erosion, compaction and biological waste inputs to the soils. Adherence to construction BMPs would ensure that these issues were minimized to tolerable levels.

Because the construction is located on previously disturbed soils and given the degree of construction activity necessary to erect the structures and install infrastructure and equipment, adverse impacts to soils would range from negligible to moderate, short to long-term, but also localized. However, adherence of the mitigation outlined in section 4.3.7 would likely reduce adverse construction impacts to minor, localized and short-term levels.

The table below outlines the impacts of soil erosion, soil compaction and soil nutrient inputs at each of the equestrian facilities with selection of Alternative D.

<b>Table 4-4 Alternative D - Soil Erosion, Compaction and Nutrient Input</b>			
<b>Stable</b>	<b>Soil erosion</b>	<b>Soil compaction</b>	<b>Soil nutrients</b>
<b>Golden Gate Dairy</b>	<p>Short-term, minor localized adverse impacts to soil erosion during removal of structures; renovation of the barn, front turn-out and residence; and construction of new paddocks, trailer parking pads, stalls, turn-out and covered ring.</p> <p>Long-term, minor localized positive impacts to soil erosion due to reduction of horse numbers at the site, renovation of the Dias Ridge trailhead and construction of the parking pads and covered ring.</p>	<p>Short-term, minor localized adverse impacts to soil compaction during removal of structures; renovation of the barn, front turn-out and residence; and construction of new paddocks, trailer parking pads, stalls, turn-out and covered ring.</p> <p>Long-term, minor localized positive impacts to soil compaction due to reduction of number of horses at the site.</p>	<p>Long-term, minor localized positive impacts to biological waste materials due to reduction of number of horses at the site.</p>
<b>Lower Tennessee Valley</b>	<p>Short-term, minor, localized adverse impacts during removal of facilities as soils are exposed.</p> <p>Long-term, localized positive impacts once equestrian activities have stopped and site has been reclaimed.</p>	<p>Short-term, minor, localized adverse impacts during removal of facilities with compaction by heavy machinery</p> <p>Long-term, localized positive impacts once equestrian activities have stopped and site has been reclaimed.</p>	<p>Long-term positive impacts once equestrian activities have been removed from the site.</p>
<b>Tennessee Valley</b>	<p>Short-term, minor, localized adverse impacts during removal and construction of facilities as soils are exposed.</p> <p>Long-term, minor, localized adverse impacts associated with increased number of horses.</p> <p>Long-term, minor, localized positive impacts due to re-vegetation at the east end of the paddocks.</p>	<p>Short-term, minor, localized adverse impacts during removal and construction of facilities as soils compacted by heavy machinery.</p> <p>Long-term, minor, localized adverse impacts associated with increased number of horses.</p>	<p>Long-term, minor localized adverse impacts to biological waste materials due to increased number of horses at the site.</p>
<b>Rodeo Valley</b>	<p>Short-term, minor localized adverse impacts to soil erosion during removal and renovations to structures.</p>	<p>Short-term, minor localized adverse impacts to soil compaction during removal and renovations to structures.</p>	<p>Minimal to no effect on soil nutrient inputs.</p>
<b>Lower Redwood Creek</b>	<p>Negligible to moderate, long-term, localized adverse impacts to soil erosion associated with</p>	<p>Negligible to moderate, long-term, localized adverse impacts to soil compaction associated</p>	<p>Negligible to moderate, long-term, localized adverse impacts to soil</p>

<b>Table 4-4 Alternative D - Soil Erosion, Compaction and Nutrient Input</b>			
<b>Stable</b>	<b>Soil erosion</b>	<b>Soil compaction</b>	<b>Soil nutrients</b>
	construction activities and use of equestrian facilities..	with construction activities and use of equestrian facilities.	nutrient inputs associated with construction activities and use of equestrian facilities on previously disturbed soils.
<b>Marincello</b>	Negligible to moderate, long-term, localized adverse impacts to soil erosion associated with construction activities and use of equestrian facilities.  Long-term, minor, localized positive impact due to re-grading and paving of access road.	Negligible to moderate, long-term, localized adverse impacts to soil compaction associated with construction activities and use of equestrian facilities.	Negligible to moderate, long-term, localized adverse impacts to soil nutrient inputs associated with construction activities and use of equestrian facilities on previously disturbed soils.

### **Cumulative Impacts**

Cumulative impacts under Alternative D are similar to those described under section 4.3.4; however, some additional adverse impacts are anticipated under Alternative D due to construction activities. There would be some long-term benefits from the site enhancements, structure construction/removal and stable improvements. Despite the slight increase in the short term adverse impacts associated with this alternative, the long-term beneficial cumulative impacts are higher under this alternative than with selection of Alternative A.

### **Conclusion**

Some localized, negligible to minor, temporary to permanent, adverse and positive impacts to park soils and geologic resources would be expected under Alternative D at the existing sites, and some long-term minor to moderate adverse impacts would occur at the new sites. No impairment of park resources or values is anticipated under this alternative. Because the impacts previously described (1) **are not inconsistent with the park's purpose and values**, (2) **do not prevent the attainment of desired** future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to geological resources in the park under Alternative D.

## **4.3.8 Mitigation Measures**

### **GS-1: Ground Disturbance Timeframe**

The ground disturbing aspects of construction would be limited to the dry season (typically between April 15 and October 15).

### **GS-2: Soil Erosion Protection (Construction)**

1. To the extent practical, all equipment, materials, and construction personnel would limit movements to access roads, surface streets, or other disturbed areas that are already compacted.
2. All residual soils and/or materials would be cleared from the project site once activities are complete.

3. Building materials and other project-related materials would not be stockpiled or stored where they could spill into water bodies or storm drains or where they would cover aquatic, riparian or other native vegetation.
4. Watering of dust-prone construction areas, especially during the dry season, would be used to reduce generation of fugitive dust and to control migration of sediment outside of the project area.
5. All stockpiled soils shall have properly installed and maintained erosion control to prevent soil loss, migration and contamination.

**GS-3: Staging Areas**

Staging areas will be located in previously disturbed areas near project sites. Staging areas will be returned to pre-construction conditions or better once construction is completed.

**GS-4: Soil Reuse**

Soils excavated during ground-disturbing activities would be reused to the extent that these locally-derived materials are found to be clean and weed-free. Any such reuse is subject to applicable NPS policies and guidance.

Wherever appropriate, soils and native plants affected by construction would be salvaged for use in site restoration. Any surplus soils and native plants may be used, as appropriate, for the restoration of other degraded areas in the park. Surplus soils not used in this way would be stockpiled and managed to keep them clean and weed-free for future use. Imported soils must (1) be compatible with existing soils, (2) be free of undesired seeds and organisms, and (3) fulfill the horticultural requirements of plants used for restoration. If the use of off-site soil to repair damaged sites is needed, parks are to select materials that are the best match for the original native soils.

**GS-5: Runoff**

Practices would be implemented to ensure that concentrated runoff is avoided and that any discharges are redirected away from exposed slopes or stockpiled soils. This could include the placement of a vegetated buffer, straw wattles or bales, silt screens, or other materials to filter and reduce runoff velocity if needed (GOGA Construction BMP handbook).

**GS-6: Planting and Revegetation after Landscape Treatment**

1. Sites where activities result in exposed soil would be stabilized to prevent erosion and revegetated as soon as feasible after activities are complete.
2. Revegetating disturbed sites would be done in accordance with an approved revegetation plan that provides protection to seeds, holds them in place and helps to retain moisture. Tightly woven fiber netting or loose materials (e.g., rice straw) would be used for erosion control or other purposes at the work sites. This limitation would be communicated to the contractor through use of Special Provisions included in the bid solicitation package. No plastic mono-filament matting would be used for erosion control.

## **4.4 Water Resources**

### **4.4.1 Guiding Regulations and Policies**

The Clean Water Act requires NPS to “comply with all Federal, State, interstate, and local requirements, administrative authority, and process and sanctions respecting the control and abatement of water pollution.” NPS Management Policies 2006 direct parks to take all actions needed

in parks “to maintain or restore the quality of surface waters and groundwaters” consistent with the Clean Water Act and any other applicable laws or regulations (sec. 4.6.3). Parks are also tasked with managing watersheds as complete hydrologic systems and minimizing human-caused disturbance to natural upland processes such as runoff, erosion and mass movements. Streams are to be managed to protect stream processes that create habitat features such as floodplains, riparian systems, woody debris accumulation, terraces, gravel bars, etc. (sec. 4.6.6).

#### 4.4.2 Assessment Methods

Agency reports, the scientific literature and professional judgment were used to qualitatively assess impacts. Agency reports used to assess the impacts to water quality were prepared by, and on behalf of the NPS, for projects occurring in the Golden Gate National Recreation Area. Impacts described in this section are based on the No Action alternative, and three action alternatives under consideration. For the purposes of analyzing impacts to water quality, the following thresholds for evaluating the intensity of an impact were established in order to describe the relative changes in water quality: overall, localized, short and long term. Types of impacts (Beneficial, Adverse, and Cumulative); context (local, regional); and duration (short-term, long-term) are defined in Chapter 4.2.

##### **Thresholds:**

- Negligible:** Chemical, physical, or biological changes or changes in ground or surface water infiltration or flow, to stream bank stability, delta formation processes, lagoon connectivity, floodplain function or other aspects of stream hydrology would not be detectable. Adverse changes to water quality would not result in the exceeding of any short or long term water quality standard or criterion. The effect on water supply and availability would not be measurable.
- Minor:** Chemical, physical, or biological effects, changes in stream bank stability, delta formation processes, lagoon connectivity, floodplain function or other aspects of stream hydrology would be barely detectable. Adverse changes to water quality would not result in the exceeding of any short or long-term state or federal water quality standard or criterion, although they may result in occasional increases in pollutants beyond those identified in park plans. The effect on water supply and availability would be barely measurable.
- Moderate:** Chemical, physical or biological effects, changes in stream bank stability, delta formation processes, lagoon connectivity, floodplain function or other aspects of stream hydrology would be noticeable. Adverse changes to water quality would not result in the permanent exceedance of water quality standards or criterion although there may be occasional fluxes in pollutants beyond standards or criteria in the short term. The effect on water supply and availability would be noticeable.
- Major:** The impact is severe. Chemical, physical, or biological effects, changes in stream bank stability, delta formation processes, lagoon connectivity, floodplain function or other aspects of stream hydrology would be frequently altered from stated desired conditions in park plans or from natural conditions; water quality may exceed federal or state standards or criteria. The effect on water supply and availability would be highly noticeable.

### 4.4.3 Impacts of Alternative A - No Action

The No Action Alternative for this project would be the retention of existing GGNRA stable facilities, management and operations, and horse numbers (76). No additional horses or stalls would be added. No new equestrian stables would be developed at Marincello or Lower Redwood Creek. Only those incremental improvements and adjustments that are required by law, regulation, and policy would be implemented. Implementation of existing planning projects, such as Park transportation and trail projects could also occur at the sites.

#### ***Facility Construction***

No new equestrian facilities would be developed and no additional horses, stalls or other facilities would be added to the existing sites except for modifications required for ABAAG compliance, as determined by the NPS. Site improvements allowable under the No Action Alternative, as described in section 2.3.1, have the potential to affect local water quality in the short and long term. These impacts would be minor to moderate.

#### ***Stable Management and Operations Activities***

Written into the existing permits are resource protection practices intended to lessen impacts on the natural resources found near the equestrian facilities. These address issues such as horse facility location, site maintenance, and water quality protection (e.g., animal waste management), and provide general guidelines as to where horses can be stabled, washed and treated on the facility. To ensure compliance, all permittees have agreed to periodic monitoring for environmental impacts and cooperation with corrective measures.

Protection of natural resources at all stable sites includes corrective measures to remedy environmental impacts identified during periodic monitoring and cooperative measures to mitigate impacts to water quality. These measures include daily collection of manure from stalls and paddocks to covered storage areas for off-site removal, exclusion of horses from waterways to prevent surface runoff from transporting animal wastes to water courses, maintenance of riparian and vegetation buffer, and periodic dry-season wet-down of paddocks to prevent erosion and dust.

The existing stables are located in low to gently sloping, poorly drained sites. Under the No Action Alternative, storm water runoff, surface water drainage, and sediment transport from parking areas, trails and un-vegetated areas of the site would not be further mitigated. Retention of the existing GGNRA stable facilities, management and operation plans would continue to contribute to existing impacts to water quality, hydrology, floodplain function, connectivity to the lagoon, and bank stability. Overall, these impacts are considered to be minor overall to moderate localized adverse.

#### ***Riparian Corridor Enhancement***

No riparian corridor enhancement would take place under the No Action Alternative. Therefore, there would be no impacts.

The table below outlines the impacts to water quality at each stable site associated with the selection of Alternative A.

#### ***Cumulative Impacts***

Projects which are planned, or currently underway, that could have cumulative effects with this Plan are described in section 4.2.5. The itemized projects are designed to improve the protection of Park resources, and while there may be short term, localized adverse effects, ultimately the projects would result in long term beneficial changes to existing water quality. Because Alternative A does not

formally address further mitigation of stormwater runoff, surface water drainage and sediment transport impacts to water quality, any cumulative benefit would be diminished.

The cumulative effects on erosion, compaction, and loss of topsoil were discussed in section 4.3.3, which addresses the impacts of the No Action Alternative on soils. To the extent that erosion reaches surface water bodies, this could lead to adverse impacts to water resources. For the stables sites, additional specific environmental concerns include organic nutrient loading of streams from fresh and decomposing manure (e.g., nitrogen, phosphorus, and ammonia – which is toxic to aquatic life).

This type of nutrient loading reduces dissolved oxygen concentrations necessary for the health of aquatic life, and the pathogenic contamination of water from fecal sources. It is accepted that streams have a natural level of fecal bacteria and sediment that enters streams; however, the natural baseline tips off balance when human land use practices influence water quality. Keeping horses concentrated in confined sites such as stalls, paddocks and arenas can have a marked increased impact on soil and water quality. The pounding of horse hooves, daily distribution of feed, constant production and collection of horse manure, and the use of horse health products such as shampoos and de-wormers each have potential impacts to soils and waters near a stable. The release of pollutants from septic systems, pit toilets and sewage systems further impacts water quality.

Impacts to vegetation also affect water quality. The presence of vegetation regulates many hydrologic processes, from dissipating energy, trapping sediments, and hydraulic residence – or the amount of time water is present as it travels from upland areas to the stream channel. Vegetation also influences nutrient storage and uptake. These processes, when functioning correctly, have positive effects on water quality. The absence of any measures to enhance the riparian corridor, mitigate surface flow, protect groundwater, and eliminate septic/sewage contaminants would result in cumulative adverse impacts.

**Table 4-5 Alternative A – Water Quality Impacts**

<b>Stable</b>	<b>Storm – Surface Water Runoff</b>	<b>Groundwater</b>
<b>Golden Gate Dairy</b>	Minor to moderate adverse impacts with current management practices; with impacts ranging from short- to mid-term. No further mitigation measures to prevent erosion and compaction impacts to streams from surface water or storm water runoff. The absence of protective measures to address compaction or enhancement of the riparian corridor could decrease the rate of infiltration, increasing the rate and severity of runoff. Moderate adverse impacts with current management practices; with impacts ranging from mid- to long-term. The transport of organic nutrients from fresh and decomposing manure and urine, would continue to impact water quality.	Minor to moderate adverse mid- to long-term impacts with current management practices. The current level of protective measures to enhance the riparian corridor would continue to impact hydraulic residence time, which would subsequently lead to increased surface water impacts. Negligible to minor adverse mid- to long-term impacts with current management practices. Use of horse veterinary healthcare, grooming and products could continue to impact water quality.

<b>Table 4-5 Alternative A – Water Quality Impacts</b>		
<b>Stable</b>	<b>Storm – Surface Water Runoff</b>	<b>Groundwater</b>
<b>Tennessee Valley</b>	Same as above	Same as above. Additionally, the release of pollutants from septic systems, pit toilets, and sewage systems could continue to impact water quality.
<b>Lower Tennessee Valley</b>	Same as above	Same as above
<b>Rodeo Valley</b>	Same as above	Same as above
<b>Marincello</b>	Not applicable	Not applicable
<b>Lower Redwood Creek</b>	Not applicable	Not applicable

### **Conclusion**

No impairment of park resources or values is anticipated under this alternative. Because the impacts previously described (1) are not inconsistent with the park's purpose and values, (2) do not prevent the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to water resources in the park under Alternative A.

### **4.4.4 Impacts Common to All Action Alternatives (B-D)**

Each of the proposed action alternatives includes facility enhancements and upgrades. Compatible new site features, including hardened paving, stalls, sheds, fences and paddocks would be built, while existing elements would be removed, upgraded or relocated. Impacts from ground disturbance related to the construction of these features are discussed in section 4.3.4.

Under all Action Alternatives, improved biological waste handling practices would be upgraded. Outdated septic systems and pit toilets would be removed. Stable operators would be required to adhere to expanded BMPs for routine management, operation and maintenance activities. Sealed vault toilets or modern high-efficiency septic systems would be installed, or domestic waste water would be hooked into the main sewer line. Animal waste would be collected daily, and all manure and soiled animal bedding would be stored in a covered manure shed, with impermeable floor, until it was hauled away for disposal. Drainage and wastewater management associated with horse-keeping would be improved at each facility. Site enhancements would improve drainage by reducing the contact between clean and potentially polluted water. For example, to protect water and soil resources at Rodeo Valley fenced vegetated strips, diversion ditches or other erosion control BMP would be added in the sloping east paddocks to reduce erosion and run-off. Riparian corridor enhancement measures would also be implemented.

Under all the action alternatives, expanded BMPs would be incorporated into routine management. To the extent these reduce erosion and secondary impacts to water quality from management, operation and maintenance, this would constitute a beneficial impact (minor, local, long-term).

The table below outlines the impacts to water quality at each stable site common to all Action Alternatives.

<b>Table 4-6 Water Quality Impacts Common to All Action Alternatives (B-D)</b>		
<b>Stable</b>	<b>Storm – Surface Water Runoff</b>	<b>Groundwater</b>
<b>Golden Gate Dairy</b>	The actions, although differing in each alternative, would result in the reduction in nutrient inputs from fresh and decomposing manure, bedding, and urine, would result in minor long-term localized beneficial impacts.	Shortening the front turn out to accommodate the new trail segment along Route 1 would result minor increased water quality. Installation of a sealed vault toilet or high-efficiency septic system would also improve water quality.
<b>Tennessee Valley</b>	The reduction in nutrient inputs from fresh and decomposing manure, bedding, urine, and sewage would result in minor long-term localized beneficial impacts.	Construction of a new manure shed and implementation of improved biological waste handling practices would result in increased water quality. Installation of a sealed vault toilet or high-efficiency septic system would also improve water quality. The reduction in nutrient inputs from fresh and decomposing manure, bedding, urine, and sewage would result in minor long-term localized beneficial impacts.
<b>Lower Tennessee Valley</b>	The reduction in nutrient inputs from fresh and decomposing manure, bedding, urine, would result in minor long-term localized beneficial impacts.	There are no proposed facility changes at this site which are Common to All Action Alternatives.
<b>Rodeo Valley</b>	The reduction in nutrient inputs from fresh and decomposing manure, bedding, urine, and sewage would result in minor long-term localized beneficial impacts.	Construction of covered manure storage and implementation of improved biological waste handling practices would result in increased water quality. Installation of a sealed vault toilet or high-efficiency septic system would also improve water quality. The reduction in nutrient inputs from fresh and decomposing manure, bedding, urine, and sewage would result in minor long-term localized beneficial impacts.

#### **4.4.5. Impacts of Alternative B - Enhanced Existing**

Under Option B1, the four existing stables would remain, but would be subject to facility, management, and operational upgrades and enhancements. No new equestrian facilities would be developed at Marincello or Lower Redwood Creek. 98 horses (maximum during dry season) would be stabled at the facilities. No additional horses or stalls would be added during the wet season, remaining at 76 horses, the same as Alternative A. Under Option B1, stable facilities would be brought in-line with NPS planning and policy objectives.

Compatible new site features, including stalls, sheds, fences and paddocks would be built, while existing elements would be upgraded or relocated. Option B1 would include components common to all action alternatives, described in section 2.3.2, in addition to the changes specific to this alternative as described below.

Under Option B2, the project would be designed, enhanced, and operated as under Option B1, with the primary difference of the Park Horse Patrol (PHP) location. The Park Horse Patrol would be relocated to the Tennessee Valley stables site and occupy facilities there.

The addition of 10% more horses (four) at Tennessee Valley within Option B2 would slightly reduce water quality benefits there compared to Option B1; however, this is a slight change and would be more than offset by water quality improvements created by the closure of stables at Lower Tennessee Valley. Therefore, overall, impacts and mitigation would be as described for Option B1; short-term adverse impacts would be negligible with the inclusion of prescribed mitigation measures.

### ***Facility Construction***

The changes to site features are designed to address existing adverse impacts to water quality. The proposed facility improvements and BMPs will reduce erosion and runoff by removing certain facilities from the stream buffer zones and introduce improved management practices described in Appendix B. Three projects associated with existing structures within the stream buffer are proposed at the Tennessee Valley facility. Two include the conversion of existing homes or horse stalls to storage, while the third involves removal of a paddock. All other construction activities would occur outside the stream buffer in previously disturbed areas; there would be no new construction within the 50-foot stream buffer zone.

As with all Action Alternatives, new covered manure sheds would be constructed at each stable. Storing horse waste (manure, soiled bedding) on an impervious surface, under cover reduces the amount of pollutants leaching to groundwater, or being transported via surface runoff to nearby streams. Drainage and wastewater management associated with horse-keeping would also be improved at each facility.

A new caretaker residence is proposed at Rodeo Valley. This new residence would be connected to the existing sewer line on Bunker Road. As a result, no new source for nutrient input and transport would be introduced. At Golden Gate Dairy a covered exercise ring would be added to allow horses to exercise in winter without impacting wet soils, reducing impacts to runoff.

The impacts of construction related to excavation, stockpiling of soils, etc., have been previously discussed in the soils discussion in section 4.3.4, and are not repeated here. Such erosion could have short-term, localized adverse impacts to water quality. However, with the implementation of proposed mitigation measures, the potential for sedimentation to reduce water quality would be negligible.

Accidental leaks or spills of hazardous materials used during construction activities (oil, grease, fuels, and chemicals such as those needed to remove lead paint) could potentially contaminate the surface water or groundwater. This contamination is considered a potential short-term, localized moderate adverse impact. Implementation of spill prevention and response Best Management Practices would minimize any potential impacts to water quality.

### ***Stable Management and Operations Activities***

Protection of natural resources at all stable sites includes corrective measures to remedy environmental impacts identified during periodic monitoring and cooperative measures to mitigate impacts to water quality. Measures required by Option B1 and B2 are the same as those described under Common to All, including Best Management Practices to protect water quality.

Drainage and sewage management would also be improved. At Tennessee Valley and Golden Gate Dairy, field treatment septic-systems associated with the caretaker residences would be replaced with

either sealed vault toilets, composting toilets or high-efficiency septic systems. Treated water would be provided for residential use.

### **Riparian Corridor Enhancement**

The riparian corridor serves several major purposes at the landscape level. The riparian corridor acts as a stream buffer by storing and slowing the runoff input into the stream, retaining sediment derived from the erosion of upland areas, filtering the non-point source pollutants, and shading the stream to lessen temperature fluctuations. Plants on undisturbed or revegetated stream banks slow the downhill flow of rainwater, promoting its infiltration into the soil. The corridor protects soil by stabilizing the stream channel through the bank reinforcement provided by the root systems of trees, shrubs, and vegetation, and providing natural flooding areas (Cacho 1992). Improvements to the riparian corridor are often realized in improvements to water quality.

Under Option B1, two riparian corridor enhancement projects are proposed:

1. Common to all action alternatives, horses would be excluded from the steep portions of the northeastern paddocks at Tennessee Valley, which would be revegetated.
2. Turnouts at Lower Tennessee Valley would be drained, and graded; steep portions would be fenced off to exclude horses, and a biofilter swale would be added.

The B2 option differs from B1 in that Lower Tennessee Valley horses and horse facilities including turnouts, paddocks, and manure shed would be removed and those areas would be revegetated to enhance the riparian corridor.

The table below outlines the impacts to water quality at each stable site associated with the selection of Option B1 or B2. Short-term adverse impacts would be negligible with the inclusion of prescribed mitigation measures.

<b>Table 4-7 Alternative B - Water Quality Impacts</b>		
<b>Stable</b>	<b>Storm – Surface Water Runoff</b>	<b>Groundwater</b>
<b>Golden Gate Dairy</b>	Negligible to minor adverse impacts, ranging from temporary to mid-term in duration. Relocation of structures, construction of new structures all have potential to temporarily increase soil erosion potential by exposing soils to erosive processes and removal of vegetation. Minor long-term, positive impacts would occur with site drainage improvements and new structures.	The reduction in nutrient inputs from fresh and decomposing manure, bedding, urine, and sewage would result in minor long-term localized beneficial impacts.
<b>Tennessee Valley (B1)</b>	Negligible to minor adverse impacts, ranging from temporary to mid-term in duration would result from proposed facility improvements. The removal and construction of structures all have potential to temporarily degrade water quality. Minor temporary adverse impacts may occur during the road obliteration and revegetation activities. Once vegetation is established, the impact would be minor long-term beneficial.	The reduction in nutrient inputs from fresh and decomposing manure, bedding, urine, and sewage would result in minor long-term localized beneficial impacts.

<b>Table 4-7 Alternative B - Water Quality Impacts</b>		
<b>Stable</b>	<b>Storm – Surface Water Runoff</b>	<b>Groundwater</b>
<b>Tennessee Valley (B2)</b>	Same as B1, except beneficial impacts would be slightly reduced in the long term with the addition of 4 horses.	Same as B1, except beneficial impacts would be slightly reduced in the long term.
<b>Lower Tennessee Valley (B1)</b>	Minor short-term temporary adverse impacts would result from proposed facility improvements. Construction of new structures, trailer pads, and modifications to turn-outs may also cause temporary minor adverse impacts. Long term impacts would be minor and beneficial. The addition of improved site drainage, manure shed, and a biofilter swale would have minor long term beneficial impacts.	The reduction in nutrient inputs from fresh and decomposing manure, bedding, urine, and sewage would result in minor long-term localized beneficial impacts.
<b>Lower Tennessee Valley (B2)</b>	Long-term beneficial impacts would be greater compared to B1 once the site has been reclaimed.	Moderate long-term beneficial impacts once equestrian activities have been removed from the site.
<b>Rodeo Valley</b>	Negligible short-term adverse impacts to water quality are associated with proposed facility improvements. Construction of the new turn-out would occur well outside the 50-foot stream buffer. Minor long-term positive impacts may be associated with the re-vegetation of the steeper paddocks.	The reduction in nutrient inputs from fresh and decomposing manure, bedding, urine, and sewage would result in minor long-term localized beneficial impacts.
<b>Marincello</b>	Not applicable	Not applicable
<b>Lower Redwood Creek</b>	Not applicable	Not applicable

### **Cumulative Impacts**

The Enhanced Existing Action Alternative B, Option B1, and Preferred Action Alternative B, Option B2, would have negligible impacts related to water supply, geomorphology (such as delta formation processes, lagoon connectivity), floodplain function or other aspects of stream hydrology; as such, no cumulative impacts are anticipated. However, both options under Alternative B could have cumulative beneficial impacts related to ground or surface water infiltration and flow; and would certainly reduce existing adverse impacts.

### **Conclusion**

The effects of the various cumulative projects on erosion, compaction, and loss of topsoil were discussed in section 4.3.4, which addresses the impacts of Option B1 and B2 on soils. To the extent that erosion reaches surface water bodies, this could lead to adverse impacts. However, the proposed site enhancements and revegetation would result in cumulative impacts which would be beneficial; including reductions in sediment and nutrient transport, and improvements to drainage and wastewater management. Corresponding benefits to water quality would be experienced as the amount of pollutants reaching water bodies would be decreased. As previously stated, improvements to the riparian buffer would result in a reduction in pollutant loading to local streams.

The incorporation of Best Management Practices during all construction, routine management, operation and maintenance activities associated with this alternative would protect water quality and

the natural resources adjacent to equestrian facilities. Any impacts to water quality as a result of facility upgrade and enhancement activities would be temporary, but some of these actions would result in long-term localized beneficial impacts.

No impairment of park resources or values is anticipated under this alternative. Because the impacts **previously described (1) are not inconsistent with the park's purpose and values, (2) do not prevent** the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to water resources in the park under Alternative B.

#### **4.4.6 Impacts of Alternative C - Consolidated**

Alternative C would reduce the number of stables in the Park by consolidating the four existing stables to two, Tennessee Valley and Rodeo Valley. The removal of stables at Lower Tennessee Valley and Golden Gate Dairy would reduce the footprint of equestrian activities within the Park, lessen the impacts to Redwood Creek, and allow the sites to be used for other NPS or park partner uses. No new equestrian facilities would be developed at Marincello or Lower Redwood Creek. The number of horses stabled would be slightly reduced from a total of 76 under Alternatives A and B, to 72 under Alternative C.

Stable facilities would be brought in-line with NPS planning and policy objectives. Alternative C would include the components common to all action alternatives, described in section 2.3.2, in addition to the changes specific to this alternative as described below. Compatible new site features, including hardened paving, stalls, sheds, fences and paddocks would be built, while existing elements would be upgraded or relocated.

##### ***Facility Construction***

Under Alternative C, 11 resident horses would be removed from the Golden Gate Dairy stable. All non-historic structures would be removed. Site design features also include the installation of parking pads for horse trailers, and modification of the existing horse turnout for day use at the Dias Ridge Trailhead.

Construction activities at Tennessee Valley would be the same as Option B1, except the number of horses boarded would expand from 42 to 48 horses. Up to six stalls and paddocks, two parking spots, tie-ups, and outdoor use areas would be developed to accommodate the Park Horse Patrol program. As indicated in the Alternative C Site Plan for Tennessee Valley (**Figure 2-15**), new stalls would be built along the north side of the existing stalls and within the existing hay barn, to replace those that were removed from within the stream buffer and to accommodate the Park Horse Patrol horses. The existing caretaker house would be relocated and renovated 25 feet to the north, further from the stream. Sewage would be contained and hauled off-site or a high-efficiency septic system would be installed.

Once the Lower Tennessee Valley site is vacated, the existing stalls, paddocks, manure shed, turn-outs, and other stable facilities, would be removed and vegetation would be restored.

The footprint of the Rodeo Valley site would increase slightly with the construction of a new caretaker residence, manure shed, and water tank. Overall, the effects of construction activities would be similar to those described for Alternative B; while the construction of new buildings under this alternative would have potential to increase the intensity of impacts in those locations, the final total footprint

under this alternative would ultimately be smaller. Construction of any new structures would be outside stream buffers and would be unlikely to have more than a minor potential for impacts in the short term to associated creeks; though during construction and restoration activities, runoff or sedimentation would be more likely than in Alternative B.

In addition, accidental leaks or spills of hazardous materials used during construction and restoration activities (oil, fuels, etc.) could potentially contaminate creeks, or groundwater. This is considered a potential short-term, localized moderate adverse impact.

### **Stable Management and Operations Activities**

Protection of natural resources at all stable sites includes corrective measures to remedy environmental impacts identified during periodic monitoring and cooperative measures to mitigate impacts to water quality. Measures required by Alternative C are the same as those described under Common to All and Alternative B.

Under Alternative C, new covered manure sheds would be constructed at the two stable sites to remain. Storing horse waste (manure, soiled bedding) on an impervious surface, under cover reduces the amount of pollutants leaching to groundwater, or being transported via surface runoff to nearby streams.

As with Option B1 and B2, an additional source of potential degradation to water quality would be eliminated by replacing existing field treatment septic-systems and pit toilets with either sealed vault toilets, composting toilets, or high-efficiency septic systems. Drainage and wastewater management associated with horse-keeping would also be improved at each facility.

### **Riparian Corridor Enhancement**

Under Alternative C, one riparian corridor enhancement project is proposed:

1. Once the Lower Tennessee Valley site is vacated, and construction activities have been completed, the disturbed areas would be restored and revegetated.

The impacts related to earthwork associated with restoration are the same as described in 4.3.4. Discharges of sediment could have moderate short-term localized adverse impacts to water quality, particularly if an unexpected storm event occurred during the dry season. With the implementation of mitigation measures, the potential of adverse impacts to reduce water quality would be negligible.

The table below outlines the impacts to water quality at each stable site associated with the selection of Alternative C.

<b>Table 4-8 Alternative C Water Quality Impacts</b>		
<b>Stable</b>	<b>Storm – Surface Water Runoff</b>	<b>Groundwater</b>
<b>Golden Gate Dairy</b>	The proposed facility removals and the removal of horses boarded at the site would result in minor to moderate long-term beneficial impacts. Activities associated with structure removal or construction could cause short-term localized adverse impacts.	Minor to moderate (or better), long-term positive impacts due to the removal of horses boarded at the site.
	Negligible to minor, localized adverse impacts	

<b>Table 4-8 Alternative C Water Quality Impacts</b>		
<b>Stable</b>	<b>Storm – Surface Water Runoff</b>	<b>Groundwater</b>
	are possible, due to increased runoff at the trailer parking pads and turnout during heavy precipitation events	
<b>Tennessee Valley</b>	Negligible to minor, long-term adverse impacts associated with increase of horses boarded.  Minor, short-term adverse impacts associated with construction of stalls, paddocks, tie-ups and parking spots and relocation of caretaker's residence. Area impacted would be confined to construction area.  Minor to moderate, short-term adverse impacts associated with construction of new turn-out, localized in the construction area.	Minor, localized long-term adverse impacts associated with increased number of horses.
<b>Lower Tennessee Valley</b>	Short-term, minor, localized adverse impacts during removal of facilities as soils are exposed. Long-term, localized positive impacts would be realized once the site has been reclaimed.	Moderate long-term beneficial impacts once equestrian activities have been removed from the site.
<b>Rodeo Valley</b>	Minor short-term temporary adverse impacts would be associated with the construction of proposed facility improvements.	Negligible to minor long-term adverse impacts associated with increased number of horses.
<b>Marincello</b>	Not applicable	Not applicable
<b>Lower Redwood Creek</b>	Not applicable	Not applicable

### **Cumulative Impacts**

The effects of the various cumulative projects on erosion, compaction, and loss of topsoil were discussed in section 4.3.5, which addresses the impacts of Alternative C on soils. To the extent that erosion reaches surface water bodies, this could lead to adverse impacts to water resources. However, the proposed site enhancements and revegetation would result in cumulative impacts which would be beneficial; including reductions in sediment and nutrient transport, and improvements to drainage and wastewater management. Corresponding benefits to water quality would be experienced as the amount of pollutants reaching water bodies would be decreased. As previously stated, improvements to the riparian buffer would result in a reduction in pollutant loading to local streams. As a result, the long-term benefits from riparian corridor enhancement and stable improvements would be beneficial, and despite the slight increase in the short term adverse impacts associated with consolidating stable operations, the long-term beneficial cumulative impacts are greatest under this alternative.

### **Conclusion**

The proposed site enhancements and revegetation would result in cumulative impacts which would be beneficial; including reductions in sediment and nutrient transport, and improvements to drainage and wastewater management. Corresponding benefits to water quality would be experienced as the amount of pollutants reaching water bodies would be decreased.

The incorporation of Best Management Practices during all construction, routine management, operations and maintenance activities associated with this alternative would protect water quality and the natural resources adjacent to equestrian facilities. Any localized minor adverse impacts to water quality as a result of facility upgrade and enhancement activities would be temporary, but would result in long-term localized beneficial impacts.

No impairment of park resources or values is anticipated under this alternative. Because the impacts previously described **(1) are not inconsistent with the park's purpose and values, (2) do not prevent** the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to water resources in the park under Alternative C.

#### **4.4.7 Impacts of Alternative D - Dispersed and Expanded**

Under Alternative D, three of the four existing stables would remain, and two new stable sites would be developed. The number of horses stabled during the wet season would be increased by 12 from 76 under Alternatives A and B, to 88, and an increase of 16 more than stabled under Alternative C. The horses would be dispersed over five stables instead of two, three or four sites. Alternative D would include the components common to all action alternatives, described in section 2.3.2, in addition to the changes specific to this alternative as described below.

##### ***Facility Construction***

The two new stables proposed under Alternative D concentrate development away from stream buffers. The new stable facility at Lower Redwood Creek would accommodate up to 12 total horses in stalls. All construction would occur within the existing developed area and at the north boundary of the site. The driveway through the facility would also be improved with grading and graveling. A parking pad and additional trailer parking would be provided.

The new stable facility at the Marincello site would include new permanent or temporary structures and site amenities to accommodate four NPS Park Horse Patrol horses. The Marincello site is located on fill, created during the Marincello Road construction, and is currently well vegetated. All construction would occur within the previously disturbed area. The existing access road would be hardened (paved) and improved to accommodate drainage and it would remain a single lane with the existing curbed, concrete median.

Construction activity associated with existing stables at the Golden Gate Dairy would include four new stalls and covered lunging ring at the north end of the property to accommodate four horses. All non-historic structures would be removed. The number of horses stabled at Rodeo Valley would increase from 19 to 24, and would require the construction of a new water tank, a new feed and hay shed south of the large arena, and a new covered manure structure. Forty-two horses would be stabled at Tennessee Valley (the same as in Alternative A and B1), requiring the construction of a new water tank, a new feed and hay shed, and a new covered manure structure. Once the Lower Tennessee Valley site is vacated, the existing horse facilities; paddocks, turn-outs, and manure shed would be removed. No new construction or modification of existing structures would occur inside of the 50-foot stream buffer.

The effects of construction activities would be similar to those described for Option B2, although the impacts related to new construction would be greater due to the addition of two new stable sites.

### **Stable Management and Operations Activities**

Protection of natural resources at all stable sites includes corrective measures to remedy environmental impacts identified during periodic monitoring and cooperative measures to mitigate impacts to water quality. Measures required by Alternative D are the same as those described under Common to All).

Under Alternative D, new covered manure sheds would be constructed at each stable. Storing horse waste (manure, soiled bedding) on an impervious surface, under cover reduces the amount of pollutants leaching to groundwater, or being transported via surface runoff to nearby streams. Drainage and wastewater management associated with horse-keeping would also be improved at each facility.

An additional source of potential degradation to water quality would be eliminated by replacing existing field treatment septic-systems and pit toilets. Drainage and wastewater management would be improved. At Tennessee Valley and Lower Redwood Creek, field treatment septic-systems would be replaced with either portable, composting toilets or high-efficiency septic systems. Treated water would be provided for residential use.

### **Riparian Corridor Enhancement**

Under Alternative D, two riparian corridor enhancement projects are proposed once the Lower Tennessee Valley site is vacated. The table below outlines the impacts to water quality at each stable site associated with the selection of Alternative D.

<b>Stable</b>	<b>Storm – Surface Water Runoff</b>	<b>Groundwater</b>
<b>Golden Gate Dairy</b>	Proposed facility improvements would result in short-term, negligible to minor localized adverse impacts. Long-term, minor localized beneficial impacts as a result of reduction of horse numbers and facility improvements.	The reduction in the number of horses boarded at the stable would result in local, long-term, minor beneficial impacts.
<b>Tennessee Valley</b>	Short-term, minor, localized adverse impacts during removal and construction of facilities as soils are exposed. Long-term, minor, localized adverse impacts associated with increased number of horses. Long-term, minor, localized positive impacts due to adding manure shed and revegetation at the east end of the paddocks.	Long-term, minor localized adverse impacts to biological waste materials due to increased number of horses at the site. The abandonment of the existing sewer would result in a minor local, long-term beneficial impact.
<b>Lower Tennessee Valley</b>	Short-term, minor, localized adverse impacts during removal of facilities. Long-term, minor, localized beneficial impacts once equestrian activities cease and site has been reclaimed.	Minor, long-term beneficial impacts once equestrian activities have been removed from the site.
<b>Rodeo Valley</b>	Short-term, minor, localized adverse impacts during removal and construction of facilities. Proposed facility enhancements would occur primarily would result in minor, long-term, localized adverse impacts.	Five additional horses added at the stable would result in negligible to minor, long-term, localized adverse impacts.
<b>Marincello</b>	Proposed new facility construction would result in minor, short and long-term, localized adverse impacts.	The addition of four horses and new sources of nutrient inputs to the site would result in negligible to minor, long-term, localized

<b>Stable</b>	<b>Storm – Surface Water Runoff</b>	<b>Groundwater</b>
		adverse impacts. Construction activities associated with, and the use of the new equestrian facility would result in long-term, localized negligible to minor adverse impacts.
<b>Lower Redwood Creek</b>	Proposed new facility enhancements would occur primarily on previously disturbed areas, resulting minor, short and long-term, localized adverse impacts.	The addition of horses and new sources of nutrient inputs to the site would result in negligible to minor, long-term, localized adverse impacts. Construction activities associated with, and the use of the new equestrian facility would result in long-term, localized negligible to minor adverse impacts.

### **Cumulative Impacts**

Impacts and mitigation would be as described for Alternatives B and C; short-term adverse impacts would be negligible to moderate with the inclusion of prescribed mitigation measures. Overall, the riparian corridor enhancement would result in long-term localized beneficial impacts.

As with Option B2, the proposed site enhancements and revegetation would result in cumulative impacts which would be beneficial; including reductions in sediment and nutrient transport, and improvements to drainage and wastewater management. Corresponding benefits to water quality would be experienced as the amount of pollutants reaching water bodies would be decreased. With implementation of mitigation measures, impacts to water quality would be short-term and minor adverse.

### **Conclusion**

The incorporation of Best Management Practices during all construction, routine management, operations and maintenance activities associated with this alternative would protect water quality and the natural resources adjacent to equestrian facilities. Any localized minor adverse impacts to water quality as a result of facility upgrade and enhancement activities would be temporary. There would be no adverse impacts greater than moderate, and all impacts would be mitigated to a level of minor to negligible. Stable improvements and construction would be beneficial in the long-term, and the benefits are greater than what would be expected for Option B2, but not as great as Alternative C.

No impairment of park resources or values is anticipated under this alternative. Because the impacts **previously described (1) are not inconsistent with the park's purpose and values, (2) do not prevent** the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to water resources in the park under Alternative D.

### **4.4.8 Mitigation Measures**

The chief water quality issues associated with horse stables include nutrients from manure and urine, ammonia from excrement, erosion of bare areas (such as paddocks, stalls, pastures, roads and parking areas), and the impacts to creeks and water bodies. There are many mitigation measures, or Best Management Practices that facilities can use to keep clean water clean, and manage polluted

water. The following mitigation measures would be common to all alternatives and become part of whichever alternative is selected. The objective of these measures is to protect park natural resources and water quality, to protect domestic animals and wildlife, and to protect the park users and visitors. All mitigation measures would be required unless the lessee can show that the measure or Best Management Practice is not necessary or does not apply.

**SE-2: Soil Erosion Prevention**

(see full description in section 4.3.7)

**SE-3: Soil Loss Prevention**

(see full description in section 4.3.7)

**WR-1: Stormwater and Runoff Management**

The goal of stormwater and runoff management is the protection of clean water and natural water sources such as streams and groundwater. The primary objectives of WR-1 are to minimize the amount of water that becomes contaminated by diverting polluted water away from clean water sources, and managing water that does become contaminated in ways that minimize pollutant loading to water resources. Pollutants include manure, urine, waste from feeding sites and horse confinement areas, horse grooming products, wash water and detergents, veterinary medicines, chemicals and pesticides, septic systems, surface soils, sediment, waterway erosion, and vehicles. Best Management Practices which address this objective would include:

1. Storm water management: Storm water shall be managed to protect water quality. It would be controlled to avoid polluting local streams such as by diverting runoff from animal areas and by covering manure collection containers.
2. Runoff and drainage: Drainage would be managed to prevent water pollution by separating clean runoff from polluted runoff. Runoff from animal areas would not come in contact with, or drain directly into, all-year or seasonal streams.
3. Stream setbacks. The NPS shall maintain a 50-foot setback from seasonal streams that dry out in the summer, and a 100-foot setback from perennial streams (see site maps).
4. Implement filter strips, berms, swales, drainfields: Installation of bioswales, engineered drainfields, vegetated buffers, and similar measures allow for uptake and absorption of nutrients and other contaminants to reduce pollutant loading on water resources.
5. Interceptor ditch and conveyance: An interceptor ditch for clean water collects water flowing toward the stable site and conveys it around rather than through the site. This keeps clean water from sweeping through the stable, picking up and carrying pollutants to a stream or other site. Within the stable site an interceptor ditch can also pick up polluted runoff and convey it to a safe place such as a seasonal treatment pond.

Water Quality monitoring would be required based on methods outlined in an approved water quality monitoring plan. This may include regular testing for temperature, pH, dissolved oxygen, coliform/bacteria, nitrates, ammonia, and total dissolved solids (conductivity). Monitoring would be conducted monthly at monumented sampling sites. Sampling would occur upstream and downstream of each stable. Additional stormwater and runoff management measures could be triggered if monitoring results indicate water quality protection levels are not being met.

A Stormwater Management Plan would be required for each stable. The Stormwater Management Plan would show the drainage system on a site plan or aerial photograph; the separation and conveyance of clean and polluted waters, treatment areas, slope directions, along with activities such as for erosion control revegetation, vegetated strip maintenance, and would describe the minimum

frequency of upkeep. It would show wells, creeks, drainage structures, and septic systems. The plan would include the contact information for the person responsible and his or her title.

***WR-2: Manure Management***

Manure Management: Manure would be managed to avoid water pollution, airborne contaminants and dust, and to reduce pests such as fly infestations. Manure and dirty bedding would be collected daily and be stored in a covered, waterproof enclosure. Manure shall be stored on a contained (curbed) concrete slab that has at least three walls and a roof that fully protects the stored manure from blowing rain. Manure and used stall bedding would be removed from the site weekly, and would be responsibly disposed of, preferably to a non-NPS composting facility. There would be no site composting and no open waste storage.

A Manure Management Plan shall be required for each stable. The Manure Management Plan would include an aerial plan showing the location of the covered manure shed. It would state the frequency of manure maintenance such as cleaning of stalls and grounds, and storage. It would explain the manure disposal technique including covered hauling, destination, and a statement about the disposal, treatment, or composting process and location. It would include the contact information for the person responsible and his or her title.

***WR-3: Stables Management***

There would be in place practices to control and minimize the use of water, such as float valve type waterers or nose pumps activated by animal for stall watering bowls. Revegetation would use native seed with low water use requirements. Efficient (even water distribution) sprinkler systems for dust control in arenas would be professionally designed and installed. Rainwater collection via roof drains, gutters and downspouts could be allowed for non-consumptive use. Water would be managed to control contaminated runoff. This may require diverting surface and roof drainage runoff water away from stalls, paddocks or turnouts.

Septic systems would be abandoned or replaced, or composting or vault toilets would be installed. Existing drainfields would be vegetated. Roof and surface water runoff would be diverted from drainfields.

Management and maintenance plans would be required, and would be provided by the stable lessee to the park as a condition of their permit. These plans would provide for ongoing incorporation of new or future stables management practices and technologies to protect water resources as they become available.

***WR-4: Stables Chemical Management***

Many of the chemicals found in barns – shampoos, fuel, paints, hoof oils, and pesticides to name a few – require careful handling and proper disposal. In general, stable products and chemicals would be used minimally, only as necessary for the health and safety of the animals and users, and that are safe for the environment. Runoff that may contain these products shall be treated as polluted runoff.

***WR-5: Equipment Inspections***

All vehicles and equipment would be kept clean. Excessive build-up of oil or grease would be avoided. All equipment used would be inspected for leaks each day prior to initiation of work. Action would be taken to prevent or repair leaks, if necessary. Vehicle and equipment maintenance activities would be conducted off-site or in a designated, protected area away from stream buffers where vehicle fluids and spills can be handled with reduced risk to water quality. If maintenance must occur on-site, designated areas would not directly connect to the ground, surface waters, or the storm drainage system to prevent the run-on of stormwater and runoff of spills. The service area would be clearly

designated with berms, sandbags, or other barriers. Secondary containment, such as, a drain pan or drop cloth, to catch spills or leaks would be used when removing or changing fluids. Fluids would be stored in appropriate containers with covers, and properly recycled or disposed of off-site.

#### **WR-6: Spill Prevention and Response Plan**

The National Park Service would develop or require a Spill Prevention and Response Plan for construction prior to commencement of construction activities to contain and/or clean up any stored or spilled fuels or chemicals and prevent oil, grease, or fuel leaks from equipment.

## **4.5 Vegetation**

### **4.5.1 Guiding Regulations and Policies**

NPS *Management Policies 2006* state that parks are to prevent or remove exotic plant species if possible and maintain native plants (Sec. 4.4.1, 4.4.1.1). Wetlands, including marsh and riparian vegetation, are protected by a specific set of laws and regulations.

Section 4.6.5 of NPS *Management Policies 2006* addresses the management of wetlands on NPS lands and requires parks to prevent the destruction, loss or degradation of this unique vegetation community (NPS 2006a). NPS also supports a policy of no net loss of wetlands, a goal outlined by the White House Office on Environmental Policy in 1993 and Executive Order 11990. Director's Order 77-1 establishes NPS policies, requirements, and standards for implementing Executive Order 11990. NPS requires a statement of finding and mitigation for any projects that may impact more than 0.25 acres of "natural" wetlands except for those related to recreational facilities (e.g., overlooks, bike/foot trails, and signs) and minor stream crossings that completely span channel and wetlands (e.g., no pilings, fill, or other support structures).

In addition to these laws and policies, Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act authorize the U.S. Army Corps of Engineers to grant permits for construction and disposal of dredged material in waters of the United States, which includes wetlands.

### **4.5.2 Assessment Methods**

Information on the type of vegetation in the study area, including rare or unique vegetation such as plants of concern or wetlands, was gathered primarily from park documents and maps; GIS; and California Native Plant Society databases. GIS analysis of the footprint of areas affected under all alternatives, and best professional judgment, were used to predict the extent of impact that would occur under each alternative.

#### **Thresholds**

**Negligible:** There would be no measurable or perceptible changes in the geographic extent of any native vegetation plant community, its continuity, integrity or species richness. No detectable changes to sensitive plant communities (including wetlands) would occur and no individuals of any rare or unique plant species would be affected. Key environmental conditions influencing plant communities (such as soils and water quality) would not be affected.

**Minor:** Measurable changes in the geographic extent of a native vegetation plant community, its continuity, integrity or species richness may occur, but its viability would be unaffected. Slight changes to sensitive plant communities (including wetlands) may occur, with one or a few individuals of rare or

unique plant species affected. Changes in environmental conditions influencing plant communities (such as soils and water quality) would be at the lower levels of detection. The potential for changes in the abundance of nonnative species would be detectable but minimal.

**Moderate:** Noticeable changes in the geographic extent of a native vegetation plant community, its continuity, integrity or species richness may occur, but its viability would remain. Detectable changes to sensitive plant communities (including wetlands) may occur, with some individuals of rare or unique plant species affected. Changes in environmental conditions influencing plant communities (such as soils and water quality) would be measurable. The potential for changes in the abundance of nonnative species would be noticeable.

**Major:** Substantial changes in the geographic extent of a native vegetation community, its continuity, integrity or species richness may occur. Although the communities would remain viable regionally, small populations may be eradicated. Noticeable changes to sensitive plant communities (including wetlands) may occur, with small populations of rare or unique species affected. Changes in environmental conditions influencing plant communities (such as soils and water quality) would be obvious. The potential changes in abundance of nonnative species would be substantial.

### 4.5.3 Impacts of Alternative A - No Action

#### ***Facility Construction***

No major construction would take place under the No Action Alternative. However, incremental improvements and adjustments as required by law, regulation and policy would occur. Activities under Alternative A would primarily occur in previously disturbed areas. Any adverse impact to vegetation would be negligible to minor, local, and short- or long-term.

#### ***Stable Management and Operations Activities***

The Plan would not affect stable management or operations under the No Action Alternative, and thus would have no impacts.

#### ***Cumulative Impacts***

Actions and plans for the park that could affect vegetation communities in addition to those proposed under the Marin Equestrian Stables Plan, include the General Management Plan, Fire Management Plan, Marin Headlands Transportation Plan, Marine Mammal Center improvement, Headlands Institute campus planning, Wetland and Creek Restoration at Big Lagoon, Dias Ridge Restoration and Trail improvement, Lower Redwood Creek Floodplain and Salmonid Habitat Restoration, Rosselli Coastal Permit, general visitor use, and other planning processes (see section 4.2.5).

**Fire management activities resulting from the park's Fire Management Plan could include prescribed burning and/or mechanical thinning, as well as suppression of wildfires in areas covered by the Plan. While this would have short-term adverse effects on vegetation, prescribed burning is believed to be regionally beneficial to native vegetation over the long term.**

Most of the impacts to wetlands from the MHFB Transportation Plan are beneficial. For example, the combined activities in the MHFB Transportation Plan would have permanent adverse impacts on 0.64 acres of wetlands and would restore just over three acres of wetland and dune habitat. Actions in the

MHFB Transportation Plan would also have adverse and beneficial impacts on other types of vegetation. Construction activities would result in minor short-term impacts to 15 acres of vegetation and permanent loss of 5.6 acres. About five acres of vegetation lost permanently would be coyote brush scrub (the remainder is mowed grass). Beneficial impacts to 13 acres of vegetation from removing trails, roads or parking and revegetating would also occur.

Relocation of the MMC had permanent impacts by removing 0.40 acres of non-native annual grassland and 15 Monterey pine or cypress trees. Mitigation for these impacts included planting or restoration of about 0.2 acres of native plants at the project's southeast edge. Placement of a road for this project also permanently filled 0.08 acres of wetlands. These impacts were considered localized and moderately adverse in intensity in the environmental assessment for the project (NPS 2004).

The Dias Ridge Trail Restoration Improvement Program realigns trail segments and restores degraded areas on Dias Ridge in the vicinity of Golden Gate Dairy. This project would have minor beneficial impacts to vegetation from the restored areas, but by improving trails for horse use, may also have negative impacts due to the potential for non-native plant material to spread and adversely affect native vegetation.

The Big Lagoon Wetland and Creek Restoration Project, at the mouth of Redwood Creek, is a 39-acre project designed to restore a functioning ecosystem, including riparian and wetlands. The Lower Redwood Creek Floodplain and Salmonid Habitat Restoration project is intended to restore hydrological function of the area for the benefit of fauna and for long-term creek recovery. These restoration projects would provide major local and regional long-term benefits to vegetation communities.

Existing visitor use also contributes to the creation and continued use of social trails across the project area, an adverse impact of unknown intensity. The park is undergoing several planning processes, including dog management, long-range transportation and general management planning. Each of these may include changes in visitor or park management activities that have additive adverse or beneficial impacts on vegetation. Because each of these planning processes is more likely to respond to existing resource issues, it is likely that each would result in cumulative beneficial impacts to vegetation in the Plan area.

Overall, considering all cumulative projects including project activities, impacts are considered to be both local and regional, and beneficial over the long term.

### **Conclusion**

Current stable management and operations may have minor ongoing adverse impacts to vegetation from incremental improvements; from facilities in stream buffer areas; or from any ongoing erosion or soil loss due to not implementing expanded BMPs. However, no impairment of park resources or values is anticipated under this alternative. Because the impacts previously described (1) are not **inconsistent with the park's purpose and values**, (2) **do not prevent the attainment of desired future conditions** for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to vegetation resources in the park under Alternative A.

## 4.5.4 Impacts Common to All Action Alternatives (B through D)

### **Facility Construction**

The following changes are common to all action alternatives (and described in more detail in Chapter 2). All existing stable sites would have trailer parking pads, new water tanks, pumps and generators, and a number of buildings remodeled or converted to other uses. At Golden Gate Dairy a trail segment along Highway 1, would be built and the front turn-out shortened to allow room for the trail. Manure staging pads, paddocks, and stalls inside the stream buffer at Tennessee Valley would be removed (stream buffers are 50 feet for intermittent streams and 100 feet for perennial streams). Drainage facilities would be improved at all stables.

Removal of facilities in the stream buffer area would be a minor beneficial long-term impact. Construction activities in, or immediately adjacent to, the stream buffer (including facility removal) could pose minor short-term erosion impacts to the riparian area (see section 4.3). These impacts could be mitigated by careful adherence to BMPs. Revegetated areas would provide a minor beneficial impact and only native species would be used.

Under all the action alternatives, expanded BMPs would be incorporated. These BMPs include soil and vegetation management techniques which would mitigate these impacts to negligible, short-term, and local. Facility construction could result in the spread of non-native, noxious invasive species by handling and disposal of vegetation and soil contaminated with weed seeds. Implementation of Mitigation Measures Veg-1 (*Planting and Revegetation after Landscape Treatment*) and Veg-2 (*Noxious Weed Control*) would eliminate these adverse effects and result in localized long-term beneficial impacts.

### **Stable Management and Operations Activities**

Under all the action alternatives, expanded BMPs would be incorporated into routine management. To the extent these reduce erosion and secondary impacts to vegetation from management, operation and maintenance, this would constitute a beneficial impact (minor, local, long-term).

## 4.5.5 Impacts of Alternative B - Enhanced Existing

### **OPTION B1**

#### **Facility Construction**

Under Option B1, the primary construction activities that would affect vegetation include removal of paddocks, stalls and other facilities at Golden Gate Dairy, Tennessee Valley, and Lower Tennessee Valley. New stalls, paddocks, lunging rings, manure sheds, and turn-outs would be constructed at these three stable sites. Some buildings would be remodeled and drainage facilities would be improved to conform to the enhanced BMPs. At Tennessee Valley and Lower Tennessee Valley, steep portions of turnouts would be fenced and revegetated. Portions of the southern turn-out would be reduced in size; and those in the stream buffer would be removed and a biofilter installed; the eastern side would be revegetated.

#### **Stable Management and Operations Activities**

There would be no change to the overnight horse capacity. However, implementation of mitigation measure Veg-2 (*Noxious Weed Control*) would reduce this impact to negligible.

**Cumulative Impacts**

The cumulative impacts described under Alternative A apply to Option B1 as well. Some minor additional disturbance to vegetation would occur due to construction activities. However, the long-term benefits of expanded BMPs, vegetation restoration at Tennessee Valley and Lower Tennessee Valley, and moving several facilities out of the stream corridor would be beneficial, and there would be beneficial cumulative impacts overall.

**Conclusion**

Construction would have localized, negligible to minor, long-term adverse impacts on vegetation. However, as stated above, the long-term benefits of expanded BMPs, removal of several facilities out of the stream corridor, and vegetation restoration, would be beneficial. Overall impacts to vegetation from Option B1 would be minor and beneficial.

No impairment of park resources or values is anticipated under this alternative. Because the impacts previously described (1) are not inconsistent **with the park's purpose and values, (2) do not prevent** the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to vegetation resources in the park under Option B1.

**OPTION B2****Facility Construction**

All actions described under Option B1 apply to Option B2 as well, with the following exceptions. The Park Horse Patrol operations would be removed from Lower Tennessee Valley to Tennessee Valley, resulting in three, instead of four permanent stables. The existing stalls, paddocks, manure shed, and other stable facilities would be removed from Lower Tennessee Valley. The lands would be restored and revegetated. At Tennessee Valley, new paddocks, stalls and a Park Horse Patrol use area would be constructed. The main residence and barn would be rehabilitated. This would be a moderate beneficial impact to vegetation at Lower Tennessee Valley. This would be offset somewhat as loss of vegetation at Tennessee Valley.

Other construction impacts are the same as those described for all action alternatives and for those under Option B1.

**Stable Management and Operations Activities**

There would be no net change to the overnight horse capacity. However there would be a change in distribution of horses; the four Park Horse Patrol horses currently at the Lower Tennessee Valley site would be moved to Tennessee Valley.

The other impacts from stable management and operations would be similar to that described for all action alternatives and under Option B1.

**Cumulative Impacts**

The cumulative impacts described under Alternative A apply to Option B2 as well. Some minor additional disturbance to vegetation would occur due to construction activities. However, the long-term benefits of expanded BMPs; vegetation restoration at Tennessee Valley and Lower Tennessee Valley; and removing several facilities out of the stream corridor would be beneficial, and there would be beneficial cumulative impacts overall.

**Conclusion**

Construction would have localized, negligible to minor, long-term adverse impacts on vegetation. However, the long-term benefits of one fewer stable, expanded BMPs, removal of several facilities out of the stream corridor, and vegetation restoration would be beneficial. Overall impacts to vegetation from Option B2 would be minor and beneficial. The beneficial impacts from Option B2 are somewhat greater than under Option B1 because there are fewer stables.

No impairment of park resources or values is anticipated under this alternative. Because the impacts previously described (1) are not inconsistent **with the park's purpose and values**, (2) **do not prevent** the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to vegetation resources in the park under Option B1.

**4.5.6 Impacts of Alternative C - Consolidated****Facility Construction**

Under Alternative C, the four stables in the project area would be consolidated to two, Tennessee Valley and Rodeo Valley stables. As in Option B2, the Park Horse Patrol would move from Lower Tennessee Valley to Tennessee Valley. As under Option B2, the land at Lower Tennessee Valley, where horse facilities were, would be restored as native vegetation communities. This would be a moderate beneficial impact to vegetation at Lower Tennessee Valley. This would be offset somewhat as loss of vegetation at Tennessee Valley.

Under Alternative C, the equestrian facilities at Golden Gate Dairy would be removed (stalls and paddocks). Trailhead facilities for horses would be improved. Other structures would be used by NPS or Park Partners. Other construction impacts are similar to those described for all action alternatives, and under Alternative B, Options B1 and B2.

**Stable Management and Operations Activities**

The overnight horse capacity of 72 under Alternative C is the lowest of all the alternatives; however there would be a change in distribution of horses (Table 4.5.1). There would be more horses at Tennessee Valley than under any other alternative, and more at Rodeo Valley than under Alternatives A and B, Options B1, and B2, but the same as under Alternative D. Increased horse use at Tennessee Valley and Rodeo Valley stables could have adverse, local, long-term effects if horses are allowed out of designated areas or trails. This impact would be mitigated to negligible if rules governing where horses are allowed are followed.

The other impacts from stable management and operations would be similar to that described for all action alternatives.

**Cumulative Impacts**

The cumulative impacts described under Alternative A apply to Alternative C as well. Some minor additional disturbance to vegetation would occur due to construction activities. However, the long-term benefits of expanded BMPs; vegetation restoration at Tennessee Valley and Lower Tennessee Valley; and removing several facilities out of the stream corridor would be beneficial, and there would be minor beneficial cumulative impacts overall.

**Conclusion**

Construction would have localized, negligible to minor, long-term adverse impacts on vegetation. However, the long-term benefits of two instead of four stables, expanded BMPs, removal of several facilities out of the stream corridor, and vegetation restoration would be beneficial. Overall impacts to vegetation from Alternative C would be minor and beneficial. Alternative C would have fewer impacts to vegetation than any other alternative.

No impairment of park resources or values is anticipated under this alternative. Because the impacts previously described (1) are not inconsistent with the park's purpose and values, (2) do not prevent the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to vegetation resources in the park under Alternative C.

**4.5.7 Impacts of Alternative D—Dispersed and Expanded****Facility Construction**

Alternative D provides for the construction of new stables at the Lower Redwood Creek and Marincello sites, modifications to the Golden Gate Dairy, Tennessee Valley, and Rodeo Valley stables, and for the removal of stable facilities at Lower Tennessee Valley (for a total of five permanent stables).

At Lower Redwood Creek, facilities to accommodate 12 horses including stalls and paddocks, water facilities, feeding and manure facilities, covered ring, parking, turnout and meeting room would be constructed. At the Marincello site, all facilities to accommodate the Park Horse Patrol would be developed, with a capacity of four horses. Facilities at the Golden Gate Dairy would be reduced to accommodate four rather than 11 horses. At Tennessee Valley, facilities would be modified to accommodate 46 horses instead of 42. Under Alternative D, the Park Horse Patrol would move out of the Lower Tennessee Valley site to Marincello. At Lower Tennessee Valley existing equestrian facilities would be removed and lands restored and revegetated.

Other construction impacts would be similar to those described for all action alternatives, and under Option B1.

**Stable Management and Operations Activities**

The overnight horse capacity under Alternative D is the highest of all the alternatives; however there would be a change in distribution of horses (Table 4.5.1). There would be horses at the Lower Redwood Creek and Marincello sites where there were previously none. Total capacity under Alternative D would be 88 horses compared to 76 under Alternatives A and B, Options B1 and B2, and 72 under Alternative C.

The other impacts from stable management and operations would be similar to those described for all action alternatives, and under Option B1.

**Cumulative Impacts**

Some minor additional disturbance to vegetation would occur due to construction activities, these would be greater under Alternative D than under the other alternatives. However, the long-term benefits of expanded BMPs; vegetation -restoration at Tennessee Valley and Lower Tennessee Valley; and removal of several facilities out of the stream corridor would be beneficial, and there would be beneficial cumulative impacts overall.

### Conclusion

Construction would have localized, minor, short-term and long-term adverse impacts on native vegetation. These impacts, while still minor, are worse under Alternative D than under the other alternatives. Alternative D would also have a greater impact on vegetation than any other alternative because there is the greatest number of stables under this alternative. The long-term benefits of expanded BMPs; removal of several facilities out of the stream corridor; and vegetation restoration would be beneficial, and these would help offset the adverse impacts.

No impairment of park resources or values is anticipated under this alternative. Because the impacts previously described (1) are not inconsistent with the park's purpose and values, (2) do not prevent the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to vegetation resources in the park under Alternative D.

Alter- native	Permanent Loss			Temporary Loss <sup>1</sup>			Restored	Permanent Net Change	
	SCR	GRA	RFS	SCR	GRA	RFS			
<b>A</b>	0	0	0	0	0	0	0	No net change	
<b>B1</b>	0	0.50	0.01	0	0.25	<0.01	0.50	0.01	Acre Loss
<b>B2</b>	0	0.50	0.01	0	0.25	<0.01	1.42	0.91	Acre Restored
<b>C</b>	0.09	0.44	0	0.04	0.22	0	1.44	0.92	Acre Restored
<b>D</b>	1.60	0.44	0	0.80	0.22	0	1.42	0.63	Acre Loss

<sup>1</sup>Due to staging and other temporary construction disturbance

Key:

SCR = Coastal scrub/chaparral

GRA = Grassland

NNE = Non-native evergreen forest

RFS = Riparian forest/shrubland

Source: NPS Database: 1994 GGNRA vegetation map

## 4.5.8 Mitigation Measures

### **Veg-1: Planting and Revegetation after Landscape Treatment**

- 1) Sites where activities result in exposed soil would be stabilized to prevent erosion and revegetated as soon as feasible after activities are complete. Erosion control fabric, hydromulch, or other mechanism would be applied as appropriate to provide protection to seeds, hold them in place, and help retain moisture. Tightly woven fiber netting or loose materials (e.g., rice straw) would be used for erosion control or other purposes at the work sites to ensure that the California red-legged frogs do not get trapped. This limitation would be communicated to the contractor through use of Special Provisions included in the bid solicitation package. No plastic mono-filament matting would be used for erosion control.

### **Veg-2: Noxious Weed Control**

Soils and vegetation contaminated with weed seeds from within the GGNRA would be segregated and disposed of or treated as appropriate. Similarly, soils heavily infested with noxious invasive plant material would be disposed of off-site.

## 4.6 Wildlife

### 4.6.1 Guiding Regulations and Policies

NPS *Management Policies 2006* require parks to maintain animals that are native to park ecosystems (Sec. 4.4.1). Specifically, they are to preserve and restore natural abundances, diversities, distribution and behaviors, restore native animal populations where they have been eliminated by past human actions and minimize human impacts.

Some groups of wildlife, including marine mammals, commercial fish species and migratory birds are **further regulated**. For example, “**Essential Fish Habitat,**” as established under the Magnusen-Stevens Fishery Management Act, is intended to protect spawning and rearing habitat of more than 65 commercially fished species. Protection is managed through the National Marine Fisheries Service.

The Migratory Bird Treaty Act, which was first enacted in 1918, implements domestically a series of treaties between the United States and Great Britain (on behalf of Canada), Mexico, Japan, and the former USSR, which provide for international migratory bird protection and authorize the Secretary of the Interior to regulate the taking of migratory birds. The act makes it unlawful, except as permitted **by regulations, “at any time, by any means, or in any manner, to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird, included in the terms of conventions” with certain other countries** (16 USC 703). This includes direct and indirect acts, although harassment and habitat modification are not included unless they result in the direct loss of birds, nests, or eggs.

### 4.6.2 Assessment Methods

Information on the type of wildlife in the study area was gathered primarily from park documents and wildlife databases. Best professional judgment and the scientific literature were used to predict the extent of impact that would occur under each alternative.

For evaluation of impacts of noise on wildlife, the following information on birds was considered. Waterfowl appear to be more overtly responsive to noise than other birds (Bowles 1995 as cited in NPS 2009). Although waterfowl can adjust to noise disturbances, the process is slow. At least one study found that flight responses of migratory waterfowl exposed to overflights by light aircraft and helicopters never completely habituated, and that changes in behavior as a result of exposure to noise were extensive enough that they could be translated into energetic losses (NPS 2009). Other studies of Pacific black brants found that the geese typically flew from the pond where they were exposed when aircraft flew overhead, and that the duration of responses was constant with repeated exposure, indicating no habituation (NPS 2009). Flight responses took place even when the helicopters were as far away as three kilometers a range at which noise would be just detectable. In studies of other water birds (egrets, snow geese), individuals returned to the area less than five minutes following overflights even when the aircraft had come quite close; e.g., within 0.2 kilometers (NPS 2009). However, as noted above, several species of ducks appear to have habituated to even very loud noise.

#### **Thresholds**

The following thresholds were used to determine the magnitude of effects on wildlife and wildlife habitat:

- Negligible:** There would be no observable or measurable impacts to native species, their habitats, or the natural processes sustaining them. Impacts would be of short duration and well within natural fluctuations.

**Minor:** Impacts on native species, habitat or natural processes sustaining them would be detectable, but would not be expected to be outside the natural range of variability. Small-scale changes in the amount of wildlife habitat or in the quality of habitat could take place. Disturbance of a few individuals is possible, but no change to population levels would result from disturbance as important behaviors such as breeding would not be interrupted.

**Moderate:** Breeding animals of concern are present; animals are present during particularly vulnerable life-stages, such as migration or juvenile stages. Mortality or interference with activities necessary for survival can be expected on an occasional basis, but is not expected to threaten the continued existence of the species at the project site.

Impacts on native species, their habitats, or the natural processes sustaining them would be detectable, and could be outside the natural range of variability for short periods of time. Noticeable changes in the amount or quality of wildlife habitat could take place. Population numbers, population structure, genetic variability, and other demographic factors for species might experience changes, but would be expected to remain stable and viable in the long term. Frequent responses to disturbance by some individuals could be expected, with some negative impacts to feeding, reproduction, or other factors affecting population levels. Individuals may temporarily relocate to avoid disturbance and construction or other activities may result in the permanent loss of some individuals.

**Major:** Breeding animals of concern are present; animals are present during vulnerable life stages; mortality or interference with activities necessary for survival would regularly occur, and may threaten the continued existence of the species at the project site.

Impacts on native species, their habitats, or the natural processes sustaining them would be detectable, and they would be expected to be outside the natural range of variability for long periods of time or be permanent. Substantial and obvious changes in the amount or quality of wildlife habitat could take place. Population numbers, population structure, genetic variability, and other demographic factors for species are likely to experience changes and the population may be substantially depressed. Disturbance may result in long term or permanent relocation of many individuals or partial or full populations of wildlife in the vicinity of the project.

### 4.6.3 Impacts of Alternative A - No Action

#### **Facility Construction**

No major construction would take place under the No Action Alternative. However, incremental improvements and adjustments as required by law, regulation and policy would occur, and these could include construction when rehabilitating current facilities. Activities that would most affect wildlife under Alternative A involve ground disturbance and the use of heavy equipment on site. Due to the relative lack of wildlife habitat at existing stable facilities, these activities are unlikely to substantially affect wildlife in the immediate construction area. However, certain species are less mobile, such as invertebrates, amphibians, reptiles and small mammals. Such species would be subject to crushing injuries or death from digging, grading or being killed by the vehicles themselves. These are considered low probability and due to the fact that only common species would be subject to this impact, it is considered a short-term, minor, local, adverse impact.

Disturbance to adjacent wildlife from construction noise and activity is also of concern. A detailed discussion of noise generated by construction activities, including the amount of noise anticipated at various distances, is provided in section 4.8. Some impacts of noise on wildlife include startle reflexes, increased metabolic rate and energy depletion, disruptions of feeding, breeding or communication. For those wildlife on or near a site at the time construction noise begins, most would be disturbed enough to leave the area. If habitat is available within walking or flying distance, impacts may be short-term, localized and minor adverse. Others may be unable to find suitable habitat, or may incur energy costs in moving that are enough to cause more severe, short-term localized moderate impacts. Nesting birds, shorebirds and migrating birds may be particularly affected because alternative habitat is unavailable or the species tends to be more sensitive to loud noise. Impacts to these few individuals may be localized, short-term and moderately adverse.

Noise levels at wetland or riparian areas adjacent to any of the stable sites may be loud enough to cause abandonment of the site by sensitive bird species such as herons or egrets while the construction is ongoing. Wildlife that is less mobile, such as invertebrates, amphibians, reptiles and small mammals have each been shown to be less sensitive to noise than birds, but could nonetheless experience short-term localized moderate adverse effects from vibrations or the intensity of combined noise.

Finally, erosion and sedimentation from construction activities, to the extent that it reaches adjacent wetland or riparian areas could degrade habitat.

Construction phasing, which would limit the amount of construction at any given time, would help alleviate adverse effects, as would the measures previously identified for erosion control, runoff, planting and revegetation, etc. However, overall impacts to wildlife from construction activities are considered short term, localized and moderately adverse. Mitigation Measures WL-1 (*Pre-Construction Educational Training*), WL-2 (*Nesting Bird and Raptor Protection Measures*), WL-3 (*Protection of Bat Populations*), and WL-4 (*Construction-Related Noise Control*) would reduce certain impacts to negligible to minor levels, particularly to the focal species under Mitigation Measures WL-2 and WL-3. For other species, such as those for whom mitigation would not reduce or avoid impacts (such as wildlife which cannot migrate out of the project area), impacts would remain moderately adverse on a local level—although these impacts are considered only minor in the context of the larger GGNRA environment, given the extent of habitat and species abundance elsewhere.

### **Stable Management and Operations Activities**

The Plan would not affect stable management or operations under the No Action Alternative, and thus would have no impacts.

### **Cumulative Impacts**

Actions and plans for the park that could affect wildlife in addition to those proposed under the Plan, include the MHFB Transportation Plan, General Management Plan, Fire Management Plan, the Marine Mammal Center improvements, Headlands Institute (HI) campus planning, Wetland and Creek Restoration at Big Lagoon, Dias Ridge Restoration and Trail improvement, Lower Redwood Creek Floodplain and Salmonid Habitat Restoration, Rosselli Coastal Permit, general visitor use, and other planning processes (see section 4.2.5).

The MHFB Transportation Plan adversely impacts .64 acres of wetlands and restores 3 acres of wetland and dune habitat. Construction effects would result in temporary loss of 15 acres of upland habitat, and permanent loss of 5.6 acres. 13 acres would have trails and roads removed and be restored to vegetated upland habitat. These activities could have direct impacts on wildlife that would be both minor or moderately adverse for disturbed areas in the short and long term, and moderately beneficial for restored areas in the long term.

Fire management activities, **resulting from the park's Fire Management Plan**, could include prescribed burning and/or mechanical thinning, as well as suppression of wildfires in areas covered by this Plan. These activities could have direct impacts on wildlife from noise and the presence of human activity, as well as altering habitat. For example, some vegetation communities have evolved to burn frequently (chaparral, coastal scrub, grasslands) with low-temperature fires. Manipulating fire frequency or suppression can alter the geographic extent of these communities, the presence of non-native species and the ability of these species to invade native communities, with changes to the distribution and abundance of native wildlife resulting. Generally, the goals of NPS fire management activities include restoring wildlife habitat to benefit native species, although safety and other considerations prevent wide-scale burning. Impacts would on balance be beneficial, and minor to perhaps moderate in intensity.

Building the Marine Mammal Center (MMC) adjacent to Fort Cronkhite also resulted in a small amount of filled wetland and 0.2 acres of native planting. Non-native trees that provide nesting habitat were also removed, with long-term minor or moderate impacts on wildlife habitat in the vicinity. Relocation of the MMC had permanent impacts by removing 0.40 acres of non-native annual grassland and 15 Monterey pine or cypress trees. Mitigation for these impacts included planting or restoration of about **0.2 acres of native plants at the project's southeast edge. Placement of a road for this project also permanently filled 0.08 acres of wetlands.** These impacts were considered localized and moderately adverse in intensity in the environmental assessment for the project (NPS 2009).

The Dias Ridge Trail Restoration Improvement Program realigns trail segments and restores degraded areas on Dias Ridge in the vicinity of Golden Gate Dairy. This project may have minor beneficial impacts to wildlife if habitat is provided in the restored areas. This may be offset by improving trails for horse use, which could negatively affect native vegetation, and may increase wildlife disturbance.

The Big Lagoon Wetland and Creek Restoration Project, at the mouth of Redwood Creek, is a 39 acre project designed to restore a functioning ecosystem, including riparian and wetlands. The Lower Redwood Creek Floodplain and Salmonid Habitat Restoration project is intended to restore hydrological function of the area for the benefit of fauna and for long-term creek recovery. These restoration projects would provide major local and regional long-term benefits to wetland and riparian wildlife species.

Visitor use contributes to impacts to wildlife. As noted above, most wildlife are sensitive to the presence of humans and human-caused noise and would expend energy running or flying from it. Walking humans or slow-moving boats tend to have a disproportionate impact on wildlife, as they are a perceived source of danger not posed by a quicker moving vehicle for example. Use can also result in degraded habitat from designated trails, visitor facilities, social trails and trampling of vegetation. Impacts are likely to be localized, short term, minor adverse for the most part because much of the Plan area remains contiguous without trails or human disturbance.

The park is undergoing several planning processes, including dog management, long-range transportation, and general management planning. Each of these may include changes in visitor or park management activities that have additive adverse or beneficial impacts on wildlife. Because each of these planning processes is more likely to respond to existing resource issues, it is likely that each would result in cumulative beneficial impacts to wildlife in GGNRA.

Cumulatively, the various activities identified above would have short-term and long-term minor to moderate adverse impacts during construction or other activities/uses, with long-term benefits from habitat restoration, improvement and restrictions on use. Any adverse effects associated with Plan activities would not fundamentally change these impact conclusions.

### **Conclusion**

Current stable management and operations may have minor ongoing adverse impacts to wildlife from construction noise and disturbance created while making incremental improvements. In the context of the larger Plan environment, these impacts would be minor where adequate habitat exists elsewhere. Cumulatively, there would be a combination of minor to moderate adverse impacts, alongside beneficial impacts.

No impairment of park resources or values is anticipated under this alternative. Because the impacts **previously described (1) are not inconsistent with the park's purpose and values, (2) do not prevent** the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to wildlife resources in the park under Alternative A.

## **4.6.4 Impacts Common to All Action Alternatives**

### **Facility Construction**

A number of construction activities under all action alternatives (see Chapter 2 for more details) would be beneficial to wildlife in the long-term. These include improvements to drainage and wastewater management which would improve water quality and habitat for aquatic species (see section 4.4) and removing facilities from stream buffers, also a local long-term minor beneficial impact to wildlife using riparian areas.

For all alternatives, overall impacts to wildlife from construction activities are still considered short term, localized and moderately adverse. Mitigation Measures WL-1 (*Pre-Construction Educational Training*), WL-2 (*Nesting Bird and Raptor Protection Measures*), WL-3 (*Protection of Bat Populations*), and WL-4 (*Construction-Related Noise Control*) would reduce certain impacts to negligible to minor levels, particularly to the focal species under Mitigation Measures WL-1 and WL-2. For other species, such as those for whom mitigation would not reduce or avoid impacts (such as wildlife which cannot migrate out of the project area), impacts would remain moderately adverse on a local level—although

these impacts are considered only minor in the context of the larger GGNRA environment, given the extent of habitat and species abundance elsewhere.

### ***Stable Management and Operations Activities***

Under all the action alternatives, expanded BMPs would be incorporated into routine management. To the extent these improve water quality in adjacent water bodies, this would constitute a beneficial impact (minor, local, long-term).

## **4.6.5 Impacts of Alternative B - Enhanced Existing**

### **OPTION B1**

#### ***Facility Construction***

Impacts to wildlife from construction activities would be the same as those described under Alternative A, and under all action alternatives. However, because there is more construction activity under Option B1 than under Alternative A, the magnitude and duration of construction impacts would be greater.

Overall impacts to wildlife from construction activities are still considered short term, localized and moderately adverse. Mitigation Measures WL-1 (*Pre-Construction Educational Training*), WL-2 (*Nesting Bird and Raptor Protection Measures*), WL-3 (*Protection of Bat Populations*), and WL-4 (*Construction-Related Noise Control*) would reduce certain impacts to negligible to minor levels, particularly to the focal species under Measures WL-1 and WL-2. For other species, such as those for whom mitigation would not reduce or avoid impacts (such as wildlife which cannot migrate out of the project area), impacts would remain moderately adverse on a local level—although these impacts are considered only minor in the context of the larger GGNRA environment, given the extent of habitat and species abundance elsewhere.

#### ***Stable Management and Operations Activities***

Impacts due to stable management and operations activities are the same as those described for all action alternatives.

#### ***Cumulative Impacts***

While cumulative impacts are the same as those described under Alternative A, additional disturbance to wildlife would be anticipated under Option B1 due to construction activities. However, the long-term amenities provided by removing facilities from the stream buffer, revegetating some areas, improving drainage and wastewater management, and applying enhanced BMPs, would combine with the beneficial impacts of other identified cumulative projects. Cumulative impacts (minor to moderate) to wildlife over the long-term would be beneficial.

#### ***Conclusion***

Impacts to wildlife from ground disturbance, noise and activity during construction would be short-term, adverse, minor to moderate and local. With mitigation, impacts would be reduced, but some could remain moderate in the short-term. Gradually over the long-term, improved water management, fewer structures in the stream buffer, and revegetated areas, would provide minor to moderate local beneficial impacts to wildlife. Cumulatively, impacts would be minor to moderate, and beneficial.

No impairment of park resources or values is anticipated under this alternative. Because the impacts previously described (1) are not inconsistent with the park's purpose and values, (2) do not prevent the attainment of desired future conditions for natural and cultural resources, (3) do not create an

unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to wildlife resources in the park under Option B1.

## **OPTION B2**

### ***Facility Construction***

The main difference in facility construction under Alternative B, Options B1 and B2, is that under Option B2 the Park Horse Patrol operations would be moved from Lower Tennessee Valley to Tennessee Valley. The existing stalls, paddocks, and other stable facilities would be removed from Lower Tennessee Valley, and those lands would be restored and revegetated.

The effects of construction would be similar to those described under Option B1 and under all action alternatives. Although the specific construction activities would vary from alternative to alternative, the impact from noise and the presence and use of heavy equipment would be similar. The vegetation restoration at Lower Tennessee Valley would, in the long-term, provide minor benefits to wildlife.

The mitigation measures identified for Option B1 would apply here; overall impacts to wildlife from construction activities are considered short-term, local, and moderately adverse with mitigation.

### ***Stable Management and Operations Activities***

The other impacts from stable management and operations would be similar to those described for all action alternatives.

### ***Cumulative Impacts***

The cumulative impacts would be as described for Option B1; short-term and long-term minor to moderate adverse impacts during construction; with long-term benefits from removing facilities from the stream buffer, revegetating some areas, improving drainage and wastewater management, applying enhanced BMPs, and having three rather than four permanent stables. Cumulative impacts (minor to moderate) to wildlife over the long-term would be beneficial.

### ***Conclusion***

Conclusions about impacts, mitigation, and conclusions regarding impairment would be as described for Option B1; overall, impacts (after mitigation) would be no more than locally moderate in the short-term, with many being negligible or beneficial over the long-term. Option B2 would be more beneficial for wildlife than Option B1 because there would be fewer permanent stables.

No impairment of park resources or values is anticipated under this alternative. Because the impacts previously described (1) are not **inconsistent with the park's purpose and values**, (2) do not prevent the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to wildlife resources in the park under Option B2.

## **4.6.6 Impacts of Alternative C - Consolidated**

### ***Facility Construction***

Under Alternative C, the four stables in the Plan area would be consolidated to two, Tennessee Valley and Rodeo Valley. As in Option B2, the Park Horse Patrol would move from Lower Tennessee Valley to

Tennessee Valley. Facility construction at Rodeo Valley would have a new residence built to the southeast of the Balloon Hangar. The stalls and 60 foot ring would not be constructed at Golden Gate Dairy resulting in less impact to Alternative C compared with Alternative B.

#### ***Stable Management and Operations Activities***

The other impacts from stable management and operations would be similar to that described for all action alternatives.

#### ***Cumulative Impacts***

The cumulative impacts would be as described for Alternative A; short-term and long-term minor to moderate adverse impacts during construction; with long-term benefits from removing facilities from the stream buffer, revegetating some areas, improving drainage and wastewater management, applying enhanced BMPs, and having two rather than four permanent stables. Cumulative impacts (minor to moderate) to wildlife over the long-term would be beneficial.

#### ***Conclusion***

General impacts conclusions, mitigation, and conclusions regarding impairment would be as described for Option B2; overall, impacts (after mitigation) would be no more than locally moderate in the short-term, with many being negligible or beneficial over the long-term. Alternative C would be the most beneficial alternative to wildlife because it has the fewest permanent stables.

No impairment of park resources or values is anticipated under this alternative. Because the impacts **previously described (1) are not inconsistent with the park's purpose and values, (2) do not prevent** the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to wildlife resources in the park under Alternative C.

### **4.6.7 Impacts of Alternative D - Dispersed and Expanded**

#### ***Facility Construction***

Alternative D provides for the construction of new stables at the Lower Redwood Creek and Marincello sites, and for the Park Horse Patrol to move from Lower Tennessee Valley to Marincello for a total of five permanent stables.

The impacts of facility construction would be as described under Option B2, but more extensive and affecting a larger region due to the inclusion of the Lower Redwood Creek and Marincello sites. In addition to the noise and disturbance impacts to wildlife described for other alternatives, Alternative D has the greatest loss of vegetated areas (grassland and coastal scrub/chaparral). This habitat loss would be a local, long-term, minor adverse impact to wildlife species using that habitat.

#### ***Stable Management and Operations Activities***

The overnight horse capacity under Alternative D is the highest of all the alternatives; however, there would be a change in distribution of horses (Table 4.5.1). There would be horses in Lower Redwood Creek and at Marincello, where there were previously none. Total capacity under Alternative D would be 88 horses, compared to 76 under Alternatives A and B, Options B1 and B2, and 72 under Alternative C.

The other impacts from stable management and operations would be similar to those described for all action alternatives.

### **Cumulative Impacts**

The cumulative impacts would be as described for Alternative A; short-term and long-term minor to moderate adverse impacts during construction; with long-term benefits from removing facilities from the stream buffer, revegetating some areas, improving drainage and wastewater management, and applying enhanced BMPs. Because of the increased stables distribution and the larger area affected by Alternative D, and the greatest number of stables, cumulative impacts (minor to moderate) to wildlife over the long-term would be beneficial, but would likely take longer to become so.

### **Conclusion**

General impacts conclusions, mitigation, and conclusions regarding impairment would be as described for Option B1 and B2. Short-term construction impacts would be greater than for the other alternatives. Overall, impacts (after mitigation) would be locally moderate in the short-term, with many being negligible or beneficial over the long-term. Alternative D is likely to have the greatest adverse effect on wildlife of all the alternatives, due to the highest number of permanent stables.

No impairment of park resources or values is anticipated under this alternative. Because the impacts **previously described (1) are not inconsistent with the park's purpose and values, (2) do not prevent the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations,** there would not be unacceptable impacts to wildlife resources in the park under Alternative D

## **4.6.8 Mitigation Measures**

### **WL-1: Pre-Construction Educational Training**

Prior to construction activities, all personnel would participate in an educational training session conducted by a qualified biologist. Training sessions would include identification of National Park Service staff resource contacts; special-status plants, wildlife, or other sensitive resources in the work area; markings for the limit line of disturbance; thresholds that would trigger a change in implementation techniques or require a halt in project implementation; prohibitions on feeding resident wildlife; and proper disposal of food waste and garbage to discourage feeding by wildlife which may increase predation on native wildlife. Upon completion of training, employees or contracting crews would be required to sign a form stating that they attended the training and understand all the conservation and protection measures.

### **WL-2: Nesting Bird and Raptor Protection Measures**

1. To the greatest extent possible, activities would be planned and conducted outside the bird-nesting season (defined as January 1—July 31 for raptors, and March 1—July 31 for landbirds).
2. **In intensively managed landscapes, vegetation would be maintained at a height of less than 8" throughout the landbird nesting season to discourage the nesting of such bird species. Any vegetation (e.g., trees, shrub, grasses) taller than 8" that is not removed within the timing window specified in the GGNRA Standard Operating Procedures for vegetation cutting and removal would be subject to the additional measures 3 and 4, below.**
3. If work is conducted within the nesting season, prior to the onset of construction involving ground-disturbing activities using heavy machinery, a qualified wildlife biologist would be retained to conduct pre-maintenance surveys for raptors and nesting birds within suitable nesting habitat in a 300 foot radius of the construction area. If no active nests are detected

during surveys, activities may proceed. If active nests are detected then measure 4 would be implemented.

4. If active nests are identified within the construction area, a biologist would establish a suitable nest buffer in coordination with NPS where no work can occur until the young have successfully fledged or the nests have been otherwise abandoned.

### **WL-3: Protection of Bat Populations**

Preconstruction surveys for bat species would be conducted in areas of suitable habitat within the project area. For tree-roosting bats, all potential roost trees that must be removed would be surveyed and identified in the field, and the following procedures would be applied prior to felling: (1) avoid implementing tree removal between April 1 and August 31 to protect potential maternity roosts, (2) trees would be removed under the warmest possible conditions practical, (3) sections of the exfoliating bark would be peeled off the tree gently to search for any roosting bats underneath, (4) noise and vibrations (e.g., striking the tree base) would be created on the tree itself. When cutting sections of the bole, if any hollows or cavities (such as woodpecker holes) are discovered, a biologist would carefully check for the presence of bats in those areas.

### **WL-4: Construction-Related Noise Control**

1. Contractors would work collaboratively with the NPS and the stables operators to schedule concentrated periods of construction, considering NPS functions and equestrian programming.
2. All equipment would be operated and maintained to minimize noise generation. Contractors would ensure that power equipment (vehicles, heavy equipment, and hand equipment such as **chainsaws**) is equipped with original manufacturer's sound-control devices, or alternate sound control that is no less effective than those provided as original equipment. Equipment would be operated and maintained to meet applicable standards for construction noise generation. No equipment would be operated with an unmuffled exhaust.
3. Contractors would use hydraulically or electrically powered construction equipment, when feasible.
4. Contractors would locate stationary noise sources as far from sensitive receptors, such as wildlife areas, conference areas, offices and work buildings, as possible.
5. Contractors would limit the idling of motors except as necessary (e.g., concrete mixing trucks).
6. Construction activities would be limited to normal business hours (7 a.m. - 4 p.m.). Work that is particularly noisy work would be limited to the hours of 10:00 a.m. and 3:00 p.m. to the extent possible to minimize noise disruptions.

## **4.7 Special Status Species**

### **4.7.1 Guiding Regulations and Policies**

The federal Endangered Species Act (ESA) of 1973, as amended, requires federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) before taking actions that (1) could jeopardize the continued existence of any federally listed plant or animal species or species proposed for listing, or (2) could result in the destruction or adverse modification of critical or proposed critical habitat for federally-listed species.

In addition, NPS *Management Policies 2006* (NPS 2006a) state that state and locally listed species are to be managed in a manner similar to the treatment of federally listed species to the greatest extent

possible. Species that are rare, unique, and declining, but not listed, are to be inventoried and managed to maintain their natural distribution and abundance (sec. 4.4.2.3).

Some groups of wildlife, including marine mammals, commercial fish species and migratory birds are **further regulated**. For example, "Essential Fish Habitat," as established under the Magnusen-Stevens Fishery Management Act, is intended to protect spawning and rearing habitat in the review of projects conducted under Federal permits, licenses, or other authorities which affect or have the potential to affect such habitat. Protection is managed through the National Marine Fisheries Service.

## 4.7.2 Assessment Methods

Special status species with potential to occur in the Plan area were identified by conducting database searches (CNDDDB and CNPS), a review of existing literature, and comparing published habitat conditions in the Plan **area with species' requirements**. This chapter evaluates potential impacts from the Plan on the five federally listed (tidewater goby, steelhead trout, coho, the California red-legged frog, and the Mission Blue butterfly), and two state listed animals (California black rail and the little willow flycatcher). **These species are referred to as "listed species" in this section**. No federal or state listed threatened or endangered plant species are known to grow in the Plan area. The other special status species listed in section 3.5 are also considered. Impacts were evaluated by assessing potential project impacts on habitats of these species, review of NPS documents, professional opinion, and input from NPS staff.

### **Thresholds**

The following thresholds were used to determine the magnitude of effects on species of special concern.

<b>Negligible:</b>	There would be no observable or measurable adverse or beneficial impacts to special status species, their habitats, or the natural processes sustaining them in the proposed project area.
<b>Minor:</b>	Individuals may temporarily avoid areas. Actions would not adversely affect critical periods (e.g., breeding, nesting, denning, feeding, resting) or habitat.
<b>Moderate:</b>	Individuals may be impacted by disturbances that interfere with critical periods (e.g., breeding, nesting, denning, feeding, resting) or habitat; including potential for physical injury or mortality of special status individuals.
<b>Major:</b>	Potential loss of federally-listed individuals, critical habitat, or loss of large numbers of special status individuals. Impacts could not be mitigated.

## 4.7.3 Impacts of Alternative A - No Action

### **Facility Construction**

No major construction would take place under the No Action Alternative. However, incremental improvements and adjustments as required by law, regulation and policy would occur, and these could include construction when rehabilitating current facilities. No rare plants or special status animals have been found at the existing stable sites; therefore, this discussion is limited to indirect impacts of construction, e.g., impacts to special status species in the vicinity of noise emitted by construction.

Special status species, especially birds, could be affected by noise from construction activity. The impact of noise on wildlife is described in section 4.6.3. If construction begins in the spring, it is possible that some special status birds may be nesting. Very loud noise may cause birds to abandon

their nests, with loss of the eggs or fledglings (GGNRA 2009). If this happens, it would be a localized, short-term moderate adverse effect on this species. Implementation of Mitigation Measures WL-2 (*Nesting Bird and Raptor Protection Measures*), WL-1 (*Pre-Construction Educational Training*), and WL-4 (*Construction-Related Noise Control*) would reduce the impacts to negligible levels.

Special status bat species that may be roosting in buildings could be disturbed by construction activities. Mitigation Measure WL-3 (*Protection of Bat Populations*) would reduce this impact to negligible.

If siltation from minor construction activities were to reach lagoons or creeks there could be impacts to tidewater gobies, steelhead, coho salmon, California red-legged frogs, or western pond turtle. Eggs, tadpoles, and newly hatched fry would be most susceptible. However, with the implementation of construction BMPs, impacts would likely be short-term, localized and minor.

No impacts to special status plant species are anticipated from construction activities under Alternative A because native vegetation should not be affected.

### **Stable Management and Operations Activities**

The Plan would not affect stable management or operations under the No Action Alternative, and thus would have no impacts.

### **Cumulative Impacts**

The cumulative effects described under section 4.6 for general wildlife would pertain to special status species as well. Cumulative effects on listed species are described below.

**Tidewater goby.** Rodeo Lagoon is the only known habitat in the park used by gobies, and is designated as part of this species critical habitat. According to the Marin County Watershed Management Plan (2004) this critical habitat is threatened by poor water quality and sedimentation. Shaw (2006) reports, that hydrologic processes in the drainage indicate most of the sedimentation is originating in the Gerbode Valley, where the channel has been largely cut off from its historic floodplain. The Gerbode Valley drains into Rodeo Creek below the stable. In contrast, wet meadows and a well-connected floodplain are still present today along most of the Rodeo Valley floor near the stable (Shaw 2006). The confluence of Gerbode Creek is below the stable, and while Gerbode Creek may contribute the bulk of the sediment impacting the Lagoon, the stable also contributes to the increased sediment, nutrient loading, diminished dissolved oxygen, increased BOD, and influx of bacterial contamination. Because the tidewater goby is limited to the lagoon, and is affected by upstream processes, the No Action Alternative is not anticipated to contribute any beneficial cumulative impacts to the species. In fact, maintaining current conditions would result in minor to moderate localized long-term adverse impacts to tidewater gobies.

**Salmonids.** According to the National Marine Fisheries Service (2000) Tennessee Valley Creek has no value as a fishery. Although there is a major fish passage barrier near the mouth, no salmonids have been captured during surveys up- or downstream of the dam (NPS 2000 in NMFS 2000). Electrofishing surveys conducted in 2000 documented steelhead in Rodeo Creek in very low densities: three to five fish per 100 feet (NPS 2000 in NMFS 2000). As a result, Alternative A would have no impact on salmonid resources in Tennessee Valley, and negligible to minor localized long-term adverse impacts to salmonids in Rodeo Creek.

Threats to coho and steelhead from diminished water quality and sedimentation in the Redwood Creek drainage would continue. Water quality samples collected between 1999 and 2004, at sites downstream of the stables are higher in bacteria, nutrients, sediments and oxygen demand (low DO,

high BOD) (Stillwater 2005). Although changes in stable management to implement measures to reduce erosion and runoff at Golden Gate Dairy have resulted in some improvement, sampling still results in excess nutrients and bacteria to the lower watershed (Stillwater 2005). Although Reichmuth et al. (2005) documented highest coho redd densities in Redwood Creek above Golden Gate Dairy, near Muir woods, substantial numbers of fry are displaced by spring flows, and rear in the mainstream Redwood Creek below the stable, including the newly expanded tidal lagoon. Steelhead also typically spawn above the stables' tributary, and similar to salmon, young steelhead rear in the creek. There is a small, intermittent tributary alongside the stables. To the Park Service's knowledge, it is not used by salmonids (personal communication, Darren Fong, 2010). Because of the life history of both species, and the presence of multiple life stages in the mainstream of Redwood Creek, the No Action Alternative is not anticipated to contribute any beneficial cumulative impacts to coho, or steelhead. In fact, maintaining current conditions would result in minor to moderate localized long-term adverse impacts to both species within the Redwood Creek mainstream.

**Red-legged frog.** Threats include elimination or degradation of habitat from development and land use activities, and habitat invasion by non-native aquatic species, most notably the bullfrog. Red-legged frogs breed in ponds downstream of equestrian facilities in Tennessee and Rodeo Valleys. Under Alternative A, existing nutrient contributions are contributing factors to low dissolved oxygen (particularly at Rodeo Lagoon) that may affect long-term utility of the pond to support breeding populations of red-legged frogs. The No Action Alternative would be anticipated to have minor adverse short-term and moderate adverse long-term impacts on the California red-legged frog.

**Mission Blue Butterfly.** Alternative A would not affect Mission blue butterflies, or the habitat used by this species' host plants.

**Other special status animal species.** Most special status wildlife species are threatened by habitat loss or other stresses associated with development (increased predation or disturbance from domestic animals and humans, exposure to pesticides or herbicides, habitat fragmentation, etc.). The special status species with potential to occur in the Plan area are no exception. To the extent that activities under any of the alternatives cause stress to these species, the Plan could be contributing to adverse cumulative impacts. However, on balance, the Plan and other planned activities in GGNRA would have beneficial long-term impacts to special status species.

**Special status plants.** Because Alternative A would not affect special status plants, this alternative would not contribute to cumulative effects to special status plants.

### **Conclusion**

Alternative A may have minor to moderate adverse short-term, local, impacts to bird or bat species because of construction noise. Existing operations and management would continue to impact or effect water resources under Alternative A. Processes currently affecting water quality would not be further mitigated; maintaining episodic diminished water quality affects aquatic species, their survivability, and their habitats, and would result in minor to moderate localized long-term adverse impacts on coho, steelhead, tidewater gobies, and California red-legged frogs. No known impacts to rare plants would occur as a result of Alternative A.

No impairment of park resources or values is anticipated under this alternative. Because the impacts previously described **(1) are not inconsistent with the park's purpose and values, (2) do not prevent** the attainment of desired future conditions for natural and cultural resources, **(3) do not create** an unsafe environment, **(4) do not diminish** opportunities for future enjoyment of the park, and **(5) do not unreasonably interfere** with park programs or activities, an appropriate use, or concessioner or

contractor operations, there would not be unacceptable impacts to special status species in the park under Alternative A.

#### **4.7.4 Impacts Common to All Action Alternatives**

##### ***Facility Construction***

A number of construction activities under all action alternatives (see Chapter 2 for more detail), would be beneficial to special status species in the long-term. These include improvements to drainage and wastewater management which would improve water quality and habitat for aquatic species (see section 4.4) and removing facilities from stream buffers, also a local long-term minor beneficial impact to special status species using riparian areas.

For all alternatives, overall impacts to special status species from construction activities are still considered short term, localized and moderately adverse. Mitigation Measures WL-1 (*Pre-Construction Educational Training*), WL-2 (*Nesting Bird and Raptor Protection Measures*), WL-3 (*Protection of Bat Populations*), and WL-4 (*Construction-Related Noise Control*) would reduce certain impacts to negligible to minor levels, particularly to the focal species under Mitigation Measures WL-2 and WL-3. Enhanced BMPs and erosion mitigation measures would reduce impacts to special status aquatic species to negligible to minor as well. For other species, such as those for whom mitigation would not reduce or avoid impacts (species that cannot migrate out of the project area), impacts would remain moderately adverse on a local level—although these impacts are considered only minor in the context of the larger GGNRA environment, given the extent of habitat and species abundance elsewhere.

##### ***Stable Management and Operations Activities***

Under all the action alternatives, expanded BMPs would be incorporated into routine management. To the extent these improve water quality in adjacent water bodies, this would constitute a beneficial impact (minor, local, long-term).

#### **4.7.5 Impacts of Alternative B - Enhanced Existing**

##### **OPTION B1**

##### ***Facility Construction***

Impacts to special status species from construction activities would be the same as those described under Alternative A and all action alternatives. The magnitude and duration of construction impacts would be greater under Option B1 than under Alternative A. Conducting rare plant surveys prior to disturbance would reduce this impact to negligible.

##### ***Stable Management and Operations Activities***

Impacts to special status species are the same as those described for all action alternatives.

##### ***Cumulative Impacts***

While cumulative impacts are described under Alternative A, additional disturbance to special status wildlife that could occur in the project area such as the California Red-Legged Frog and Northern Spotted Owl (see section 3.5.2) could occur Option B1 due to construction activities. However, the long-term amenities provided by removing facilities from the stream buffer, revegetating some areas, improving drainage and wastewater management, and applying enhanced BMPs, would combine with the beneficial impacts of other identified cumulative projects. Implementation of Option B1 would result in long-term impacts that would be beneficial to fish, as the contribution of sediments and other pollutants decreases. Reduced runoff and nutrient loading would improve dissolved oxygen

concentrations and decrease BOD in the lagoons, both of which would benefit red-legged frogs and tidewater gobies. The reduction in sediment and nutrient loading would also benefit stream dwelling coho and steelhead. Cumulative impacts (minor to moderate) to special status species over the long-term would be beneficial.

### **Conclusion**

Impacts to special status species from ground disturbance, noise and activity during construction would be short-term, adverse, minor to moderate and local. With mitigation, impacts would be reduced, but some could remain moderate in the short-term. Gradually over the long-term, improved water management, fewer structures in the stream buffer, and revegetated areas, would provide minor to moderate local beneficial impacts to special status species. Impacts from construction and enhancement would ultimately benefit coho, steelhead, and tidewater goby. Implementation of identified BMPs would mitigate adverse impacts to fish to locally negligible. Cumulatively, impacts would be minor to moderate, and beneficial.

No impairment of park resources or values is anticipated under this alternative. Because the impacts previously described **(1) are not inconsistent with the park's purpose and values, (2) do not prevent** the attainment of desired future conditions for natural and cultural resources, **(3) do not create** an unsafe environment, **(4) do not diminish** opportunities for future enjoyment of the park, and **(5) do not unreasonably interfere** with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to special status species in the park under Option B1.

## **OPTION B2**

### **Facility Construction**

The effects of construction would be similar to those described for all action alternatives and under Option B1. Although the specific construction activities would vary from alternative to alternative, the impact from noise and the presence and use of heavy equipment would be similar. The removal of horse facilities and vegetation restoration at Lower Tennessee Valley would, in the long-term, provide minor benefits to special status species, depending on the type of vegetation restored.

Overall impacts to special status species from construction activities are considered short-term, local, and moderately adverse with mitigation.

### **Stable Management and Operations Activities**

The other impacts from stable management and operations would be similar to those described for all action alternatives. The removal of horses and horse operations at Lower Tennessee Valley would, in the long-term, provide minor benefits to special status species, depending on the type of vegetation restored.

### **Cumulative Impacts**

The cumulative impacts would be as described for Option B1; short-term and long-term minor to moderate adverse impacts during construction; with long-term benefits from removing facilities from the stream buffer, revegetating some areas, improving drainage and wastewater management, and applying enhanced BMPs. Cumulative impacts (minor to moderate) to special status species over the long-term would be beneficial.

### **Conclusion**

Conclusions about impacts, mitigation, and conclusions regarding impairment would be as described for Option B1; overall, impacts (after mitigation) would be no more than locally moderate in the short-

term, with many being negligible or beneficial over the long-term. Option B2 would be more beneficial to special status species due to having three instead of four permanent stables.

No impairment of park resources or values is anticipated under this alternative. Because the impacts **previously described (1) are not inconsistent with the park's purpose and values, (2) do not prevent** the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to special status species in the park under Option B2.

## **4.7.6 Impacts of Alternative C - Consolidated**

### ***Facility Construction***

Under Alternative C, the four stables in the Plan area would be consolidated to two existing stables sites, Tennessee Valley and Rodeo Valley. As in Option B2, the Park Horse Patrol would move from Lower Tennessee Valley to Tennessee Valley.

The impacts of facility construction to special-status species would be as described for Alternative B, Option 2, except at Golden Gate Dairy, the impacts would be reduced because stalls would not be rebuilt and horses would be removed, and at Lower Tennessee Valley no building construction would take place.

### ***Stable Management and Operations Activities***

Potential impacts from stable management and operations would be reduced compared to the other action alternatives because stables operations would be removed from Golden Gate Dairy and Lower Tennessee Valley. The removal of horses and horse operations at Lower Tennessee Valley and Golden Gate Dairy would, in the long-term, provide minor benefits to special status species, depending on the type of vegetation restored. Total number of horses under Alternative C would be 72, compared to 76 under Alternatives A and B, Options B1 and B2. This would be a long-term beneficial impact.

### ***Cumulative Impacts***

The cumulative impacts would be as described for Alternative A; short-term and long-term minor to moderate adverse impacts during construction; with long-term benefits from removing facilities from the stream buffer, revegetating some areas, improving drainage and wastewater management, and applying enhanced BMPs. Cumulative impacts (minor to moderate) to special status species over the long-term would be beneficial. The removal of Golden Gate Dairy as an active stable would eliminate further contributions of pollutants to Redwood Creek. This would result in improved water quality conditions, enhanced habitat, improved foraging opportunities, and increased egg and fry survival, all of which would benefit coho and steelhead in the long-term.

### ***Conclusion***

General impacts conclusions, mitigation, and conclusions regarding impairment would be as described for Option B2; overall, impacts (after mitigation) would be no more than locally moderate in the short-term, with many being negligible or beneficial over the long-term. Impacts from construction and enhancement would ultimately benefit coho, steelhead, and tidewater goby. Implementation of identified BMPs would mitigate short-term impacts to fish to locally negligible adverse. The long-term beneficial cumulative impacts anticipated under Alternative C exceed those expected under Alternatives A, B, Option B1 and B2, and D.

No impairment of park resources or values is anticipated under this alternative. Because the impacts **previously described (1) are not inconsistent with the park's purpose and values, (2) do not prevent** the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to special status species in the park under Alternative C.

#### **4.7.7 Impacts of Alternative D - Dispersed and Expanded**

##### ***Facility Construction***

The impacts of facility construction would be as described under all action alternatives, but more extensive and affecting a larger region due to the inclusion of the Lower Redwood Creek and Marincello sites. In addition to the noise and disturbance impacts to special status species described for other alternatives, Alternative D has the greatest loss of non-disturbed areas (grassland and coastal scrub/chaparral). This habitat loss would be a local, long-term, minor adverse impact to special status animal or plant species using that habitat.

##### ***Stable Management and Operations Activities***

There would be horses in the Lower Redwood Creek and Marincello sites under Alternative D, where there were previously none. Total capacity under Alternative D would be 88 horses, compared to 76 under Alternatives A and B, Options B1 and B2, and 72 under Alternative C. New construction at the additional stable sites has the potential to increase short term impacts in Redwood and Tennessee Valley creeks above other action alternatives.

The other impacts from stable management and operations would be similar to those described for all action alternatives.

##### ***Cumulative Impacts***

The cumulative impacts would be as described for Alternative A; short-term and long-term minor to moderate adverse impacts during construction; with long-term benefits from removing facilities from the stream buffer, revegetating some areas, improving drainage and wastewater management, and applying enhanced BMPs. Because of the larger area affected by Alternative D, cumulative impacts (minor to moderate) to special status species over the long-term would be beneficial, but would likely take longer to become so. There is greater potential for cumulative habitat loss for special status plants since more native vegetation would be lost. Site improvements and new construction at the two Redwood Creek stables would result in benefits to coho and steelhead that exceed Alternative B, Options B1 and B2, but are less beneficial than Alternative C. Cumulative adverse effects to special status wildlife species would be greater under Alternative D than under the other alternatives because of the number and distribution of stables.

##### ***Conclusion***

General impacts conclusions, mitigation, and conclusions regarding impairment would be as described for Option B2. Short-term construction impacts would be greater than for the other alternatives. Overall, impacts (after mitigation) would be locally moderate in the short-term, with many being negligible or beneficial over the long-term. Impacts from construction and enhancement would ultimately benefit coho, steelhead, and tidewater goby over Alternative A. Implementation of identified BMPs would mitigate short-term impacts to fish to locally negligible adverse. Adverse effects to special status wildlife species would be greater under Alternative D than under the other alternatives because of the number of stables.

No impairment of park resources or values is anticipated under this alternative. Because the impacts **previously described (1) are not inconsistent with the park's purpose and values, (2) do not prevent** the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to special status species in the park under Alternative D.

### 4.7.8 Mitigation Measures

**WL-1: Pre-Construction Educational Training**

(see full description in section 4.6.9)

**WL-2: Nesting Bird and Raptor Protection Measures**

(see full description in section 4.6.9)

**WL-3: Protection of Bat Populations**

(see full description in section 4.6.9)

**WL-4: Construction-Related Noise Control**

(see full description in section 4.6.9)

## 4.8 Air Quality

During scoping (see Chapter 1), it was determined that heavy equipment used to construct or rehabilitate buildings and other stable facilities, vehicles delivering construction supplies, and vehicles associated with additional equestrian use of stable sites could increase air pollutants.

### 4.8.1 Guiding Regulations and Policies

Beyond NPS's responsibility to protect air quality under the Clean Air Act and the 1916 Organic Act, NPS *Management Policies 2006* state that NPS would, "seek to perpetuate the best possible air quality in parks to: (1) preserve natural resources and systems; (2) preserve cultural resources; and (3) sustain visitor enjoyment, human health, and scenic vistas. The Service would... **minimize air quality** pollution emissions associated with park operations... (Sec. 4.7.1)."

### 4.8.2 Assessment Methods

The air quality analysis methods and thresholds are based on those in the Marin Headlands and Fort Baker Transportation Infrastructure and Management Plan Final EIS.

**Short-term Impacts.** The analysis includes a general discussion of potential short-term impacts on air quality resulting from construction. Short-term construction-generated criteria air pollutant and precursor emissions are qualitatively assessed as recommended by the Bay Area Air Quality Management District (BAAQMD). The BAAQMD does not require quantification of construction emissions. Instead, it requires implementation of effective and comprehensive feasible control measures to reduce PM10 emissions (BAAQMD 1999) (NPS 2009a).

The amount of PM10 emitted during construction activities varies greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, and weather conditions. Despite this variability in emissions, experience has shown that there are a number of feasible control measures that can be reasonably implemented to reduce PM10 emissions during

construction. These control measures are aimed at controlling PM10 emissions and are summarized in **Table 4-11**. The impact analysis assumes that these measures are implemented as a standard operating procedure (NPS 2009a).

While construction equipment also emits CO and ozone precursors, construction-related emissions of these pollutants were not estimated, because they are already included in the emission inventory that **forms the basis for BAAQMD's** regional air quality plans, and those emissions are not expected to impede attainment or maintenance of ozone and CO standards in the Bay Area (BAAQMD 1999) (NPS 2009a).

**Long-term Impacts.** An analysis of potential long-term, operational air pollutant impacts is also provided. None of the alternatives would result in the operation of any major stationary emission sources of criteria, odorous, or toxic air pollutants. Consequently, the analysis of potential long-term impacts focuses on mobile source emissions. Regional and local mobile source criteria air pollutant and precursor emissions (ROG, NO<sub>x</sub>, and PM<sub>10</sub>) are qualitatively assessed based on a comparison of BAAQMD-recommended screening trigger levels with the predicted change in daily traffic volumes from existing conditions.

<b>Table 4-11 BAAQMD Feasible Control Measures for Construction Emissions of PM<sub>10</sub></b>
<b>Basic Control Measures. The following controls should be implemented at all construction sites.</b>
<ul style="list-style-type: none"> <li>▪ Water all active construction areas at least twice daily.</li> <li>▪ Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard.</li> <li>▪ Pave, apply water three times daily, or apply (nontoxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.</li> <li>▪ Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at construction sites.</li> <li>▪ Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.</li> </ul>
<b>Enhanced Control Measures. The following measures should be implemented at construction sites greater than four acres in area.</b>
<ul style="list-style-type: none"> <li>▪ Hydroseed or apply (nontoxic) soil stabilizers to inactive construction areas (e.g., previously graded areas inactive for 10 days or more).</li> <li>▪ Enclose, cover, water twice daily, or apply (nontoxic) soil binders to exposed stockpiles (e.g., dirt and sand).</li> <li>▪ Limit traffic speeds on unpaved roads to 15 mph.</li> <li>▪ Install sandbags or other erosion control measures to prevent silt runoff to public roadways.</li> <li>▪ Replant vegetation in disturbed areas as quickly as possible.</li> </ul>

*Note: If water is used, only as much water as necessary for dust control shall be used in order to avoid runoff. Storm drain inlet control measures (e.g. sandbags, filter fabric, etc.) should be used. Dry sweeping is a preferred alternative to water sweeping.*

*Source: BAAQMD 1999*

**Thresholds.** Impact thresholds are defined separately for short-term construction-generated emissions and long-term regional and local mobile source emissions. Short-term threshold levels were selected based on BAAQMD-recommended cut-off values for determining whether basic, enhanced, or optional control measures would be implemented during construction. Long-term threshold levels were selected based on screening trigger levels for long-term operational emissions (e.g., regional mobile source ROG, NO<sub>x</sub>, and PM10 emissions; local mobile source CO emissions). More specifically, according to the BAAQMD CEQA Guidelines (BAAQMD 1999), the implementation of projects that generate less than 2,000 trips per day would not result in long-term mobile source

emissions that exceed the BAAQMD's thresholds of significance (e.g., 15 ton/year or 80 lb/day of ROG, NOX, or PM10) or violate applicable ambient air quality standards.

#### **Short-Term Construction-Generated Emissions:**

<u>Negligible:</u>	The area of construction activity would not change from the area disturbed under the No Action Alternative. In addition, there would be no potential for impact to air quality from odors associated with project activities.
<u>Minor:</u>	The construction area would be equal to four acres or less. In addition, sensitive receptors may notice odors, but they would be barely detectable and not offensive.
<u>Moderate:</u>	The construction area would be more than four acres but less than 15 acres. In addition, sensitive receptors would notice odors and may find them objectionable.
<u>Major:</u>	The construction area would be 15 or more acres and located near sensitive areas. In addition, sensitive receptors would nearly universally notice odors and find them objectionable.

#### **Long-Term Regional and Local Mobile Source Emissions:**

<u>Negligible:</u>	The daily traffic volume or the level of service for individual locations would not change.
<u>Minor:</u>	The change in daily traffic volume from existing conditions would be less than 1,000 trips. The level of service for individual locations would change by one category and would remain at an acceptable level (LOS A, B, C, or D).
<u>Moderate:</u>	The change in daily traffic volume from existing conditions would be 1,001 to 2,000 trips. The level of service for individual locations would change by more than one category but would remain at an acceptable level (LOS A, B, C, or D).
<u>Major:</u>	The change in daily traffic volume from existing conditions would be more than 2,000 trips. The level of service for individual locations would change from acceptable (LOS A, B, C, or D) to unacceptable (LOS E or F).

### **4.8.3 Impacts of Alternative A - No Action**

**Short-term Impacts.** No Plan-related construction activities would take place under the No Action Alternative. Therefore, there would be no impacts.

**Long-term Impacts.** Under the No Action Alternative, the public and staff would continue to use primarily private vehicles as transportation to the existing equestrian sites. Because there would be no Project-related change from existing conditions in the number of trips, there would be no related impacts.

**Cumulative Impacts.** Because the No Action Alternative would have no Plan-related impacts, there would be no related contribution to cumulative air quality impacts.

**Conclusion.** Under Alternative A, no Plan-related construction activities would occur that could generate emissions. Stable-related traffic would remain at current levels and would have no new effects on air quality. There would be no new contribution to cumulative air quality impacts.

#### 4.8.4 Impacts Common to All Action Alternatives

**Short-term Impacts.** Construction activities of all action Alternatives would generate emissions. However, appropriate PM10 control measures as shown in **Table 4-11** would be implemented. In general, construction would be phased such that the active construction area at any given time would generally be four acres or less resulting in a localized and regional short-term minor adverse impact. Odors during construction would be primarily limited to construction equipment exhaust; these would be anticipated to be barely detectible off-site and not offensive, and as such, impacts would be minor.

**Long-term Impacts.** Because the number of additional vehicle trips is anticipated to be less than 100 per day for individual locations, none of the action Alternatives would approach the BAAQMD threshold of 2,000 vehicle trips per day, and none would degrade LOS, nor would the alternatives result in long-term impacts on air quality.

**Stable Management and Operations Activities.** Under all the action alternatives, expanded BMPs would be incorporated into routine management. To the extent these reduce dust and erosion from management, operation and maintenance, this would constitute a beneficial impact (minor, local, long-term).

**Cumulative Impacts.** Construction-related emissions of other projects in the region are included in the emission inventory that forms the basis for BAAQMD's regional air quality plans. Because those emissions are not expected to impede attainment or maintenance of ozone and CO standards in the Bay Area (BAAQMD 1999) (NPS 2009a), cumulative impacts of all action Alternatives are, to a large extent, addressed by BAAQMD's regional planning and are considered to be no more than negligible to minor adverse.

To the extent that construction activities of any other project occur at the same time, in no case would such an impact be anticipated to exceed the threshold for a moderate adverse impact. Such an impact would only be anticipated very infrequently during periods of intense construction activity, and is therefore unlikely.

Some of the cumulative projects could generate additional mobile source emissions, and would generate a negligible amount in view of the 2,000 vehicle trip per day BAAQMD threshold for individual sites. Further, the Marin Headlands and Fort Baker Transportation Infrastructure and Management Plan is anticipated to reduce the number of vehicles on the road over the long term, a beneficial impact on long-term emissions. In combination with the negligible impacts on long-term emissions, overall long-term cumulative impacts would also be considered negligible.

**Conclusion.** All action Alternatives would result in short-term regional and local minor adverse impacts. Additional public programs at the stables would generate negligible adverse long-term emissions. Cumulatively, impacts are considered negligible, with a low potential of infrequent moderate impacts.

Implementing any of the action Alternatives would not impair park air quality. Because the impacts previously described (1) are not inconsistent with the park's purpose and values, (2) do not prevent the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts on air quality in the park under any of the action Alternatives.

## 4.8.5 Impacts of Alternative B - Enhanced Existing

### OPTION B1

**Short-term Impacts.** Because construction activities at the existing sites are not substantially different overall, Option B1 would have the same short-term air quality impacts as those described for all action Alternatives, with the addition of construction impacts at Lower Tennessee Valley.

**Long-term Impacts.** Because of similar designs, capacities, and programs, long-term operational air quality impacts of Alternative B would be the same as those described for all action Alternatives.

**Cumulative Impacts.** Cumulative air quality impacts of Option B1 would be the same as those described for all action Alternatives.

**Conclusion.** Option B1 would result in short-term, regional and local, minor adverse impacts. Additional public programs would generate negligible adverse long-term emissions. Cumulatively, impacts are considered negligible, with a low potential of infrequent moderate impacts. For the same reasons described for all action Alternatives, there would not be unacceptable impacts on air quality in the park under Option B1.

### OPTION B2

**Short-term Impacts.** Due to nearly identical construction activities, short-term air quality impacts of Option B2 would be the same as for Option B1.

**Long-term Impacts.** Due to nearly identical stable operations, long-term air quality impacts of Option B2 would be the same as for Option B1.

**Cumulative Impacts.** Cumulative air quality impacts of Option B2 would be the same as for Option B1 with the exception of no new construction impacts at Lower Tennessee Valley.

**Conclusion.** Similar to Option B1, Option B2 construction activities would result in short-term, regional and local minor adverse impacts. Additional public programs would generate negligible adverse long-term emissions. Cumulatively, impacts are considered negligible, with a low potential of infrequent moderate impacts. For the same reasons described for Option B1, there would not be unacceptable impacts on air quality in the park under Option B2.

## 4.8.6 Impacts of Alternative C - Consolidated

**Short-term Impacts.** Because construction activities at the existing sites are not substantially different overall, Alternative C would have the same short-term air quality impacts as Option B2.

**Long-term Impacts.** Because of similar designs, capacities, and programs, long-term operational air quality impacts of Alternative C would be the same as for Option B2.

**Cumulative Impacts.** Cumulative air quality impacts of Alternative C would be the same as for Option B2.

**Conclusion.** Similar to Option B2, Alternative C construction activities would result in short-term, regional and local, minor adverse impacts. Additional public programs would generate negligible

adverse long-term emissions. Cumulatively, impacts are considered negligible, with a low potential of infrequent moderate impacts. For the same reasons described for Option B2, there would not be unacceptable impacts on air quality in the park under Alternative C.

### 4.8.7 Impacts of Alternative D - Dispersed and Expanded

**Short-term Impacts.** Short-term air quality impacts would be greater for Alternative D than other alternatives because construction activities would occur at all existing sites plus two new sites. At the Lower Redwood Creek site, construction of access and the other facilities could involve more than four acres, but less than 15 acres at any one time. Therefore, Alternative D would have localized and regional short-term minor to moderate adverse impacts with implementation of enhanced control measures (Table 4-1).

**Long-Term Impacts.** Long-term air quality impacts associated with Alternative D would be slightly higher than the other alternatives because it would have a slightly higher number of resident horses. Because there would be two new individual sites resulting in substantially less than 1,000 vehicle trips per day each, Alternative D would result in minor impacts from increased vehicle trips.

**Cumulative Impacts.** Due to the relatively small number of additional horses overall, impacts would be as described for Option B2. Alternative D would result in minor adverse cumulative impacts.

**Conclusion.** Alternative D would have short-term, regional and local, minor to moderate adverse impacts during construction, minor adverse long-term impacts from emissions, and cumulatively negligible impacts overall, with a low potential of infrequent moderate impacts. For the same reasons described for Option B2, there would not be unacceptable impacts on air quality in the park under Alternative D.

## 4.9 Cultural Resources

### 4.9.1 Guiding Regulations and Policies

NPS is charged with management and protection of cultural resources through a variety of guidance documents and legislation in which NPS managers avoid, or minimize to the greatest degree practicable, adverse impacts on park resources and values. The following are the primary guidance documents used by NPS for the management of cultural resources.

The National Historic Preservation Act (NHPA), as amended, is the principal legislative authority for management of cultural resources located within national parks. It requires federal agencies to strive to minimize harm to historic properties that would be adversely affected by an undertaking. Section 106 of the NHPA requires all federal agencies to consider the effects of their actions on cultural resources determined eligible for inclusion in the National Register of Historic Places (NRHP) (see discussion below). Section 110 of the NHPA, among other things, charges federal agencies with the responsibility to establish preservation programs for identification, evaluation and nomination of cultural resources to the NRHP.

NPS-28: Cultural Resources Management Guidelines (NPS 1998) is the fundamental basis for managing cultural resources in the National Park System. It contains park management standards and other requirements for cultural resources, including archeological resources, historic and prehistoric structures, museum collections, cultural landscapes and ethnographic resources. This document also addresses energy conservation and historic preservation. Federal agencies are required to reduce

energy consumption; this guideline addresses the means to ensure preservation of historic material and character while conserving energy. For example, proposed retrofit measures would be reviewed by historical architects and/or landscape architects, and other cultural resources specialists who would consider whether (1) the evaluation of effect for compliance purposes is adequate, and (2) the proposed action is planned and would be conducted in accordance with relevant management policies, guidelines, and standards (NPS 1998, Chapter 4).

NPS *Management Policies 2006* outlines park service management policies for cultural resources including the identification and evaluation of cultural resources, the integration of this information in planning and decision-making, and the stewardship to ensure that cultural resources are preserved and protected (NPS 2006, 60).

Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments, November 6, 2000) provides for regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications.

### **Section 106 Compliance**

This cultural resource analysis summarizes what is currently known about the cultural resources and historic properties within the six Areas of Potential Effect (APEs) for the Plan - the Golden Gate Dairy stables (Ranch M), Tennessee Valley stables (Ranch A/B), Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds), Lower Tennessee Valley, Marincello, and Lower Redwood Creek. The process described in Section 106 of the NHPA (36 CFR Part 800, Protection of Historic Properties) is being conducted concurrently with the preparation of this NEPA documentation. The impacts analysis in this chapter is based on the potential effects of each of the Plan alternatives to historic properties within the APE and what is known about cultural landscapes, architectural, and archeological resources within each APE.

At this time, all architectural resources (e.g., structures) and cultural landscapes have been evaluated for eligibility to the National Register of Historic Places with determinations of eligibility, with the exception of the Marincello site which has not been evaluated for its potential eligibility for listing in the NRHP. Only Alternative D involves physical modifications to the Marincello APE and therefore, if Alternative D is selected, this site would be evaluated for its potential eligibility for listing in the NRHP. In addition, no formal archeological inventories have been conducted within the APEs and only a few archeological properties have been recorded, within the Golden Gate Dairy APE, based on previous discoveries in the locales associated with the Marin Equestrian Stables Plan. These resources and nearby sites relevant to the discussion of potential effects **for an area's sensitivity to archeological** resources are described in this chapter and form the basis for the analysis of potential effects to archeological resources and the archeological sensitivity of each of the APEs for the Plan.

**The Advisory Council on Historic Preservation's** (ACHP) regulations for implementation of Section 106 require that impacts to historic resources be identified and evaluated by determining (1) the area of potential effects (the area of geographic study); (2) identifying cultural resources present in the area of potential effects that are either listed on or eligible for listing on the NRHP; (3) applying the criteria of adverse effect (see below) to affected cultural resources either listed on or eligible for listing on the National Register; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

**Under the ACHP's regulations, a determination of either adverse effect** or no adverse effect must be made for affected NRHP-listed or eligible cultural resources located within the APE. An adverse effect occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the NRHP. Adverse effects also include reasonably foreseeable effects caused by the proposal that would occur later in time, be farther removed in distance, or be

cumulative (36 CFR 800.5, Assessment of Adverse Effects). The resolution of adverse effects can occur in a variety of ways, in accordance with 36 CFR 800.6 (Resolution of Adverse Effects). A determination of no adverse effect means there is an effect, but the effect would not diminish, in any way, the characteristics of the cultural resource that qualify it for inclusion in the NRHP. All effect determinations are made in consultation with the California SHPO.

In all cases where new cultural resources are discovered during project activities, or where it is discovered post-review that NRHP-eligible resources may be affected, potential adverse impacts to those NRHP-eligible resources would be coordinated by the park with the SHPO. Impact threshold definitions below contain statements specifically related to adverse effects as defined in 36 CFR 800.

### **Tiered Approach for Section 106 Compliance**

The National Park Service will consult with SHPO under 36 CFR 800 on the preferred alternative. Consultation with SHPO regarding the preferred alternative is predicated under the assumption that this will be the selected alternative and the alternative that will not result in adverse effects to historic properties. Due to the fact that this alternative is still conceptual and further design and details are forthcoming, additional identification to satisfy 36 CFR 800.4 is required and preservation planning to avoid adverse effects will occur following the tiered approach to Section 106 compliance outlined here.

- Conduct archeological survey and evaluation within each APE in coordination with the SHPO and Federated Indians of the Graton Rancheria (FIGR),
- Prepare Historic Structures Reports (HSRs) and Cultural Landscape Reports (CLRs) that include specific treatment recommendations for historic properties including cultural landscapes, historic structures, and archeological resources, which will be submitted for SHPO review and concurrence;
- The Park will implement these treatments of historic properties and carry out Section 106 under the existing Golden Gate Parkwide PA (1992) as long as there are no adverse effects identified;
- If a specific project will result in an adverse effect to a historic property, the Park will conduct additional SHPO consultation to resolve the adverse effect.
- The Park and SHPO will review timeframes and additional details to this tiered approach for Section 106 compliance, as appropriate in the course of consulting on the Preferred Alternative described in this EA.

### **NPS Cultural Landscape Workshop**

In June 2010, the cultural resource and planning staff from NPS and the cultural resources consultants joined together for a two day workshop which initially provided recommendations and the basis of the preferred alternative. The state office of Historic Preservation was invited to this meeting but could not attend. During the Cultural Landscape Workshop, each historic property was visited, analyzed, and discussed to determine how the proposed undertaking could avoid adverse effects in accordance with Section 106 of the National Historic Preservation Act. It was also discussed if the project could result in beneficial effects through the rehabilitation of significant features of the NRHP-eligible or -listed cultural landscape resources present at Golden Gate Dairy stables (Ranch M), Tennessee Valley stables (Ranch A/B), and Rodeo Valley stables (Fort Barry Balloon Hanger and Motor Vehicle Sheds). **Per the SHPO's determination**, there are no NRHP eligible or listed structures within the Lower Tennessee Valley, or Lower Redwood Creek APEs and therefore, these areas were not part of the Cultural Landscape Workshop discussion. While, the Marincello site has not yet been evaluated for its potential eligibility for listing in the NRHP, only Alternative D would result in disturbances and potential effects to this location. If Alternative D were to be selected, the Marincello site would be formally evaluated for its potential eligibility for listing in the NRHP.

The elements of the Cultural Landscape Workshop Summary have been integrated into the mitigation measures described in section 4.9.9 in order to ensure that all action alternatives adhere to the goals of enhancing the existing NRHP-eligible and -listed cultural landscapes. The Cultural Landscape Workshop established site specific goals in terms of rehabilitation and restoration of the central core open areas of the ranches; significant vegetation features of the landscapes, such as the historic windbreaks and kitchen gardens; and the overall spatial organization of each of the NRHP-eligible or -listed cultural landscapes, including the historic circulation routes and building clusters.

Based on the Cultural Landscape Workshop, the goals for all action alternatives are:

- All rehabilitation should be based on specific standards as referenced in the Secretary of Interior Standards for Rehabilitation, for compatible use as an equestrian facility. The standards do allow for minor modifications to contributing features.
- All new features should reinforce and enhance the historic period of significance and support the associated historic cultural landscape.
- NPS should take all possible opportunities to rehabilitate the historic setting through the removal of non-contributing features and modern structures that were constructed outside of the period of significance.
- Cultural Landscape Reports (CLRs) and Historic Structures Reports (HSRs) should be prepared or updated to provide specific treatment recommendations for carrying out the EA proposals in a manner that protects resource values specific to each of the sites. The existing Cultural Landscape Inventory reports for Tennessee Valley stables (Ranch A/B [NPS 2008]) and for Golden Gate Dairy stables (Ranch M [NPS 2008]) and the Abbreviated Historic Structure Report for the Rodeo Valley stables (Fort Barry Balloon Hangar [NPS 2005]) currently serve as existing inventories for these resources. Additionally, archeology studies would include all information regarding the survey, recordation, and inventory of prehistoric and historic archeological resources at each site. The preparation of the CLRs, HSRs, and preparation of new archeology studies would result in a comprehensive cultural resources inventory that addresses historic structures, historic cultural landscape features, and prehistoric and historic archeological resources as they relate to proposed changes to the resources as a result of the implementation of this Plan.

For each APE, there would be a set of specific guidelines that delineate **the Park's** responsibilities under Section 106 and 36 CFR 800 prior to project implementation. These guidelines are described above, under the Tiered Approach for Section 106 Compliance.

## 4.9.2 Assessment Methods

The following describes the methodology used to evaluate the impacts to cultural resources that could result from implementation of the Marin Equestrian Stables Plan.

### **Area of Potential Effects**

In accordance with the Advisory Council on Historic Preservation's regulations implementing Section 106, the APE is determined as the geographic area within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties (36 CFR 800.16(d)). For analysis of effects to cultural resources for the Marin Equestrian Stables Plan, the APE is comprised of geographical boundaries of analysis which vary depending on the associated resource and source of effect(s). The APE is defined as the boundary of the Golden Gate Dairy stables (Ranch M/Golden Gate

Dairy), Tennessee Valley stables (Ranch A/B), Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds), as well as the Lower Tennessee Valley, Marincello, and Lower Redwood Creek APEs for the presence of historic and pre-contact archeological resources. This is the area in which the greatest potential to affect cultural resources exists as a result of the Plan activities (e.g., construction of new resources and rehabilitation of existing resources). For a more detailed description of the APE see Chapter 3.

### Context and Level of Impacts to Cultural Resources

**Local:** Impacts to cultural resources occur within the vicinity of Golden Gate Dairy stables (Ranch M/Golden Gate Dairy), Tennessee Valley stables (Ranch A/B), and Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds).

**Regional:** Impacts to cultural resources occur within the western Marin Headlands within the Golden Gate National Recreation Area (GGNRA), including the Forts Baker, Barry and Cronkhite National Register District.

### Duration of Impacts to Cultural Resources

**Archeological resources:** Due to the non-renewable nature of archeological resources, adverse impacts are considered permanent. Beneficial effects would be similar in duration to those defined under cultural landscapes.

#### Cultural landscapes

**Short-term:** Effects to cultural landscapes would persist for less than one year (e.g., construction phase).

**Long-term:** Effects to cultural landscapes would persist for more than a year.

### Thresholds

The following thresholds were used to determine the magnitude of impacts to cultural resources resulting from implementation of any of the alternatives. (Note: Cultural resources are nonrenewable resources and adverse effects to them generally consume, diminish, or destroy the original historic materials or form, resulting in a permanent loss in the integrity of the resource that can never be recovered).

### Cultural Landscapes

Cultural landscapes are environmental settings that human beings have created that reveal the fundamental ties between people and the land. They reflect the human need to grow food, to form settlements, to meet a need for recreation or work, or to bury the dead (NPS 1998). Most importantly, cultural landscapes are places where people lived and resided. Cultural landscape features can include buildings, structures; small-scale features such as fences; natural and planned landscape features, such as gardens, windbreaks, and other vegetation; circulation features, such as paths, roads, and trails used by humans and livestock; and spatial organization, such as the historic core (central open areas) important to each of the ranches.

**Negligible:** The impact is at the lowest levels of detection or barely perceptible and not measurable. For purposes of Section 106, the determination of effect would be no adverse effect.

**Minor:** Beneficial impact: Character-defining features would be preserved in accordance with the *Secretary of the Interior's Standard for the Treatment of Historic Properties*, therefore maintaining the integrity of the cultural landscape. For purposes of Section 106, the determination

of effect would be no adverse effect.

Adverse impact: The impact would not notably affect the character-defining features of a cultural landscape listed on or eligible for the National Register of Historic Places. For purposes of Section 106, the determination of effect would be no adverse effect.

**Moderate:** Beneficial impact: The landscape or its features would be rehabilitated in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*, to make possible a compatible use of the landscape while preserving its character-defining features. For purposes of Section 106, the determination of effect would be no adverse effect.

Adverse impact: The impact would alter a character-defining feature or features of the cultural landscape but would not diminish the integrity of the landscape to the extent that its National Register eligibility would be jeopardized. For purposes of Section 106, the determination of effect would be adverse effect. For purposes of Section 106, the determination of effect would be adverse effect. A memorandum of agreement is executed between the NPS and applicable State or Tribal Historic Preservation Officer and, if necessary, the ACHP in accordance with 36 CFR 800.6(b).

**Major:** Beneficial impact: The cultural landscape would be rehabilitated in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* to accurately depict the features and character of a landscape as it appeared during its period of significance. For purposes of Section 106, the determination of effect would be no adverse effect.

Adverse impact: The impact would alter a character-defining feature(s) of the cultural landscape, diminishing the integrity of the resource to the extent that it would no longer be eligible to be listed on the National Register. For purposes of Section 106, the determination of effect would be adverse effect. A memorandum of agreement is executed between the NPS and applicable State or Tribal Historic Preservation Officer and, if necessary, the ACHP in accordance with 36 CFR 800.6(b).

**Impairment:** See discussion under "Impairment Analysis" in section 4.2.6.

### Archeological Resources

Archeological resources from indigenous populations of Native Americans within the present boundaries of GGNRA typically consist of sites such as village sites, camps, rock shelters, procurement sites such as food gathering and hunting spots or quarries for tool making, food processing sites such as shell middens, funerary sites, and trails. Isolated artifacts relating to many of the above functions may appear in areas with greater or lesser association to these sites. Historic period archeological resources expected within and around historic agricultural and military fort resources would likely include privy pits, refuse deposits/dumps, and foundations. In addition, there are two documented historic period archeological sites present within the Golden Gate Dairy Stables APE which are associated with historic uses of the site.

**Negligible:** Impact is at the lowest levels of detection with neither adverse nor

beneficial consequences. For purposes of Section 106, the determination of effect would be no adverse effect.

**Minor:** Beneficial impact: Preservation of a site(s) in its natural state. For purposes of Section 106, the determination of effect would be no adverse effect.

Adverse impact: Disturbance of a site(s) results in little loss of integrity or important information potential, and the qualities of the site(s) (the material aspects that provide a connection to the past and to the land that are important to the Coast Miwok, as well as for historic period archeological sites) are retained. For purposes of Section 106, the determination of effect would be no adverse effect.

**Moderate** Adverse Impact: the impact would affect and archeological site with the potential to yield information important in prehistory or history, and would impact portions of the property that had integrity or elements that **were pivotal to the site's significance. For the purposed of NHPA Section 106**, the determination of effect would be adverse effect.

**Major:** Beneficial impact: Active intervention to preserve a site(s). For purposes of Section 106, the determination of effect would be no adverse effect.

Adverse impact: Disturbance of a site(s) results in loss of most or all site integrity and its potential to yield important information related to the **site's significance, or its importance to the Coast Miwok**. For purposes of Section 106, the determination of effect would be adverse effect. A memorandum of agreement is executed between the NPS and applicable State or Tribal Historic Preservation Officer and, if necessary, the ACHP in accordance with 36 CFR 800.6(b).

**Impairment:** See discussion under "Impairment Analysis" in section 4.2.6.

### **Assumptions Related to Cultural Resource Analysis**

To promote consistency and clarity, the following assumptions have been made for the evaluation of effects to cultural resources under all alternatives:

- Ranch M/Golden Gate Dairy and Ranch A/B are cultural landscapes that have been determined eligible for listing in the NRHP.
- The landscapes and structures at the existing Lower Tennessee Valley stables and Lower Redwood Creek sites have been evaluated and SHPO determined that they are not eligible for listing in the NRHP (SHPO 2007).
- The Fort Barry Balloon Hangar and the Motor Vehicle Sheds are contributing buildings to the National Historic Landmark Historic District on the Harbor Defenses of San Francisco, a determination from SHPO regarding the eligibility of these structures is pending.
- Under all alternatives, it is assumed that future development and associated effects to cultural resources (historic structures, cultural landscapes, and archeological resources) at Ranch M/Golden Gate Dairy, Ranch A /B, within Fort Barry, and Lower Tennessee Valley, Marincello, and Lower Redwood Creek (for archeological resources) would be conducted in compliance with Section 106 of the NHPA.
- Under all alternatives, it is assumed that prior to future development and associated effects resulting from such development, NPS or the lessees of each particular project area would

comply with Section 106 and 36 CFR 800.4, the identification of archeological resources and 36 CFR 800.5 and 36 CFR 800.6, the resolution of adverse effects, if potentially NRHP-eligible archeological resources are present.

### 4.9.3 Impacts of Alternative A - No Action

Alternative A (No Action) retains the four existing Golden Gate National Recreation Area (GGNRA) stable facilities and their continued management and operations. No new equestrian facilities would be developed and no additional horses, stalls or other facilities would be added to the existing sites except for modifications for Architectural Barriers Act Accessibility Guidelines compliance as determined by the NPS. Current resource protection measures intended to limit impacts on natural resources found near the equestrian facilities would remain in place; these include continued site maintenance, horse location, waste management, riparian buffers, animal exclusion from waterways, removal of animals from sloped paddocks in the wet season to control erosion, and dry-season wet-down of paddocks to minimize dust.

#### 4.9.3.1 Cultural Landscape Resources

Chapter 3.7 (Affected Environment-Cultural Resources) describes each historic cultural landscape and lists their contributing resources. The impacts under Alternative A that are discussed in this section are the same at each cultural landscape.

##### Existing Equestrian Business Plans and Operations

Under the No Action Alternative, these stables would continue to be operated by existing permittees. Existing equestrian management programs would continue without a comprehensive management plan. Short term planning (one month to five years) would address program development, staffing, facility improvements, and resource protection.

**Impacts to Cultural Landscape Resources:** Actions of the permittees and NPS that would affect cultural landscape resources are expected to be very limited and conducted according to Park regulations and policy. Therefore, impacts to cultural landscape resources at Golden Gate Dairy stables (Ranch M/Golden Gate Dairy), Tennessee Valley stables (Ranch A/B), and Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds) would be negligible (no adverse effect).

##### Visitor Experience and Programs

Under the No Action Alternative, visitor services would continue to include information, maps, and toilet facilities. Public programming is currently offered at Tennessee Valley stables.

**Impacts to Cultural Landscape Resources:** Impacts to cultural landscape resources at Golden Gate Dairy stables (Ranch M/Golden Gate Dairy), Tennessee Valley stables (Ranch A/B), and Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds) would be negligible (no adverse effect).

##### Existing Facilities, Sanitation, and Safety

Under the No Action Alternative, no additional modifications to the sites or facilities would be implemented except for modifications for NPS Architectural Barriers Act Accessibility Guidelines (ABAAG) compliance as determined by NPS. These elements would include a defined accessible route, ramps to buildings with public programming, accessible restrooms, accessible hardware, signage, and other elements that would be determined on an individual basis.

**Impacts to Cultural Landscape Resources:** Protection of cultural resources at the stable sites includes corrective measures required by the Superintendent and/or the business agreements to remedy

impacts identified during periodic monitoring by NPS Maintenance or Cultural Resources staff or other parties. These measures are designed to mitigate cultural resource impacts and stabilize historic structures and landscape features. The NPS would continue to provide oversight and advice regarding the management, maintenance, and repair of historic sites (see also Chapter 2, section 2.3.1).

Actions of NPS that would affect cultural landscape resources are expected to be very limited and to be conducted according to Park regulations and policy. Impacts to cultural landscape resources at Golden Gate Dairy stables (Ranch M/Golden Gate Dairy), Tennessee Valley stables (Ranch A/B), and Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds) would be minor adverse (no adverse effect) due to the introduction of new, non-historic, but compatible structures and features.

#### Natural Resource Protection

Under the No Alternative Action, the NPS would continue to provide oversight and advice regarding the management, maintenance, and repair of historic sites at these stables.

***Impacts to Cultural Landscape Resources:*** Erosion or impacts to the Cultural Landscapes could continue due to the lack of BMP implementation. Actions of the permittees and NPS that would affect cultural landscape resources are expected to be limited and conducted according to Park regulations and policy. Therefore impacts to cultural landscape resources at Golden Gate Dairy stables (Ranch M/Golden Gate Dairy), Tennessee Valley stables (Ranch A/B), and Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds) would be negligible (no adverse effect).

#### **4.9.3.2 Archeological Resources**

**Components of "Existing Equestrian Business Plans and Operations," "Visitor Experience and Programs", "Existing Facilities, Sanitation, and Safety," and "Natural Resource Protection" would be the same as those described above for cultural landscape resources.**

***Impacts to Archeological Resources:*** Facility improvements designed in accordance with the Architectural Barriers Act Accessibility Guidelines (ABAAG) would need to comply with Section 106 of the National Historic Preservation Act as determined by NPS. The existing permits require site management; however, there are no specific measures to address soil protection for archeological resources. No known effects would occur to documented archeological resources at Golden Gate Dairy stables (Ranch M/Golden Gate Dairy), Tennessee Valley stables (Ranch A/B), and Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds) or at Lower Tennessee Valley, Lower Redwood Creek, or Marincello sites. Since archeological inventories have not been conducted throughout the APEs, the impacts to archeological resources remains undefined and could range from negligible, moderate or major adverse. However, as described above under the tiered approach to Section 106 compliance, 36 CFR 800. 4, the identification of archeological resources will be completed prior to project specific implementation and according to Park goals, all efforts will be made to minimize adverse effects to archeological resources.

#### ***Cumulative Impacts to Cultural Landscape and Archeological Resources***

There are no actions described in this Plan that would occur within the APEs, in conjunction with other actions related to other projects, and thus there are no cumulative impacts, only impacts related to the specific actions described in association with the implementation of this Plan. The exception to this statement is the cumulative impact related to the construction of the parking lot and multi-use rail located across Rodeo Valley Road from the Balloon Hangar and within the Rodeo Valley APE, as a result of the Marin Headlands and Fort Baker Transportation Management Plan.

### **Conclusion**

Under this alternative, no construction activities would occur that could adversely affect cultural landscape or archeological resources. Overall, impacts would be minor adverse to negligible.

No impairment of park resources or values is anticipated under this alternative. Because the impacts **previously described (1) are not inconsistent with the park's purpose and values, (2) do not prevent** the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to cultural resources in the park under Alternative A.

For the purposes of Section 106 of the NHPA, no cultural resources listed in or eligible for the NRHP are expected to be adversely affected under this alternative (no adverse effect), see **Table 4-12** below.

<b>Table 4-12 Alternative A Section 106 Assessment of Effect</b>		
<b>Resource</b>	<b>Treatment</b>	<b>Section 106 Finding</b>
<u>Cultural landscape resources</u>	Continued maintenance of site – no improvements proposed except for modifications for NPS ABAAG compliance. No cultural landscapes and no historic buildings would be rehabilitated.	No adverse effect
<u>Archeological resources</u>	Continued maintenance of site – improvements related to ABAAG compliance could result in ground disturbance.	Effects could range from no effect to adverse effect but in all likelihood there would be adverse effect.

## **4.9.4 Impacts Common to All Action Alternatives**

This section discusses potential impacts to cultural resources that are common to all action alternatives including Business Management Strategies; Visitor Experience and Public Benefit; Facilities, Sanitation and Safety; and, Natural Resource protection measures. The discussion of Facilities, Sanitation and Safety is further divided into project components that are common to all action alternatives at each of the historic cultural landscape sites (Golden Gate Dairy stables (Ranch M/Golden Gate Dairy), Tennessee Valley stables (Ranch A/B), and Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds). This section also discusses potential impacts to archeological resources at all sites, including the non-historic locations of Lower Tennessee Valley and Lower Redwood Creek. The NRHP eligibility status of the Marincello site is not currently defined. This section begins with a discussion of cultural landscape resources followed by a similar discussion of potential impacts and mitigation measures designed to protect archeological resources.

For a detailed description of each historic cultural landscape as well as list of their contributing resources refer to section 3.7.

### **4.9.4.1 Cultural Landscape Resources**

#### Business Management Strategy

Under all action alternatives, NPS would develop a Business Management Strategy, (refer to Chapter 2, **Table 2-5**) that would be guided by this Plan and EA and would conform to laws, regulations, and

NPS policies. The business management strategy would include the following components relevant to cultural resource protection: Resource Stewardship; Visitor Outreach and Use; Facilities, Sanitation, and Safety; Cultural Resources; and Historic Building Rehabilitation. The long-term planning would also address program development, staffing, and facility improvements.

***Impacts to Cultural Landscape Resources:*** Certain elements of the Business Management Strategy are **discussed below under “Facilities, Sanitation, and Safety” or “Natural Resources”**. Several of the business management strategies would result in alterations to the historic cultural landscapes such as the introduction of new structures or paddocks. However, the business management strategy would be guided by this Plan and EA and would be conducted in accordance with Park regulations and policy. Therefore impacts to cultural landscape resources at Golden Gate Dairy stables (Ranch M/Golden Gate Dairy), Tennessee Valley stables (Ranch A/B), and Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds) would be long term, local, direct, and minor adverse to cultural landscape resources (no adverse effect).

#### Visitor Experience and Public Benefit

Under all action alternatives, public outreach at the stables would be enhanced through improved trail and road signs. A minimum of one interpretive sign and two directional signs would be installed at each stable. Displays would also be installed in contributing buildings for historic interpretation purposes.

***Impacts to Cultural Landscape Resources:*** The installation of these interpretive signs and displays would introduce new features into these historic cultural landscapes. However, they would be small in scale and reversible. These introduced features would not diminish the integrity of the cultural **landscapes’ contributing buildings and structures, circulation pathways, vegetation, and spatial organization** to the extent that their NRHP eligibility would be adversely affected. Therefore the impact at Golden Gate Dairy stables (Ranch M/Golden Gate Dairy), Tennessee Valley stables (Ranch A/B), and Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds) would be local, direct, and minor adverse to cultural landscape resources (no adverse effect).

#### Facilities, Sanitation, and Safety

This section begins with a list of facility improvements that are common to all action alternatives **and** are common to all sites. This discussion is followed by descriptions of those project components that are common to all action alternatives for each of the historic stable locations.

The following improvements are common to all action alternatives at every site that remains or becomes a stable:

- Utilities would be upgraded.
- Major new buildings would be designed to obtain a minimum silver or higher Leadership in Environmentally Efficient Design (LEED) rating.
- Each stable would provide a covered place to exercise horses in wet weather and an adequately sized stall with either a separate or adjoining individual outdoor paddock for each horse or a shared outdoor paddock.
- The drainage and wastewater management would be improved. Field treatment septic-systems would be replaced with either portable or composting toilets.
- Safety and emergency procedures would be posted.
- Flammable feed, manure, and fuels would be stored in fire-proof structures or buildings physically separated from horse stalls or residence.
- The manure storage will be converted to a roofed structure, and stalls will be relocated into appropriate locations as determined by NPS (e.g., constructed with consideration of historic setting).

- A dwelling unit and/or an overnight caretaker would be required on site.
- Water tanks for on-site water storage and an emergency pump, generator, and fuel would be required for fire emergencies.
- At each cultural landscape site, a toilet would be placed in a location where it would not impact the historic viewshed.
- Best Management Practices will be required at each stable site that will improve soil stability and protect natural and cultural resources.

**Impacts to Cultural Landscape Resources:** The proposed improvements described above would result in construction or installation of new buildings, structures, and safety procedures or the rehabilitation of existing structures. Rehabilitation of contributing resources would allow for the enhancement of the historic landscape setting by minimizing or removing modern intrusions. The following paragraphs provide further analysis at each of the cultural landscape sites. This discussion is based on the Cultural Landscape Workshop Summary Report (NPS 2010).

The LEED requirements to achieve a minimum silver rating could result in changes to cultural landscape resources at each stable. For example, this could include the installation of roofing material that better reflects solar heat and renewable energy options like solar panels on buildings and structures. It could also include alterations to landscape features to improve irrigation and storm runoff at each stable. Mitigation measures described in section 4.9.9 would be implemented to ensure **compatibility of new construction and/or alteration of contributing resources within each stable's** historic setting. For example, solar paneling would be installed in such a way that it would avoid visual impacts to the cultural landscape. Alterations to landscape features would avoid changes to contributing landscape features such as the historic windbreaks.

With the implementation of the mitigation measures described in section 4.9.9, impacts to cultural landscape resources at Golden Gate Dairy stables (Ranch M/Golden Gate Dairy), Tennessee Valley stables (Ranch A/B), and Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds) would be long-term, localized, direct, minor adverse (no adverse effect). In addition, the removal of non-historic structures and rehabilitation of historic structures, as well as the enhancement of important landscape features such as windbreaks and open central core areas would result in long-term, local, minor and moderate beneficial (no adverse effect).

#### **Golden Gate Dairy stables (Ranch M/Golden Gate Dairy)**

- Under all action alternatives, the Muir Beach Volunteer Fire Department would potentially maintain facilities at Golden Gate Dairy stables. A trail segment with associated facilities, such as tie-ups, water, and mounting blocks, would be installed along Route 1 in accordance with GGNRA Trail Planning. The existing front turn-out would remain and be shortened to provide extra room for this trail segment. Trailer parking pads would be installed at existing gravel parking areas. The historic pit toilet building would be stabilized for other uses. A toilet would be located outside of the NRHP-significant core historic area, within a historic location of a toilet, or in a location that would not impact the historic viewshed of the cultural landscapes.

**Impacts to Cultural Landscape Resources:** Golden Gate Dairy stables would include new composting toilets and a sanitary stall to be placed inside existing structures and out of sight. Also at Golden Gate Dairy, historic vegetation features such as the kitchen garden, windbreaks, and trees near the existing mailboxes on Highway 1 would be rehabilitated per future CLR recommendations. This would contribute to the enhancement **of the cultural landscape's historic spatial organization and setting.** The non-historic horse paddocks, stalls at the existing turn-out vicinity, a shed behind the barn, stalls to the north, and the manure container, would be removed. The fire department would operate under an

appropriate business agreement and in a manner consistent with the protection of resources at this cultural landscape.

In balance, the long-term benefits of this Plan to the historic landscape at Golden Gate Dairy stables (Ranch M/Golden Gate Dairy) would surpass the potential short-term, negligible impacts due to construction of new, non-historic, but compatible structures, and to potentially maintaining the fire department. Therefore impacts are considered minor adverse (no adverse effect).

***Tennessee Valley stables (Ranch A/B)***

At Tennessee Valley stables, vegetation management practices would rehabilitate, to the extent possible, the historic vegetation features such as the windbreaks and the height of the eucalyptus trees would be managed per future CLR recommendations. Vegetation would be enhanced within the north east paddocks. A fenced area just south of the existing arena would be installed for day use horse turn-out purposes during dry weather only. The stalls within the stream buffer would be converted to storage and the plumbing and septic system of the historic bunkhouse (Auxiliary House) would be removed or abandoned; the main hay barn (identified as Main Stable Wing (Hay Barn) would be converted to stalls. The historic red barn (House Barn) would be rebuilt and rehabilitated for hay or storage and the historic shed would be rebuilt and rehabilitated for hay and feed or storage; manure containers would be covered and relocated.

***Impacts to Cultural Landscape Resources:*** Tennessee Valley stables would include paddocks and a water tank to be located outside the historic core central open area. One cluster of existing paddocks and stalls would be removed from, and relocated outside, the historic core open area. This would minimize its visual impact within the landscape and would enhance the spatial organization and setting of the original landscape. The vegetation management of eucalyptus trees at this site would contribute to the historic setting **of the cultural landscape's historic spatial organization and setting.**

The long-term benefits of this Plan to the historic landscape at Tennessee Valley stables (Ranch A/B) would surpass the potential short-term, negligible impacts due to construction. Therefore, impacts are considered minor adverse due to the introduction of new, non-historic, but compatible structures (no adverse effect).

***Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds)***

At Rodeo Valley stables, the Fort Barry Balloon Hangar would be rehabilitated and would continue to be used by NPS or the equestrian lessee. The west motor vehicle shed would be rehabilitated to accommodate another use, such as residence, storage or office space. To protect water and soil resources, fenced vegetated strips or swales would be added in the sloping east paddocks to reduce erosion and run-off.

***Impacts to Cultural Landscape Resources:*** The long-term benefits of this Plan to the historic landscape at Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds) would surpass the potential short-term, negligible impacts that would occur due to construction. Therefore impacts are considered minor adverse (no adverse effect). Mitigation measures described in section 4.9.9 would also be implemented to ensure that the rehabilitation of the Balloon Hangar would be designed to preserve the character-defining features that contribute to its significance. Rehabilitation of this building would enhance the historic landscape setting by minimizing or removing modern intrusions. With the implementation of the mitigation measures described in section 4.9.9, impacts would be long-term, localized, direct, minor adverse to cultural landscape resources due to the introduction of new, non-historic, but compatible structures (no adverse effect).

**Summary of Impacts at All Three Historic Cultural Landscape Sites:** At all three historic cultural landscape sites Mitigation Measures described in section 4.9.9 would ensure compatibility of new or remodeled construction within the historic setting and this measure would ensure that the rehabilitation of all contributing resources are designed to preserve the character-defining features which contribute to their significance. Rehabilitation of these sites would enhance the historic landscape setting by minimizing or removing modern intrusions. With the implementation of mitigation measures, impacts would be long-term, localized, and, minor adverse to cultural landscape resources due to the introduction of new, non-historic, but compatible structures in each APE (no adverse effect) The rehabilitation of historic structures and setting and enhancing the important landscape features such as windbreaks and open central core areas would result in a minor and moderate beneficial (no adverse effect).

#### Natural Resources

The proposed Best Management Practices (BMPs) would be incorporated into routine management, operation and maintenance activities to protect natural resources including water quality and sensitive habitats adjacent to equestrian facilities. The proposed Best Management Practices features may include basins/ponds, culverts, berms, swales, and drainfields, among others.

**Impacts to Cultural Landscape Resources:** The BMPs could introduce new landscape features into the historic cultural landscapes. Mitigation measures described in section 4.9.9 would be implemented to ensure compatibility of new landscape features within the historic setting. This would contribute to the enhancement of **the cultural landscape's historic spatial organization and setting. With the** implementation of the mitigation measures, impacts would be long term, localized, direct, and minor adverse (no adverse effect).

#### **4.9.4.2 Archeological Resources**

As described above, archeological resources in the vicinity of the GGNRA may consist of sites from indigenous populations of Native Americans, such as village sites, camps, rock shelters, procurement sites such as food gathering and hunting spots or isolated artifacts relating to many of the above functions may appear in areas with greater or lesser association to these sites. Historic period archeological resources expected within and around historic agricultural and military fort resources would likely include privy pits, refuse deposits/dumps, foundations, etc. In addition, there are two documented historic period archeological sites present within the Golden Gate Dairy stables APE which are associated with historic residential use of the site. Archeological inventories have not been completed throughout the remainder of the APEs and therefore potential impacts are not currently defined.

Project components which are common to all action alternatives would be the same as those described above for cultural landscape resources at Golden Gate Dairy stables (Ranch M/Golden Gate Dairy), Tennessee Valley stables (Ranch A/B), and Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds). Archeological resources could also be impacted at sites such as Lower Tennessee Valley stables, Lower Redwood Creek and Marincello. These activities have the potential to result in permanent, localized adverse impacts depending on the archeological resource involved and the level of disturbance created, particularly if within undisturbed soils layers.

**Impacts to Archeological Resources:** Ground disturbing activities such as the construction of new facilities, trailheads, installation of toilets, etc. have the potential to impact archeological resources. However, with the implementation of Mitigation Measures CR-1 (*Design Review and Pre-Construction Archeological Surveys and Assessments*), CR-2 (*Native American Consultation*), CR-3 (*Archeological and Native American Monitoring*), CR-4 (*Archeological Sensitivity Training*), and CR-5

(*Inadvertent Archeological Discoveries*) adverse effects to archeological resources within the Plan APEs would likely not exceed minor in intensity (no adverse effect).

### **Cumulative Impacts to Cultural Landscape and Archeological Resources**

There are no actions described in this Plan that would occur within the APEs, in conjunction with other actions related to other projects, and thus there are no cumulative impacts, only impacts related to the specific actions described in association with the implementation of this Plan.

Per the NPS Marin Equestrian Stables Plan Cultural Landscape Workshop held on June 1 and 2, 2010, the Plan's objectives include:

- Rehabilitating NRHP-eligible or NRHP-listed cultural resources would result in highlighting the original, significant features and elements of the historic landscape and setting while avoiding adverse effects.
- Allowing for the functional use of the facilities that meets the NPS business plan.
- Considering cumulative effects, in particular changes due to accessibility law (e.g., the removal of architectural barriers to allow for disabled access to site and programs would be reviewed for potential effects and mitigations) (Siskin and Lang 2010).

Under common to all action alternatives, the historic cultural landscape resources, including the buildings and structures, vegetation, circulation features, and spatial organization, and archeological resources of the Golden Gate Dairy (Ranch M/Golden Gate Dairy), Tennessee Valley (Ranch A/B), and Rodeo Ranch (Fort Barry Balloon Hangar and Motor Vehicle Sheds) stables would be preserved or rehabilitated while avoiding adverse effects. With implementation of the mitigation measures, the work outlined would be based on specific standards and guidelines, such as The *Secretary of the Interior's Standards for the Treatment of Historic Properties* and the HSRs and CLRs that would be prepared prior to implementation of the alternative. Overall, many non-contributing resources would be removed from the historic core area and new construction and rehabilitation would be compatible with the cultural landscapes' historic setting. This would allow NPS to achieve the Plan's objectives and provide a beneficial effect to the Park's cultural resources.

Lastly, as mandated by the NHPA, NPS has a responsibility to preserve and protect important historic properties, including these cultural landscapes. GGNRA, through the GMP, has ensured the preservation of these resources through adaptive use by park partners providing continued life and maintenance of the structures and landscapes. Because of this, the actions described within this Plan would have beneficial cumulative effects on regional efforts to preserve such resources and settings.

### **Conclusion**

Overall impacts, mitigation and conclusions regarding impairment would be the same as described under Alternative B, Option B2 (preferred). Long-term effects to the park's cultural landscape and archeological resources related to actions Common to all Action Alternatives range from negligible to minor adverse. Negligible adverse effects are related to maintaining Muir Beach Volunteer Fire Department at Golden Gate Dairy stables (Ranch M/Golden Gate Dairy). Minor adverse effects to cultural landscape resources would result from the implementation of the business management strategy and alterations to contributing resources to improve facilities related to visitor experience, public benefit, and sustainability at each stable site. Negligible to minor, long-term, adverse effects to archeological resources would result from ground disturbance related to landscape alterations (e.g., vegetation modification, new and remodeling construction activities, natural resources management, etc.). Project components which are Common to All Action Alternatives would not contribute to the overall adverse cumulative impact on cultural resources. In addition, there will be a minor and moderate beneficial effects on the cultural landscape features and historic structures due the

rehabilitation of historic structures and the enhancement of the landscape through the rehabilitation of important landscape features such as windbreaks and open central core areas (no adverse effect).

No impairment of park resources or values is anticipated under this alternative. Because the impacts **previously described (1) are not inconsistent with the park’s purpose and values, (2) do not prevent** the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to cultural resources in the park under all action alternatives.

For the purposes of Section 106 of the NHPA, no cultural resources listed in or eligible for the NRHP are expected to be adversely affected under this alternative (no adverse effect), see **Table 4-13** below.

<b>Table 4-13 Actions Common to All Action Alternatives Section 106</b>		
<b>Assessment of Effect</b>		
<b>Resource</b>	<b>Treatment</b>	<b>Section 106 Finding</b>
<u>Cultural landscape resources</u>	In accordance with the HSRs/CLRs and <b>Secretary of Interior’s standards and guidelines</b> , design new facilities to be compatible with the existing historic setting and rehabilitate existing structures to enhance historic character and serve new compatible uses. Two cultural landscapes and 11 historic buildings would be rehabilitated.	No adverse effect
<u>Archeological resources</u>	No known resources in immediate project areas, except for Golden Gate Dairy stables, but all areas are considered sensitive for subsurface historic and prehistoric archeological resources. Conduct archeological surveys and evaluation prior to ground disturbance or following ground exposures through vegetation or structural removals. Monitor and conduct Mitigation Measures CR-1 through CR-5 as determined necessary.	Effects could range from no effect to adverse effect but in all likelihood there would be adverse effect.

### **4.9.5 Impacts of Alternative B - Enhanced Existing , Option B1 (Compared to Option B2 - Option B2 (Preferred))**

This section discusses potential impacts to cultural resources for Alternative B, Options B1 and B2 (Preferred). Selection of Option B1 or B2 would include all of the components that are common to all action alternatives as described above in section 4.9.4. Those project components related to **“Business Management Strategy,” “Visitor Experience and Programs,”** and **“Natural Resource Protection”** would be identical to those described above for common to all action alternatives. Therefore, the following discussion and analysis focuses on project elements of Alternative B, OptionB1 and B2, which are not common to all action alternatives and which fall under the header **“Facilities, Sanitation, and Safety.”**

As with the sections above, the following discussion of “Facilities, Sanitation and Safety” is further divided into project components that are specific to each of the historic cultural landscape sites (Golden Gate Dairy stables (Ranch M/Golden Gate Dairy), Tennessee Valley stables (Ranch A/B), and Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds). This section also discusses potential impacts to archeological resources at additional non-historic locations including Lower Tennessee Valley, Marincello and Lower Redwood Creek. This section begins with a discussion of Cultural Landscape Resources followed by a similar discussion of potential impacts and mitigation measures designed to protect archeological resources.

For a detailed description of each historic cultural landscape as well as list of their contributing resources refer to section 3.7. Following is a brief summary of Options B1 and B2.

**Option B1:** With selection of Alternative B, Option B1, the four existing stables would remain but facility improvements and operational changes would occur at all four sites (see Chapter 2.3.3 for a detailed list of proposed enhancements to the existing facilities). No new equestrian facilities would be developed at Marincello or Lower Redwood Creek. As many as 98 horses would be stabled at the facilities during the dry season, and the wet season total would retain the 76-horse capacity. Under B1, stable facilities would be brought in-line with NPS planning and policy objectives and would include the components common to all alternatives as outlined in sections 2.3.2 and 4.3.4.

**Option B2:** Alternative B, Option B2, is the preferred alternative and has three stable sites compared to four with B1. It would include all of the same improvements to the facilities as described in Alternative B, Option B1, except at Tennessee Valley and Lower Tennessee Valley. B2 would remove equestrian facilities at Lower Tennessee Valley, and would provide facilities for the Park Horse Patrol at Tennessee Valley Stables.

#### 4.9.5.1 Cultural Landscape Resources

##### Facilities, Sanitation, and Safety

##### ***Golden Gate Dairy stables (Ranch M/Golden Gate Dairy)***

New facilities under Action Alternative B, Option B1 (B2 is discussed under that Option) would include:

- Paddocks, a water tank, a generator, and trailer parking pads would be installed.
- A 60-foot x 60 foot covered lunging ring would be installed north of the north windbreak
- Nine to 11 new stalls and paddocks would be installed north of the historic core area. They would be located north of the Creamery and Sanitary Barn, which are contributing buildings to the cultural landscape.
- A manure shed would be installed on the north elevation of the existing hay barn, a contributing resource to the cultural landscape.

Remodeled facilities under Action Alternative B, Options B1 and B2 would include:

- If NPS future planning determines that the historic farmhouse should be rehabilitated as a caretaker residence, it will be rehabilitated for this use unless the lessee can provide an acceptable alternative solution for equestrian safety and monitoring.

***Impacts to Cultural Landscape Resources:*** The construction of these facilities would introduce new features into the historic cultural landscape. However, mitigation measures described in section 4.9.9 would be implemented to ensure compatibility of new construction within the historic setting. For example, the new stalls and paddocks, covered lunging ring, and the manure shed would be located

outside of the central core area in historically compatible structures. This would restore the spatial organization and setting of the original landscape. With the implementation of the mitigation measures, impacts would be long term, localized, direct, minor adverse (no adverse effect).

The repair and rehabilitation of these structures listed above would result in changes to cultural landscape resources. However, mitigation measures described in section 4.9.9 would be implemented to ensure that the rehabilitation of the historic pit toilet building and farmhouse would be designed to preserve the character-defining features of these buildings that contribute to their significance. Rehabilitation of these buildings would also allow enhancement of the historic landscape setting by minimizing or removing modern intrusions. With the implementation of the mitigation measures, impacts would be long term, localized, direct moderate beneficial to cultural landscape resources (no adverse effect).

### ***Tennessee Valley stables (Ranch A/B)***

Under Action Alternative B, Option B1, impacts to cultural landscape resources at Tennessee Valley stables (Ranch A/B) would be comparable to those under Action Alternative B, Option B2, with specific changes to this site under Action Alternative B, Option B1, described below. Refer to section 4.9.6 for a discussion of the similar impacts under Action Alternative B, Option B2.

Remodeled facilities specific to Action Alternative B, Option B1, would include:

- The historic main residence (which is a contributing resource to the cultural landscape, would be converted to the caretaker residence and its sewage facility would be upgraded.

***Impacts to Cultural Landscape Resources:*** The rehabilitation of the historic main residence would cause alterations to this contributing resource. However, mitigation measures described in section 4.9.9 would be implemented to ensure that the rehabilitation of the main residence would be designed to preserve the character-defining features of the building which contribute to its significance. Rehabilitation of this building would also allow enhancement of the historic cultural landscape setting by minimizing or removing modern intrusions. With the implementation of the mitigation measures, impacts would be long term, localized, direct, moderate beneficial to cultural landscape resources (no adverse effect).

### ***Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds)***

Remodeled facilities under Action Alternative B, Options B1 and B2, would include:

- Hay/feed storage would be relocated to the Balloon Hangar
- Long term interim repair or NPS use of the Balloon Hangar would require a steel container for hay and feed placed south of the west Motor Vehicle Shed, and the rehabilitation of a portion of the west Motor Vehicle Shed to an open small covered exercise ring.
- A caretaker residence may be constructed in the western Motor Vehicle Shed. Stalls would be located in the eastern Motor Vehicle Shed.
- The large arena located west of the Motor Vehicle Sheds would be reduced by 190 feet, and new fencing would be added.

***Impacts to Cultural Landscape Resources:*** The repair and rehabilitation of the Balloon Hangar and Motor Vehicle Sheds would result in changes to cultural landscape resources. However, mitigation measures described in section 4.9.9 would be implemented to ensure that the rehabilitation of these buildings would be designed to preserve the character-defining features that contribute to their significance. Rehabilitation of this building would also allow enhancement of the historic landscape setting by minimizing or removing modern intrusions. With the implementation of the mitigation measures, impacts would be long term, localized, direct, minor adverse to cultural landscape

resources (no adverse effect) due to the introduction of new, non-historic, but primarily compatible structures. The impacts associated with the placement of the temporary steel container structure for the storage of the hay and feed during long-term, interim repair, would be local, long-term, localized, and minor adverse due to the introduction of a new, non-historic structure.

The large arena is a non-contributing structure to the cultural landscape. The reduction of its size would lessen its impact on the **landscape's historic setting. The alteration of this structure would result** in a long term, localized, direct benefit to cultural landscape resources (no adverse effect).

#### **4.9.5.2 Archeological Resources**

Under Action Alternative B, Option B1, impacts to archeological resources at Golden Gate Dairy stables (Ranch M/Golden Gate Dairy), Tennessee Valley stables (Ranch A/B) and Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds) and Lower Tennessee Valley stables would be comparable to those under Common to All Action Alternatives. Refer to section 4.9.4 for a discussion of those impacts.

**Impacts to Archeological Resources:** Ground disturbing activities such as the construction of new facilities, trailheads, installation of toilets, etc. have the potential to impact archeological resources. There are two documented historic period archeological resources within the Golden Gate Dairy stables APE. Other project components have the potential to result in permanent, localized adverse impacts depending on the archeological resource involved and the level of disturbance created, particularly if within undisturbed soil layers. These potential impacts occur through the loss of cultural context of artifacts, features, etc. Depending upon the resource, this could be a major adverse effect. However, with the implementation of Mitigation Measures CR-1 (*Design Review and Pre-Construction Archeological Surveys and Assessments*), CR-2 (*Native American Consultation*), CR-3 (*Archeological and Native American Monitoring*), CR-4 (*Archeological Sensitivity Training*), and CR-5 (*Inadvertent Archeological Discoveries*) adverse effects to archeological resources within the Plan APEs would not exceed minor in intensity (no adverse effect).

#### **4.9.5.3 Cumulative Impacts to Cultural Landscape and Archeological Resources**

Impacts would be the same as described above in Common to All Action Alternatives (overall beneficial cumulative impact).

#### **Conclusion**

While there would be some differences among the alternatives, overall impacts of B1 and B2, mitigation, and conclusions regarding impairment would overall be long-term, long-term, direct, moderate beneficial as described under Alternative B, Option B2 (Preferred). Long term effects to the **park's** archeological and cultural landscape resources under Alternative B, Option B1, range from beneficial to minor adverse. Beneficial and negligible adverse effects are related to the proposed facilities modifications and historic building rehabilitation; and removal of non-contributing facilities. Minor adverse effects to cultural landscape resources would result from the construction of new buildings and facilities; maintenance for sustainability, sanitation, safety, and fire management; and natural resources management actions. Negligible to minor, long term, adverse effects to archeological resources would result from ground disturbance related to landscape alterations (e.g., vegetation modification, new and repair construction activities, natural resources management, etc.). This alternative would not contribute to the overall adverse cumulative impact on cultural resources.

No impairment of park resources or values is anticipated under this alternative. Because the impacts **previously described (1) are not inconsistent with the park's purpose and values, (2) do not prevent**

the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to cultural resources in the park under Alternative B, Option B1.

For the purposes of Section 106 of the NHPA, no cultural resources listed in or eligible for the NRHP are expected to be adversely affected under this alternative (no adverse effect), see **Table 4-14** below.

<b>Table 4-14 Alternative B, Option B1 Section 106 Assessment of Effect</b>		
<b>Resource</b>	<b>Treatment</b>	<b>Section 106 Finding</b>
<u>Cultural landscape resources</u>	In accordance with the HSRs/CLRs and <b>Secretary of Interior's standards and guidelines</b> , design new facilities to be compatible with the existing historic setting and restore or rehabilitate existing structures to enhance historic character and serve new compatible uses. Three cultural landscapes and 15 historic buildings would be rehabilitated. Introduction of new, non-historic but compatible structures.	No adverse effect
<u>Archeological resources</u>	No known resources in immediate project areas, with the exception of two documented historic period archeological resources within the Golden Gate Dairy APE (see section 3.7.2.1) but all areas are considered sensitive for subsurface historic and prehistoric archeological resources. Conduct surface and/or subsurface surveys prior to ground disturbance or following ground exposures through vegetation or structural removals. Monitor and conduct Mitigation Measures CR-1 through CR-5 as determined necessary.	Effects could range from no effect to adverse effect but in all likelihood there would be adverse effect.

#### **4.9.6 Impacts of Alternative B - Enhanced Existing, Option B2 (Preferred)**

Alternative B, Option B2, reduces the number of stables sites to three compared to four in Alternatives A and Option B1. These are Golden Gate Dairy, Tennessee Valley, and Rodeo Valley stables. In general, the impacts of B2 would include all of the components described under Common to All Action Alternatives and would be identical to those described above for Option B1 with the following differences.

#### 4.9.6.1 Cultural Landscape Resources

##### Facilities, Sanitation, and Safety

##### **Tennessee Valley stables (Ranch A/B)**

New Facilities under Action Alternative B, Option B2, would include:

- New paddocks and stalls would be installed at the Tennessee Valley (Ranch A/B) stables to replace existing stalls to be removed and to accommodate Park Horse Patrol (PHP) operations, which would be relocated from Lower Tennessee Valley stables.

Remodeled Facilities under Action Alternative B, Option B2, would include:

- The main residence building would be rehabilitated for Park Horse Patrol offices and storage.
- The bunkhouse would be rehabilitated for continued residential use.

**Impacts to Cultural Landscape Resources:** The construction of new facilities would introduce new features into the historic cultural landscape. However, mitigation measures described in section 4.9.9 would be implemented to ensure compatibility of new construction within the historic setting. This would protect the spatial organization and setting of the original landscape. With the implementation of mitigation measures, impacts would be short-term, localized, direct, minor adverse (no adverse effect).

The remodeling of buildings would result in changes to cultural landscape resources. Mitigation measures described in section 4.9.9 would be implemented to ensure that the rehabilitation of the main residence building and bunkhouse would be designed to preserve the character-defining features that contribute to their significance. Rehabilitation of these resources would also allow enhancement of the historic landscape setting by minimizing or removing modern intrusions. With the implementation of mitigation measures described in section 4.9.9, impacts would be short-term, localized, direct, moderate benefits to cultural landscape resources (no adverse effect).

#### 4.9.6.2 Archeological Resources

Under Action Alternative B, Option B2, impacts to archeological resources at Golden Gate Dairy stables (Ranch M/Golden Gate Dairy), Tennessee Valley stables (Ranch A/B), Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds) and Lower Tennessee Valley stables would be comparable to those under Common to All Action Alternatives. Refer to section 4.9.4 for a discussion of those impacts.

**Impacts to Archeological Resources:** Ground disturbing activities such as the construction of new facilities, trailheads, installation of toilets, etc. have the potential to impact archeological resources. There are two documented historic period archeological resources within the Golden Gate Dairy stables APE. Other project components have the potential to result in permanent, localized adverse impacts depending on the archeological resource involved and the level of disturbance created, particularly if within undisturbed soils layers. These potential impacts occur through the loss of cultural context of artifacts, features, etc. Depending upon the resource, this could be a major adverse effect. However, with the implementation of Mitigation Measures CR-1 (*Design Review and Pre-Construction Archeological Surveys and Assessments*), CR-2 (*Native American Consultation*), CR-3 (*Archeological and Native American monitoring*), CR-4 (*Archeological Sensitivity Training*), and CR-5 (*Inadvertent Archeological Discoveries*) adverse effects to archeological resources within the Plan APEs would not exceed minor in intensity (no adverse effect).

### 4.9.6.3 Cumulative Impacts to Cultural Landscape and Archeological Resources

Under Action Alternative B, Option B2, cumulative impacts to cultural landscapes and archeological resources would be the same as those under Common to All Action Alternatives. Refer to section 4.9.4 for a discussion of those impacts.

#### **Conclusion**

Long term effects to the park's archeological and cultural landscape resources under Alternative B, Option B2, range from beneficial to minor adverse. Beneficial and negligible adverse effects would result from implementation of a business management strategy; historic building rehabilitation; and removal of non-contributing facilities. Minor adverse effects to cultural landscape resources would result from the construction of new buildings and facilities, from maintenance for sustainability, sanitation, safety, and fire management, and from natural resource management actions. Negligible to minor, long term, adverse effects to archeological resources would result from ground disturbance related to landscape alterations (e.g., vegetation modification, new and remodeling construction activities, natural resources management, etc.). This alternative would not contribute to the overall adverse cumulative impact on cultural resources.

Due to the rehabilitation of the three historic sites, Alternative B, Options 1 and 2, was determined by NPS to be **"Significantly Better" for Conservation and rehabilitation of Historic Structures**. Alternative B scored **"Significantly Better" for Financially and Operationally Sustainable Opportunities** and for **Provides for other NPS Management Objectives**. Rehabilitating previously impacted stables sites lessens impacts to park resources (compared to creating new sites) and also helps historic preservation efforts by rehabilitating three cultural landscapes and 15 historic buildings. The intent under this alternative is to preserve the historic landscape and historic core areas to the greatest extent possible while protecting water quality by removing all non-historic facilities from the stream buffer zones. Certain non-historic features in the historic core areas would also be removed unless they are needed for stables operations (e.g., manure shed). Those modern equestrian facilities that must remain in the historic core area will be designed to be compatible with historic features.

No impairment of park resources or values is anticipated under this alternative. Because the impacts **previously described (1) are not inconsistent with the park's purpose and values, (2) do not prevent** the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to cultural resources in the park under Alternative B, Option B2.

For the purposes of Section 106 of the NHPA, no cultural resources listed in or eligible for the NRHP are expected to be adversely affected under this alternative (no adverse effect), see **Table 4-15** below.

<b>Table 4-15 Alternative B, Option B2 Section 106 Assessment of Effect</b>		
<b>Resource</b>	<b>Treatment</b>	<b>Section 106 Finding</b>
<u>Cultural landscape resources</u>	In accordance with the HSRs/CLRs and Secretary of Interior's standards and guidelines, design new facilities to be compatible with the existing historic setting and restore or rehabilitate existing structures to enhance historic	No adverse effect

<b>Table 4-15 Alternative B, Option B2 Section 106 Assessment of Effect</b>		
<b>Resource</b>	<b>Treatment</b>	<b>Section 106 Finding</b>
	character and serve new compatible uses. Three cultural landscapes and 15 historic buildings are rehabilitated.	
<u>Archeological resources</u>	No known resources in immediate project areas but all areas are considered sensitive for subsurface historic and prehistoric archeological resources. Conduct surface and/or subsurface surveys prior to ground disturbance or following ground exposures through vegetation or structural removals. Monitor and conduct Mitigation Measures CR-1 through CR-5 as determined necessary.	Effects could range from no effect to adverse effect but in all likelihood there would be adverse effect.

### 4.9.7 Impacts of Alternative C - Consolidated

This section discusses potential impacts to cultural resources for Alternative C. Alternative C reduces the number of stables sites to two compared to Alternatives A and B. These are Tennessee Valley, and Rodeo Valley stables. Selection of Alternative C would include all of the components that are common to all action alternatives as described above in section 4.9.4. Those project components related to “**Business Management Strategy**,” “**Visitor Experience and Programs**,” and “**Natural Resource Protection**” would be identical to those described above for common to all action alternatives. Therefore, the following discussion and analysis focuses on project elements of Alternative C which are not common to all action alternatives and which fall under the header “**Facilities, Sanitation, and Safety**.”

As with the sections above, the following discussion of “**Facilities, Sanitation and Safety**” is further divided into project components that are specific to each of the historic cultural landscape sites (Golden Gate Dairy stables (Ranch M/Golden Gate Dairy), Tennessee Valley stables (Ranch A/B), and Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds). This section also discusses potential impacts to archeological resources at additional non-historic locations including Lower Tennessee Valley and Lower Redwood Creek, as well as at Marincello which has not yet been evaluated for its potential eligibility for listing in the NRHP. This section begins with a discussion of Cultural Landscape Resources followed by a similar discussion of potential impacts and mitigation measures designed to protect archeological resources.

#### 4.9.7.1 Cultural Landscape Resources

##### Facilities, Sanitation, and Safety

##### **Golden Gate Dairy stables (Ranch M/Golden Gate Dairy)**

Remodeled facilities under Action Alternative C would include:

- Historic buildings would be rehabilitated for uses to be determined by future NPS planning. These could be utilized by the NPS or Park Partners for community meeting spaces, residence, garage, stewardship center, and/or NPS maintenance purposes or other uses to be determined to be consistent with the General Management Plan (GMP).

- Non-historic structures (e.g., accessible toilet) would be added or incorporated into an existing structure.

Removed facilities under Action Alternative C would include:

- Under Action Alternative C, most non-historic buildings and structures (e.g., horse stalls, paddocks, and the manure container) would be removed. As described in section 4.9.4 Common to All Action Alternatives, the front turn-out would remain in use for visiting equestrians.

**Impacts to Cultural Landscape Resources:** The rehabilitation of these buildings and structures would cause alterations to contributing resources. However, mitigation measures described in section 4.9.9 would be implemented to ensure that the rehabilitation of contributing resources would be designed to preserve the character-defining features that contribute to their significance. Rehabilitation of these resources would also allow for the enhancement of the historic landscape setting by minimizing or removing modern intrusions. For example, new pit or composting toilets would be placed within existing structures. With the implementation of mitigation measures, impacts would be long term, localized, direct, moderate benefits to cultural landscape resources (no adverse effect).

The removal of non-contributing resources would help rehabilitate the cultural landscape's historic core area and site plan. It would result in a long term, localized, direct benefit to cultural landscape resources (no adverse effect).

#### **Tennessee Valley stables (Ranch A/B)**

Under Action Alternative C, the installation of new buildings and structures would be comparable to **"New facilities under action Alternative B, Option B2" with the following exceptions:**

- A new hay/feed structure would be built between the main barn and the bunkhouse.
- A new manure shed would be built in the historic core area near the main barn.
- New stalls would be built along the north side of the main barn across the historic concrete path.

Under Action Alternative C, the rehabilitation of cultural landscape resources would be comparable to **"Remodeled facilities under Action Alternative B, Option B2," with the following exceptions:**

- A visitor contact facility would be constructed at the office (Sanitary Barn).
- Existing historic buildings would be rehabilitated to accommodate the Park Horse Patrol operations. This includes the main residence building for Park Horse Patrol office, stalls and storage.
- The existing bunkhouse, which is currently used as a caretaker residence, would be relocated 25 feet north out of the stream buffer and would be rehabilitated for continued residential use.

**Impacts to Cultural Landscape Resources:** The construction of these buildings and structures would cause alterations to contributing resources. However, mitigation measure described in section 4.9.9 would be implemented to ensure compatibility of new construction within the historic setting. For example, the hay/feed structure and the new stalls and paddocks would be located outside of the central core area in historically compatible structures. This would enhance the spatial organization and setting of the original landscape. With the implementation of mitigation measure, impacts would be long term, localized, direct, minor adverse (no adverse effect).

The rehabilitation of these buildings and structures would cause alterations to contributing resources. However, mitigation measures would be implemented to ensure that the rehabilitation of contributing resources would be designed to preserve the character-defining features that contribute to their

significance. Rehabilitation of these resources would also allow for the enhancement of the historic landscape setting by minimizing or removing modern intrusions. For example, the new visitor contact facility and Park Horse Patrol office and storage space would be placed within existing structures. With the implementation of mitigation measures, impacts would be long term, localized, direct, moderate benefits to cultural landscape resources (no adverse effect).

### ***Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds)***

Under Action Alternative C, impacts to cultural landscape resources at Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds) would be comparable to those under Action Alternative B, Option B2 (Preferred), with specific changes to this site under Action Alternative C described below.

New facilities under Action Alternative C would include:

- A caretaker residence would be constructed at the southwest end of the site outside the stream buffer, in a previously disturbed stall and building location; the footprint of the site would increase.
- A manure shed would be installed north of the east Motor Vehicle Shed.

Remodeled facilities under Action Alternative C would include:

- Hay and feed storage would be relocated to the Balloon Hangar.

***Impacts to Cultural Landscape Resources:*** The construction of new facilities and structures would cause alterations to contributing resources. However, mitigation measures described in section 4.9.9 would be implemented to ensure compatibility of new construction within the historic setting. For example, the new caretaker residence and manure shed would be located outside of the central core area in historically compatible structures. This would enhance the spatial organization and setting of the original landscape. With the implementation of mitigation measures, impacts would be long term, localized, direct, minor adverse (no adverse effect) due to the introduction of new, non-historic, but compatible structures.

The stabilization and rehabilitation of buildings would cause alterations to contributing resources. However, mitigation measures described in section 4.9.9 would be implemented to ensure that the stabilization and rehabilitation of the Balloon Hangar and Motor Vehicle Sheds would be designed to preserve the character-defining features that contribute to their significance. Rehabilitation of these buildings would also allow for the enhancement of the historic landscape setting by minimizing or removing modern intrusions. For example, hay and feed storage would be relocated to the Balloon Hangar instead of in a new, modern structure. With the implementation of mitigation measures, impacts would be short-term, localized, direct, moderate benefits to cultural landscape resources (no adverse effect).

### **4.9.7.2 Archeological Resources**

Under Action Alternative C, impacts to archeological resources at four stable locations, including Lower Tennessee Valley, would be similar to those described under Common to All Action Alternatives.

***Impacts to Archeological Resources:*** Ground disturbing activities such as the construction of new facilities, trailheads, installation of toilets, etc. have the potential to impact archeological resources. There are two documented historic period archeological resources within the Golden Gate Dairy stables APE. Other project components have the potential to result in permanent, localized adverse impacts depending on the archeological resource involved and the level of disturbance created, particularly if within undisturbed soils layers. These potential impacts occur through the loss of cultural context of artifacts, features, etc. Depending upon the resource, this could be a major adverse

effect. However, with the implementation of Mitigation Measures CR-1 (*Design Review and Pre-Construction Archeological Surveys and Assessments*), CR-2 (*Native American Consultation*), CR-3 (*Archeological and Native American Monitoring*), CR-4 (*Archeological Sensitivity Training*), and CR-5 (*Inadvertent Archeological Discoveries*) adverse effects to archeological resources within the Plan APEs would not exceed minor in intensity (no adverse effect).

### **Cumulative Impacts to Cultural Landscape and Archeological Resources**

Impacts would be the same as those described under Common to All Action Alternatives (overall minor adverse cumulative impact).

### **Conclusion**

While there would be some differences among the alternatives, overall impacts, mitigation and conclusions regarding impairment would be as described under Alternative B, Option B1 and B2 (Preferred). Long term **effects to the park's cultural landscape** and archeological resources under Alternative B, Option B2, range from beneficial to minor adverse. Beneficial and negligible adverse effects are related to the preparation of a business management plan; historic building rehabilitation; and removal of non-contributing facilities. Minor adverse effects to cultural landscape resources would result from the construction of new buildings and facilities; maintenance for sustainability, sanitation, safety, and fire management; and natural resources management actions. Negligible to minor, long term, adverse effects to archeological resources would result from ground disturbance related to landscape alterations (e.g., vegetation modification, new and repair construction activities, natural resources management, etc.). This alternative would not contribute to the overall adverse cumulative impact on cultural resources.

No impairment of park resources or values is anticipated under this alternative. Because the impacts previously described (1) are not inconsistent with the park's purpose and values, (2) do not prevent the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to cultural resources in the park under Alternative C.

For the purposes of Section 106 of the NHPA, no cultural resources listed in or eligible for the NRHP are expected to be adversely affected under this alternative (no adverse effect), see **Table 4-15** below.

<b>Resource</b>	<b>Treatment</b>	<b>Section 106 Finding</b>
<u>Cultural landscape resources</u>	In accordance with the HSRs/CLRs and Secretary of Interior's standards and guidelines, design new facilities to be compatible with the existing historic setting and preserve, restore or rehabilitate existing structures to enhance historic character and serve new compatible uses. Two cultural landscapes and 11 historic buildings would be rehabilitated.	No adverse effect
<u>Archeological resources</u>	No known resources in immediate project areas but all areas are considered sensitive for subsurface historic and prehistoric archeological	Effects could range from no effect to adverse effect but in all likelihood there would be adverse effect.

<b>Table 4-16 Alternative C Section 106 Assessment of Effect</b>		
<b>Resource</b>	<b>Treatment</b>	<b>Section 106 Finding</b>
	resources. Conduct surface and/or subsurface surveys prior to ground disturbance or following ground exposures through vegetation or structural removals. Monitor and conduct Mitigation Measures CR-1 through CR-5 as determined necessary.	

## 4.9.8 Impacts of Alternative D - Dispersed and Expanded

Alternative D increases the number of stables sites to five compared to four in Alternative A. These are the Golden Gate Dairy, Tennessee Valley, and Rodeo Valley stables, the Lower Redwood Creek site and the Marincello site. Due to the fact that Marincello site has not been evaluated for its potential eligibility for listing in the NRHP, this would be required prior to the implementation of this Alternative. Selection of Alternative D would result in the utilization of three of the existing stable locations and the development of two new stable locations. Tennessee Valley, Golden Gate Dairy, and Rodeo Valley stables would remain as equestrian sites, while Lower Tennessee Valley stables facilities would be removed. New stables would be developed at the Lower Redwood Creek and Marincello Road sites. A total of 18 additional horses would be stabled with selection of Alternative D relative to the No Action Alternative; however, they would be disbursed over five stable locations rather than the four existing sites.

Selection of Alternative D would include the components common to all action alternatives as described in section 4.3.4, in addition to the changes specific to this alternative as described below.

### 4.9.8.1 Cultural Landscape Resources

#### Facilities, Sanitation, and Safety

#### **Golden Gate Dairy stables (Ranch M/Golden Gate Dairy)**

Under Action Alternative D, impacts to cultural landscape resources at Golden Gate Dairy stables (Ranch M/Golden Gate Dairy) would be comparable to those under Action Alternative B, Option B2 (Preferred), with specific changes to this site under Action Alternative D described below.

New facilities under Action Alternative D would include:

- Paddocks, water tank, a generator, and trailer parking pads would be installed.
- A 60-foot diameter covered lunging ring would be installed south of the north windbreak
- Four new stalls and paddocks north of the historic core area would be installed
- A new manure shed would be attached or placed near the hay barn's north elevation.

Remodeled facilities under Action Alternative D would include:

- The historic barn could be rehabilitated for NPS or Park Partner use.
- The residence could be rehabilitated for future use, to be determined.

**Impacts to Cultural Landscape Resources:** The construction of these structures would cause alterations to contributing resources. However, mitigation measures described in section 4.9.9 would be

implemented to ensure compatibility of new construction within the historic setting. For example, the new paddocks, stalls, generator, parking pads, and lunging ring would be located outside of the central core area in historically compatible structures. This would enhance the spatial organization and setting of the original landscape. With the implementation of mitigation measures, impacts would be long term, localized, direct, minor adverse (no adverse effect).

The rehabilitation of these buildings and structures would cause alterations to contributing resources. However, mitigation measures described in section 4.9.9 would be implemented to ensure that the rehabilitation of the contributing resources would be designed to preserve the character-defining features that contribute to their significance. For example, the new stalls and manure shed would be designed to appear as though it was not a separate structure but as if it melds with the existing historic barn. Rehabilitation of the historic barn and residence would also allow for the enhancement of the historic landscape setting by minimizing or removing modern intrusions. With the implementation of mitigation measures impacts would be long term, localized, direct, moderate benefits to cultural landscape resources (no adverse effect).

### ***Tennessee Valley stables (Ranch A/B)***

Under Action Alternative D, impacts to cultural landscape resources at Tennessee Valley stables (Ranch A/B) would be comparable to those under Action Alternative B, Option B2 with specific changes to this site under Action Alternative D described below.

New facilities under Action Alternative D would include:

- A new hay and feed shed and a manure shed would be installed inside the historic core central open areas.

Remodeled facilities under Action Alternative D would include:

- The main residence, the Lopes House, would be rehabilitated as a residence, and the bunkhouse would be rehabilitated as program space.

***Impacts to Cultural Landscape Resources:*** The construction of these structures would cause alterations to contributing resources. However, mitigation measures described in section 4.9.9 would be implemented to ensure compatibility of new construction within the historic setting. For example, the new sheds would be located outside of the central core area in historically compatible structures. This would enhance the spatial organization and setting of the original landscape. With the implementation of Mitigation Measure CR-5, impacts would be long term, localized, direct, minor adverse (no adverse effect).

The rehabilitation of these structures would cause alterations to these contributing resources. However, mitigation measures described in section 4.9.9 would be implemented to ensure that the rehabilitation of the Lopes House would be designed to preserve the character-defining features that contribute to its significance. Rehabilitation of this building would also allow for the enhancement of the historic landscape setting by minimizing or removing modern intrusions. With the implementation of mitigation measures described in section 4.9.9, impacts would be long term, localized, direct, moderate benefits to cultural landscape resources (no adverse effect).

### ***Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds)***

Under Action Alternative D, impacts to cultural landscape resources at Rodeo Valley stables (Fort Barry Balloon Hangar and Motor Vehicle Sheds) would be comparable to those under Action Alternative B, Option B2 (Preferred) with specific changes to this site under Action Alternative D described below. Refer to section 4.9.6 for a discussion of the similar impacts under Action Alternative B, Option B2.

New facilities under Action Alternative D would include:

- A residence would be constructed in the north end of the west Motor Vehicle Shed.
- A building for feed and hay storage would be constructed south of the outdoor arena.
- A roof would be constructed on a portion of the upper outdoor arena to provide a covered ring.
- A manure shed would be installed near the Balloon Hangar, adjacent to and south of the western Motor Vehicle Shed.

Remodeled facilities under Action Alternative D would include:

- Under action alternative D, the Balloon Hangar would be rehabilitated for NPS operations.
- **Impacts to Cultural Landscape Resources:** The rehabilitation of this building would cause alterations to contributing resources.

**Impacts to Cultural Landscape Resources:** The construction of new structures would cause alterations to contributing resources. However, mitigation measures described in section 4.9.9 would be implemented to ensure compatibility of new construction within the historic setting. For example, the feed and hay storage building and manure shed would be located outside of the central core area in historically compatible structures. This would enhance the spatial organization and setting of the original landscape. With the implementation of mitigation measures described in section 4.9.9, impacts would be short-term, localized, direct, minor adverse (no adverse effect).

#### **4.9.8.2 Archeological Resources**

Under Action Alternative D, impacts to archeological resources at all four existing stables sites and Lower Redwood Creek would be comparable to those under Common to All Action Alternatives. The Marincello site would need to be evaluated for its potential eligibility for listing in the NRHP before impacts could be fully defined. Refer to section 4.9.3 for a discussion of the similar impacts Common to All Action Alternatives.

**Impacts to Archeological Resources:** Ground disturbing activities such as the construction of new facilities, trailheads, installation of toilets, etc. have the potential to impact archeological resources. These potential impacts occur through the loss of cultural context of artifacts, features, etc. Depending upon the resource, this could be a major adverse effect. There are two documented historic period archeological resources within the Golden Gate Dairy stables APE. Other project components have the potential to result in permanent, localized adverse impacts depending on the archeological resource involved and the level of disturbance created, particularly if within undisturbed soils layers. These potential impacts occur through the loss of cultural context of artifacts, features, etc. Depending upon the resource, this could be a major adverse effect. However, with the implementation of Mitigation Measures CR-1 (*Design Review and Pre-Construction Archeological Surveys and Assessments*), CR-2 (*Native American Consultation*), CR-3 (*Archeological and Native American Monitoring*), CR-4 (*Archeological Sensitivity Training*), and CR-5 (*Inadvertent Archeological Discoveries*) adverse effects to archeological resources within the Plan APEs would not exceed minor in intensity (no adverse effect).

#### **Cumulative Impacts to Cultural Landscape and Archeological Resources**

Impacts would be as described under Common to All Action Alternatives (overall beneficial cumulative impact).

#### **Conclusion**

While there would be some differences among the alternatives, overall impacts, mitigation and conclusions regarding impairment would be the same as described under Alternative B, Option B2

(Preferred). **Long term effects to the park's** archeological and cultural landscape resources under both Alternatives B, Option 2, and D range from beneficial to minor adverse. Beneficial and negligible adverse effects are related to the proposed facilities modifications for historic building rehabilitation and removal of non-contributing facilities. Minor adverse effects to cultural landscape resources would result from the construction of new buildings and facilities; maintenance for sustainability, sanitation, safety, and fire management; and natural resources management actions. Negligible to minor, long term, adverse effects to archeological resources would result from ground disturbance related to landscape alterations (e.g., vegetation modification, new and remodeling construction activities, natural resources management, etc.). This alternative would not contribute to the overall adverse cumulative impact on cultural resources.

No impairment of park resources or values is anticipated under this alternative. Because the impacts **previously described (1) are not inconsistent with the park's purpose and values, (2) do not prevent** the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to cultural resources in the park under Alternative D.

For the purposes of Section 106 of the NHPA, no cultural resources listed in or eligible for the NRHP are expected to be adversely affected under this alternative (no adverse effect), see **Table 4-16** below.

<b>Table 4-17 Alternative D Section 106 Assessment of Effect</b>		
<b>Resource</b>	<b>Treatment</b>	<b>Section 106 Finding</b>
<u>Cultural landscape resources</u>	In accordance with the HSRs/CLRs and <b>Secretary of Interior's standards and guidelines</b> , design new facilities to be compatible with the existing historic setting and restore or rehabilitate existing structures to enhance historic character and serve new compatible uses. Three cultural landscapes and 14 historic buildings would be rehabilitated.	No adverse effect
<u>Archeological resources</u>	No known resources in immediate project areas but all areas are considered sensitive for subsurface historic and prehistoric archeological resources. Conduct surface and/or subsurface surveys prior to ground disturbance or following ground exposures through vegetation or structural removals. Monitor and conduct Mitigation Measures CR-1 through CR-5 as determined necessary.	Effects could range from no effect to adverse effect but in all likelihood there would be adverse effect.

## 4.9.9 Mitigation Measures

### CR-1: Design Review and Pre-Construction Archeological Surveys and Assessments

During design and implementation of the Marin Equestrian Stables Plan, all work areas that will have ground disturbance or exposure through structure or vegetation removal will be archeologically surveyed to identify, assess, and determine best protective treatments for those archeological resources considered eligible for listing on the National Register of Historic Places. Survey methods may include pedestrian surface coverage, subsurface sampling through coring or mechanical equipment, or various forms of remote sensing. Best discovery methods will be determined by the nature and extent of planned disturbance. Treatments may include protective covering, stabilization, monitoring during construction, etc. Archeological work will be conducted early enough in the design process to allow avoidance of impacts to significant properties. Documentation for identified archeological properties will meet standards established in the NPS Archeological Sites Management Information System (ASMIS) and the California Historical Resources Information System (CHRIS). Survey and assessment findings will be provided to the SHPO for concurrence. All compliance reviews associated with archeological resources will be conducted through an existing Programmatic Agreement between the National Park Service and the California State Historic Preservation Office, unless adverse impacts to significant archeological resources appears to be unavoidable. Sites that may be adversely affected will require separate NHPA consultation with the California SHPO under 36 CFR 800.13 (Protection of Historic Properties - Post review discoveries).

### CR-2: Native American Consultation

Pre-construction archeological surveys and assessments will include consultation with the Federated Indians of Graton Rancheria, the recognized American Indian tribe affiliated to Marin lands in Golden Gate National Recreation Area.

### CR-3: Archeological and Native American Monitoring

An archeological monitor and representative of the Federated Indians of the Graton Rancheria (Coast Miwok) are required during any ground disturbing activities in the vicinity (within 100') of known precontact archeological sites, or in areas of high sensitivity to the discovery of such resources. Monitoring associated with historic archeological features or sensitive areas will require only a qualified archeologist. Native American consultation, archeological reviews of developing project designs, and/or pre-construction assessments will determine when and what type of monitors will be required.

### CR-4: Treatment of Historic Cultural Landscapes

1. Prior to implementation of the action alternative, Historic Structures Reports (HSRs) and Cultural Landscape Reports (CLRs) would be prepared by a professional historical architect and a historical landscape architect, respectively. The reports would conform to The *Secretary of the Interior's Standards for the Treatment of Historic Properties*. Physical changes to cultural landscape resources, including building and landscape restoration and rehabilitation, would adhere to detailed recommendations developed by the required CLRs and HSRs and CLRs and HSRs will be provided to the SHPO for review.
2. The CLRs and HSRs should be guided by the provisions set forth in the "Final Marin Equestrian Stables Plan Summary of the NPS Cultural Landscape Workshop, June 1 and 2, 2010 Memorandum (NPS 2011)." The summary of the Cultural Landscape Workshop Summary describes the contributing features and resources for each NRHP-eligible and -listed cultural landscape and delineates methods to implement the Plan that would enhance the significant historic features and restore important elements of each cultural landscape such as the central

core open area, historic vegetation (e.g., windbreaks), spatial organization, and building clusters.

3. As part of the HSRS and CLRS, guidelines would be created to ensure compatibility of new building construction and the introduction of other new elements into the historic setting and would be subject to review and approval by NPS. The guidelines would conform to The *Secretary of the Interior's Standards for the Treatment of Historic Properties*.
4. Design review prior to implementation would be required. New construction would be reviewed under Section 106 by NPS cultural resource staff under the Golden Gate Programmatic Agreement with the SHPO.

#### **CR-5: Inadvertent Archeological Discoveries**

Inadvertent Discoveries: If previously unidentified buried cultural resources are inadvertently discovered during ground disturbing activities, work shall stop within a 100-foot radius of the find until a qualified archeologist can document, assess the significance of the find, and a management decisions can be made about their treatment. Inadvertent discoveries would be treated in accordance with the current Programmatic Agreement between the Park and the California State Historic Preservation Office (SHPO) by the onsite monitor in consultation with the Park archeologist and Native American monitor, as appropriate. Avoidance in place or without adverse effect from project actions as the preferred treatment for discoveries. If the site cannot be avoided and will be adversely affected, the Park will prepare documentation of the site, expected impacts, an explanation of its significance, and a proposed treatment plan to the SHPO in compliance with 36 CFR 800.13 (Protection of Historic Properties - Post review discoveries). Treatment plans would fully evaluate avoidance, project redesign, and data recovery alternatives before outlining actions proposed to resolve adverse effects.

Discovery of Human Remains: If human skeletal remains are encountered, all work shall stop in the vicinity of the discovery, and the find would be secured and protected in place. The Marin County coroner, Park Law Enforcement, and the Park Archeologist would all be immediately notified. If a determination finds that the remains are Native American, and that no further coroner investigation of the cause of death is required, they would be treated in accordance with the Native American Graves Protection and Repatriation Act Regulations at 43 CFR 10.4 (Inadvertent discoveries). The coroner would also contact the California Native American Heritage Commission (pursuant to section 7050.5[c] of the California Health and Safety Code) and the County Coordinator of Indian Affairs.

#### **VR-1: Minimize Long-term Visual Impacts**

New construction would be designed to be compatible with existing structures and landscape features to ensure visual continuity. The design and placement would take into account elements of massing, scale, materials, and color. Site furnishings would be consistent with the *Parkwide Site Furnishings Guidelines* for similar features found elsewhere in the park. New design elements would be sited so that they would not compete with important views and vistas, and would be incorporated into the surrounding landscape.

#### **VR-2: Prepare Visual Simulations during Design Phase**

For those alternatives that include new facility construction, the NPS or lessee would prepare visual simulations or other visual aids during the schematic design phase to assist in studying and communicating to others the proposals and to determine the visual impacts.

**VR-3: Minimization of Construction-Related Visual Impacts**

Construction activities would be coordinated with other construction activities in the area to the greatest extent possible to minimize visual intrusion of construction equipment and activity in popular visitor areas.

## 4.10 Visitor Experience

### 4.10.1 Guiding Regulations and Policies

The importance of and commitment to visitor experience is affirmed in various NPS documents. The 1916 Organic Act requires NPS to ensure its natural and cultural resources are not impaired, while providing for the enjoyment of these resources. NPS *Management Policies 2006* (NPS 2006a) state that the enjoyment of park resources and values by the people of the U.S. is part of the fundamental purpose of all parks and that NPS is committed to providing appropriate, high-quality opportunities for visitors to enjoy the parks. As many forms of recreation occur outside a national park setting, NPS seeks to provide opportunities for forms of enjoyment that are uniquely suited and appropriate to the natural and cultural resources found in a particular unit.

NPS has committed to providing facilities which are designed to be accessible to all individuals. All practicable efforts would be made to make NPS facilities, programs, services, employment, and meaningful work opportunities accessible and usable by all people, including those with disabilities. This policy reflects the commitment to provide access to the widest cross section of the public and ensure compliance with all applicable guidelines. Accessibility would be provided consistent with preserving park resources and providing visitor safety and high quality visitor experiences (NPS 2006a, sec. 9.1.2).

The visitor experience often includes the enjoyment of a park's natural soundscape. NPS Management Policies charges NPS with preserving "to the greatest extent possible, the natural soundscapes of parks" (NPS 2006a sec. 4.9). "The natural ambient sound level—that is, the environment of sound that exists in the absence of human-caused noise—is the baseline condition, and the standard against which current conditions in a soundscape" should be measured and evaluated (NPS 2006a, sec. 8.2.3). Human activities that generate noise, including that caused by mechanical devices, are to be monitored in and around parks. The Management Policies further require parks to evaluate impacts of motorized equipment in their planning and are required to choose equipment that has the least potential for impact to the natural soundscape (NPS 2006a, sec. 8.2.3). In addition, Director's Order 47 (Soundscape Preservation and Noise Management) articulates NPS policies that address the protection, maintenance or restoration of the natural soundscape resource in a condition unimpaired by inappropriate or excessive noise sources (NPS 2000).

### 4.10.2 Assessment Methods

The purpose of this impact analysis is to determine if the proposed actions are compatible or in conflict with the purpose of the Park, its visitor experience goals, and the direction provided by NPS policies. The potential for change in visitor experience and use, including effects to the Park's natural soundscape, is evaluated by identifying anticipated effects resulting from project implementation.

Effects to the visitor experience related to traffic and parking restrictions are addressed and are not intended to function as a technical transportation analysis. Rather, they are analyzed as to how they would effect a visitor's enjoyment of the area. See the *Transportation* section for additional analysis of transportation-related effects.

The analysis of the effects of noise on visitor experience in national parks involves a variety of factors, **many of which are not easily quantifiable. These include, among other things, a visitor's expectation** (e.g., presumptions of noise levels in **developed vs. undeveloped/wilderness areas**), **a visitor's personal characteristics** (the likelihood of being annoyed by noise), and the degree to which a quiet experience is desired (Gramann 1999). For instance, visitors may perceive noise as more annoying **when it occurs in areas they expect to be very quiet. A visitor's expectation and the difference** between existing noise levels and those from mechanical sources also affects whether visitors report annoyance and interference with natural quiet. For example, exit interviews at 23 National Park units (NPS 1994a) found that a higher percentage of backcountry (compared to front country) visitors recalled hearing aircraft and were more likely to experience interference with enjoyment and natural quiet because of it. Whether or not sounds are consistent with the settings in which they are heard appears to be an important factor in judging whether the visitor experience is adversely or positively affected.

Noise receptors in the area could be affected by short-term construction noise, and include those taking part in equestrian programming, park staff, park partners, as well as other park visitors who frequent the Rodeo Beach and Rodeo Lagoon areas and a variety of park trails (e.g., Miwok, Coastal, Lagoon, Ridge) in the surrounding park lands. All of these users would be considered noise receptors for the purposes of this analysis. The closest receptors include equestrian program participants, park staff, park partners, and local businesses (including the Pelican Inn) located within the Southern Marin NPS lands and surrounding communities.

Noise receptors in the area could be affected by long-term noise related to stables operations such as the use of the bullhorn to communicate with students and delivery trucks. Noise receptors may include nearby residential homeowners, those taking part in equestrian programming, park staff, park partners, as well as other park visitors who frequent a variety of park trails (e.g., Tennessee Valley, Old Springs, Miwok, Bobcat, Rodeo Valley, Coastal, Dias Ridge) in the surrounding Park lands. All of these users would be considered noise receptors for the purposes of this analysis. The closest receptors include equestrian program participants, park staff, local businesses in Muir Beach (including the Pelican Inn), and park partners located within the project vicinity.

**Table 4-18** provides general information on typical noise levels, 50 feet from their sources, associated with heavy construction equipment. Noise levels vary with distance from the source and with operation mode. For instance, at 10 feet away grading equipment produces 94 dBA, while at 70 feet the level falls to 82 dBA. As points of reference, normal conversation at the source point results in a 60 dBA noise level, while whispering at five feet result in a 20 dBA noise level. At levels above 80 dBA, it is recommended that exposure time be limited to avoid hearing loss (National Institute for Occupational Safety and Health 2006). **Table 4-18** provides additional information on predicted noise levels from any source at various distances from a construction site using a combination of the three loudest pieces of construction equipment simultaneously.

<b>Table 4-18 Noise Emission Levels Typical for Construction Equipment</b>	
<b>Equipment</b>	<b>Typical Noise Level (dBA) 50 feet from Source</b>
Backhoe	80
Grader	85
Loader	85
Roller	75
Bulldozer	85
Truck	88
Scraper	89

*Note: dBA = A-weighted decibel scale.*

*Source: Federal Transit Administration 1995.*

<b>Table 4-19 Examples of Estimated Noise Levels Associated with Construction Areas</b>	
<b>Distance Attenuation</b>	
<b>Distance to Receptor (feet)</b>	<b>Sound Level at Receptor (dBA)</b>
50	92
100	86
200	80
400	73
600	69
800	67
1,000	64
1,500	60
2,000	57
2,500	54
3,000	51
4,000	47
5,280	43
7,500	36

*The following assumptions were used:*

*Basic sound level drop-off rate: 6.0 dB per doubling of distance.*

*Assumes simultaneous operation of three pieces of heavy equipment (scraper, truck, bulldozer).*

*Distance for reference sound level: 50 feet*

*Source: Jones and Stokes 2002*

The visual effects of the alternatives on visitor experience are discussed in section 4.12.

### **Context and Duration**

- Short-term:** Effects would be perceptible to visitors only temporarily (e.g., construction-related) and/or these management actions would persist for less than one year.
- Long-term and Intermittent:** Effects would be repeatedly perceptible to visitors, lasting for at least one year or more. This includes long-term intermittent effects.

### **Thresholds**

The following thresholds were used to determine the magnitude of impacts on the visitor experience.

**Negligible:** Visitors would not likely be aware of changes related to visitor use, in critical characteristics of visitor experiences fundamental to the park's purpose and significance, or in any defined indicator of visitor satisfaction.

**Minor:** Visitors would be aware of changes related to visitor use, in critical characteristics of visitor experiences fundamental to the park's purpose and significance, or in any defined indicators of visitor satisfaction, but the effects would be minor. While noticeable, effects would not disrupt the experience and enjoyment of the park's values and facilities.

**Moderate:** Visitors would be aware of readily apparent changes related to visitor use, in any critical characteristic of visitor experiences fundamental to the park's purpose and significance, or in any defined indicators of visitor satisfaction. Detectable effects would degrade/limit the visitor's ability to experience and enjoy the park's values and facilities within certain areas.

**Major:** Visitors would be highly aware of changes related to visitor use, in any critical characteristic of visitor experiences fundamental to the park's purpose and significance, or in defined indicators of visitor satisfaction. These effects may prompt visitors to choose to pursue their activity/experience in other areas outside the park.

### **4.10.3 Impacts of Alternative A - No Action**

Alternative A (No Action) would retain the four existing GGNRA stable facilities and their continued management and operations. No new equestrian facilities would be developed and no additional horses, stalls or other facilities would be added to the existing sites except for modifications for NPS ABAAG (Architectural Barriers Act Accessibility Guidelines) compliance as determined by the NPS and as required by law, regulation and NPS policy; these are outlined in Chapters 2.3.1 and 2.3.2. The following paragraphs describe the potential visitor impacts that could result from continued operation of the stables.

#### **4.10.3.1 Construction**

Under the No Action Alternative, there would be no project-related changes to stables utilities or infrastructure. Therefore, there would be no impacts.

#### **4.10.3.2 Inside Equestrian Stables Permitted Areas**

**Soundscape.** While equestrian programming is designed to minimize its effect on other visitors, it is possible that some visitors may be affected by continued use of equestrian programs. However, inside the permitted areas it is expected that most visitors would not have an adverse reaction to the noise generated by typical stables operations. Depending on the visitor and his/her expectations in a particular area, adverse effects related to the park's soundscape likely range from negligible to minor, short-term and localized, long-term intermittent.

#### 4.10.3.3 Outside Equestrian Stables Permitted Areas

**Trails.** The use of nearby trails by equestrian users boarding horses at the stables has the potential to negatively affect visitor experience for those visiting park trails and beaches during times when equestrian groups are present. This could include those visitors who may have a negative experience concerning horse manure on the trails, expectations of an experience marked by solitude, as well as **those with expectations of experiencing park's resources that are unaffected by what they may perceive as crowding.** The likelihood of conflict is elevated by the use of the nearby trails by recreationists with inherent conflicting expectations about trail use and experience (e.g., mountain bikers and hikers).

As part of NPS protocols and management, Park staff work in collaboration with Park Partner staff to closely monitor the nearby stables and trails and to avoid negative effects to the **Park's** visitors as well as natural and cultural resources. If it is determined by NPS staff that an equestrian activity has a negative effect to the **Park's resources**, those activities would be reviewed and managed to mitigate those effects. This management protocol is designed to minimize conflicts between equestrian users and other visitors throughout the Park. Depending on the visitor and his/her expectations in a particular area, adverse effects related to the **Park's** trails likely range from negligible to minor, short-term and localized, long-term intermittent.

**Soundscapes.** Some visitors may be affected by noise related to equestrian activities outside the permitted stables area. As described above, it is the practice of the stables operators to keep noise to a minimum so as not to disturb other visitors but it is not uncommon to hear equestrian groups. The Park would intentionally plan public outreach programs so that activities involving noise are separated from other park visitors. However, depending on time of day, location of other visitors, numbers of equestrian users in a given area, wind patterns, and the type of equestrian activity, it is possible that visitors could be affected by noise related to equestrian public outreach programming. Depending on the visitor and his/her expectations in a particular area, adverse effects related to the **Park's** soundscape likely range from negligible to minor, short-term and localized.

#### 4.10.3.4 Cumulative Impacts

There are no past, currently planned or reasonably foreseeable future projects that could result in cumulative effects to visitor experience under the No Action Alternative.

#### 4.10.3.5 Conclusions

Implementation of the No Action Alternative would result in localized long-term benefits to the visitor experience related to the on-going monitoring and protection of park resources, as well as the existing state of accessibility. In addition, negligible, short- and long-term, localized adverse effects to the visitor experience would be expected to occur as a result of the increased use of public outreach programs outside the stables (**potential conflict with other users**), and effects to the park's natural soundscape related to stables operations. A variety of projects have resulted in positive cumulative effects for visitor experience in the GGNRA.

### 4.10.4 Impacts Common to All Action Alternatives

#### 4.10.4.1 Construction

Under all action alternatives, during the construction of staging areas, building rehabilitation activities, utility/infrastructure activities, and other landscape modifications (install trailhead facilities, water

tank, manure shed) visitor experience could be affected by creating safety issues and related access restrictions, changing parking and circulation, and increasing noise in certain locations for periods of time.

**Public Access/Restrictions.** Under all action alternatives, for safety reasons, equestrian users may have to vacate the premises temporarily during periods of significant grading and construction. This is considered a short-term impact that would be minimized by working closely with Park personnel and with the implementation of Mitigation Measures VE-1 (*Construction Management Plan*). Similarly, visitor restrictions may occur in some areas as per Mitigation Measure VE-2 (*Construction Exclusion Areas-Visitor Restrictions*). These would include active construction areas (e.g., parking pads, water tank, manure shed installation), landscape enhancement areas (e.g., grading, vegetation and topographic modifications), and construction staging areas. Some construction areas may be fenced to ensure visitor safety. Construction equipment would be stored in designated staging areas which would also be restricted from the public. Depending on when construction activities occur, such restrictions could affect access to existing equestrian areas and pedestrian circulation routes within the permitted areas for a period of time. Collectively, these construction-related activities would undoubtedly restrict public access to certain areas, if only periodically. While safety issues would be negligible with implementation of Mitigation Measure VE-2, the resulting restrictions in access would have short-term, localized, minor adverse impacts on visitor experience.

**Circulation/Parking.** Under all action alternatives, construction traffic could also interfere with park visitors; however, with implementation of TR-1 (*Traffic Control Plan*), adverse effects to the visitor experience are expected to be negligible, short-term, and localized.

**Soundscapes/Noise.** Under all action alternatives, the use of mechanized equipment, particularly heavy grading equipment, would result in temporary increases in noise levels within and around the stables. The intensity of the effects on the park's soundscape would vary with the type of construction activity, its location, and the duration of the activity. Noise impacts are also affected by a variety of other factors, including the distance from noise-sensitive receptors, weather, topography, ambient noise levels, etc. Noise effects would be compounded by simultaneous use of several pieces of noise-generating equipment.

Horses and equestrian users may be affected during weekdays as construction work is anticipated during the typical weekday business hours. Park staff and park partners would be near the stables throughout the day while construction activities are occurring. Minor to moderate short-term, localized, adverse effects are anticipated for those individuals who are exposed to construction noise.

While construction noise would be reduced in areas that are further away (lagoon, beach, trails, etc.), changes in the soundscape would be more noticeable as these are relatively quiet areas within the GGNRA. Assuming a maximum three pieces of heavy equipment working simultaneously, visitors within a mile of the stables could experience noise levels of approximately 43 dBA; those within a ½ mile radius could experience noise levels of approximately 55 dBA; those within a ¼ mile could experience levels of 60-64 dBA (refer to **Table 4-4**). This latter level equates approximately to the noise level of normal conversation. Logically, as one moves closer to the construction zone, the potential for greater visitor impacts occurs. For instance, those visitors along the Tennessee Valley Trail could experience noise levels of approximately 70 dBA.

Effects to the park's soundscape from construction activity would be moderated in some cases by natural sounds (wind), climatic conditions (wind direction), and topography. The degree to which any of these factors would moderate noise impacts would vary depending on the weather and the specific location of a particular visitor.

Considering these many factors, it is believed that construction-related noise effects to the Park's soundscape inside and outside permitted use areas could result in short term, localized, negligible to moderate adverse impacts on visitor experience. The range in impact would vary based upon the sound level at the receiver, and the receiver's **perception of the sound**. The effects would be short-term and localized. Implementation of Mitigation Measures VE-1 (*Construction Management Plan*), and VE-3 (*Construction-Related Noise Control*) would generally reduce these impacts to a minor adverse level, although isolated instances of moderate impacts are likely.

#### **4.10.4.2 Inside Equestrian Stables Permitted Areas**

Under all action alternatives, stable enhancements would include a variety of factors which would improve the visitor experience for equestrian users and general park visitors. First, the upgrades of stables facilities and buildings would better serve visitors. Design would be in such a manner as to fulfill accessibility standards and NPS directives (see Guiding Regulations and Policies above). New directional and informational signage would be added to stables for more efficient way-finding. The addition of this interpretive potential would enhance the visitor experience at the facilities.

#### **4.10.4.3 Outside Equestrian Stables Permitted Areas**

As stated under the No Action Alternative, the focus of this EA is the equestrian stables; however, the increased use of nearby trails due to increased public outreach programs has the potential to negatively affect visitor experience for those visiting park trails and beaches during times when equestrian groups are present. This could include those visitors who may have a negative experience concerning horse manure on the trails, expectations of an experience marked by solitude, as well as those with **expectations of experiencing park's resources that are unaffected by what they may perceive as crowding**. The likelihood of conflict is elevated by the use of the nearby trails by recreationists with inherent conflicting expectations about trail use and experience (e.g., mountain bikers and hikers).

That said, several measures could be implemented to minimize negative effects to non-equestrian Park visitors. For one, the Best Management Practices (BMPs) described in Appendix B, would be implemented as part of all action alternatives. The BMPs are designed to reduce erosion, prevent the introduction of noxious weeds, improve water quality and protect natural and cultural resources and may include the regular clean-up of manure along trails within a certain distance from the stables or **the use of sanitation sack or "horse diapers"**. In addition, per Mitigation measure VE-5, Trail Etiquette Suggestions would be posted at the stables to increase equestrian awareness and consideration of other users and the **"leave no trace" ethic** (e.g., recommended use of sanitation sack, noise kept to minimum, efforts not to disturb other visitors etc.). The selection of specific outreach programs should coordinate the use of trails to minimize potential impacts to other recreationists. For instance, some programs could be restricted as to how many groups may visit and when they may visit. It is likely with the implementation of these measures that the continued equestrian use at the stables sites would result in negligible, short-term, localized and/or intermittent long term adverse effects to visitor experience, particularly for visitors in the area during weekdays.

Access limitations and the potential for conflicts between equestrian groups and other park visitors would be generally as described under Alternative A. With the increased number of public outreach programs, some additional impacts arising from increased use of existing trails is likely, both as a result of direct conflicts between equestrian user groups and other visitors, as well as the potential for resource degradation and related degradation of the visitor experience. However, the site management program would identify and ameliorate any issues at locations where there is resource

degradation, consistent overcrowding, or conflicts between park visitors. As such, impacts would be kept to no more than short-term, negligible to minor and localized.

#### **4.10.4.4 Cumulative Impacts**

Cumulative impacts of all action alternatives are similar to those described for the No Action Alternative. Overall, while there may be some adverse impacts, cumulative visitor experience impacts are anticipated to be long-term and beneficial.

#### **4.10.4.5 Conclusions**

Under all action alternatives, project construction is anticipated to lead to short-term, localized minor to moderate adverse effects related to restricted access, circulation/parking alterations, and effects to soundscapes. Over the long term, impacts to visitor experience would be beneficial as a result of increased public outreach capacity, utility/infrastructure improvements, enhanced interpretation, improved signage, and site resource monitoring. In addition, a variety of positive cumulative effects would influence visitor experience in the GGNRA.

### **4.10.5 Impacts of Alternative B - Enhanced Existing**

#### **OPTION B1**

Selection of Option B1 would include the components common to all action alternatives as described above, in addition to the changes specific to this alternative as described below. With selection of Option B1, the four existing stables would remain but facility improvements and operational changes would occur at all four sites (see Chapter 2.3.3 for a detailed list of proposed enhancements to the existing facilities). As many as 100 horses would be stabled at the facilities during the dry season, and the wet season total would retain the 76-horse capacity.

**Construction.** Construction-related impacts would be the same as those described for all action alternatives.

**Soundscapes/Noise.** Soundscapes/Noise-related impacts would be the same as those described for all action alternatives.

**Inside Equestrian Stables Permitted Areas.** Under Option B1, the total number of overnight horse capacity remains unchanged from Alternative A (76); however, increased public outreach programs could potentially increase the number of equestrian visitors. In general, increased use of the stables due to public outreach programs is not expected to substantially impair the visitor experience of the equestrian users, park partners, or other park visitors, as this use would be consistent with the purpose of the stables. In general, Visitor Experience-related impacts would be the same as those described for all action alternatives.

Collectively, the rehabilitation and interpretation of historic structures would result in long-term, localized benefits to visitor experience related to infrastructure improvements, increased accessibility, and furtherance of the understanding of the historic significance of the stables.

**Outside Equestrian Stables Permitted Areas.** As stated under the No Action Alternative, the focus of this EA is the equestrian stables; however, the increased use of nearby trails due to increased public outreach programs has the potential to negatively affect visitor experience for those visiting

park trails and beaches during times when equestrian groups are present. This could include those visitors who may have a negative experience concerning horse manure on the trails, expectations of an experience marked **by solitude, as well as those with expectations of experiencing park's resources** that are unaffected by what they may perceive as crowding. The likelihood of conflict is elevated by the use of the nearby trails by recreationists with inherent conflicting expectations about trail use and experience (e.g., mountain bikers and hikers).

That said, several measures would be implemented to minimize negative effects to non-equestrian Park visitors. For one, the Best Management Practices (BMPs) described in Appendix B, would be implemented as part of all action alternatives. The BMPs are designed to reduce erosion, prevent the introduction of noxious weeds, improve water quality and protect natural and cultural resources and may include the regular clean-up of manure along trails within a certain distance from **the stables or the use of sanitation sack or "horse diapers"**. In addition, per Mitigation measure VE-4, Trail Etiquette Suggestions would be posted at the stables to increase equestrian awareness and consideration of other users and the **"leave no trace" ethic** (e.g., recommended use of sanitation sack, noise kept to minimum, efforts not to disturb other visitors etc.). The selection of specific outreach programs should take into consideration the coordination of the use of trails to minimize potential impacts to other recreationists. For instance, some programs could be restricted as to how many groups may visit and when they may visit. It is likely with the implementation of these measures that the continued equestrian use at the stables sites would result in negligible, short-term, localized and/or intermittent long term adverse effects to visitor experience, particularly for visitors in the area during weekdays.

Access limitations and the potential for conflicts between equestrian groups and other park visitors would be generally as described under Alternative A. With the increased number of public outreach programs, some additional impacts arising from increased use of existing trails is likely, both as a result of direct conflicts between equestrian user groups and other visitors, as well as the potential for resource degradation and related degradation of the visitor experience. However, the site management program would identify and ameliorate any issues at locations where there is resource degradation, consistent overcrowding, or conflicts between park visitors. As such, impacts would be kept to no more than short-term, negligible to minor and localized.

**Cumulative Impacts.** Cumulative impacts of Option B1 are similar to those described for the No Action Alternative; however, this alternative would permanently increase visitor use at the stables. The alternative would contribute to additional cumulative short-term impacts on visitor experience as a result of construction, while providing long-term benefits related to improved facilities and infrastructure, and additional interpretive opportunities. Overall, while there may be some adverse impacts, cumulative visitor experience impacts are anticipated to be long-term and beneficial.

**Conclusions.** Project construction is anticipated to lead to short-term, localized minor to moderate adverse effects related to restricted access, circulation/parking alterations, and effects to soundscapes. Over the long term, impacts to visitor experience under Option B1 would be beneficial as a result of historic building rehabilitation, increased public outreach capacity, historic building rehabilitation, utility/infrastructure improvements, enhanced interpretation, improved signage, and resource monitoring. In addition, a variety of positive cumulative effects would influence visitor experience in the GGNRA.

## **OPTION B2**

Option B2 would include all of the same improvements to the facilities as described in Option B1; however, selection of this alternative would close the existing Lower Tennessee Valley stables and

convert certain facilities at Tennessee Valley to Park Horse Patrol. Those proposed activities that could have impacts to visitor experience are discussed briefly below.

**Construction.** During restoration of Lower Tennessee Valley site and the removal of facilities, short-term construction related impacts as described in Chapter 2 could occur to visitors along Tennessee Valley Trail in the immediate vicinity of the site. However, this impact is considered similar to the construction of enhanced facilities proposed under Option B1.

**Inside Equestrian Stables Permitted Areas.** The removal of Park Horse Patrol equestrian facilities from Lower Tennessee Valley would reduce the use of vehicles and improve visitor experience along Tennessee Valley Trail. Additionally, relocating Park Horse Patrol to upper Tennessee Valley would concentrate more parking at that site, which could increase parking congestion there (although this addition may be negligible), and would increase circulation (delivery trucks, farrier visits, etc) at Tennessee Valley.

**Outside Equestrian Stables Permitted Areas.** Relocating all horses and programs at Lower Tennessee Valley to Tennessee Valley would result in the shared use of some facilities with other users at the stables. The use of these common facilities would be determined through consultation with park partners and appropriate design during planning. Changes involving the Golden Gate Dairy stables operations would be locally discernable to staff, park partners and the general public. Because these discernable changes would be noticeable to the general public, impacts would be moderate.

**Cumulative Impacts.** The Plan-related cumulative impacts for Option B2 would be the same as those described under B1.

**Conclusions.** Overall, the Plan-related visitor experience impacts for Option B2 would be similar to those described under B1. It is not expected that the change in location of the Park Horse Patrol would have any effect to visitor experience assuming that the management and operation of Park Horse Patrol remain similar to existing conditions.

## 4.10.6 Impacts of Alternative C - Consolidation

Selection of Alternative C would include the components common to all action alternatives, described in section 2.3.2, in addition to the changes specific to this alternative as described below. Alternative C would reduce the number of stables in the Park by consolidating the four existing stables into two existing sites: Tennessee Valley and Rodeo Valley. Under Alternative C, the horse capacity in stalls drops from 76 to 72. The impacts of Alternative C would be similar to those described under Alternative B with the following additional remarks.

### 4.10.6.1 Construction

This alternative would result in expanded construction activities at Rodeo Valley and Tennessee Valley stables, reduced construction at Golden Gate Dairy and the removal of Lower Tennessee Valley equestrian facilities as described under Option B2. Construction of buildings and related construction impacts would be generally as described for Option B1 and B2. The construction of new buildings would be slightly greater at Tennessee Valley and Rodeo Valley stables and reduced at Golden Gate Dairy, therefore the impact conclusions and mitigation for this alternative would be similar as those described under Option B1. The impacts at Lower Tennessee Valley would be similar to those described under Option B2 (short-term negligible to moderate adverse impacts with mitigation).

#### **4.10.6.2 Inside Equestrian Stables Permitted Areas**

Under Alternative C, the total number of equestrian stables declines from four sites to two sites and the number of stalls declines from 76 (Alternative A) to 72. The result is a change in the geographic distribution of the equestrian stables which is considered a potentially significant effect to equestrian visitors in particular. The total number of horses boarded at the stables would decline from 76 to 72 which would be a minor impact to equestrian visitors.

The stable enhancements would include a variety of factors which would improve the visitor experience for equestrian users at Rodeo Valley and Tennessee Valley stables.

Under Alternative C, Golden Gate Dairy stables would be available for short-term day use by visiting equestrians as a place to tie horses. Impacts would be long-term, negligible to minor and localized.

#### **4.10.6.3 Outside Equestrian Stables Permitted Areas**

Impacts would be as described for Alternative B; short-term, negligible to minor and localized and intermittent long-term.

#### **4.10.6.4 Cumulative Impacts**

Cumulative impacts of Alternative C are similar to those described for the No Action Alternative. The alternative would contribute to additional cumulative short-term impacts on visitor experience as a result of construction, while providing long-term benefits related to improved facilities and infrastructure, and additional interpretive opportunities. Overall, while there may be some adverse impacts, cumulative visitor experience impacts are anticipated to be long-term and beneficial.

#### **4.10.6.5 Conclusion**

Impacts and mitigation would be generally as described for Alternative B (short-term, localized minor to moderate adverse effects during construction, beneficial long-term effects), with additional long-term localized benefits associated with the renovated buildings.

### **4.10.7 Impacts of Alternative D - Dispersed and Expanded**

Alternative D would result in utilization of three of the existing stable locations and the development of two new stable locations with a maximum capacity of 88 equestrian stalls. Tennessee Valley, Golden Gate Dairy, and Rodeo Valley stables would remain as equestrian sites. Golden Gate Dairy horses will be decreased from 11 to four." New stables would be developed at Lower Redwood Creek and Marincello sites which would involve the following:

Marincello (new site development). Construction/installation of a Park Horse Patrol office, parking areas, turn-outs, stalls/paddocks, hay storage facilities, manure sheds, tack sheds, storage sheds and covered ring. In addition, the existing access road would be paved and improved to facilitate drainage and make vehicle access easier.

Lower Redwood Creek (new equestrian site development). The existing small pond would be drained and removed and the nursery shade structure also removed. Existing residence would be remodeled **to be used for a caretaker's residence.** The driveway through the facility would be improved with grading and graveling. Stalls, paddocks, pump/generator, hay/feed facilities, manure shed,

tack/storage sheds and a turnout would all be installed or constructed. Also, a covered ring, parking area, turn-outs, new office facility and additional trailer parking lots would be constructed.

All the beneficial visitor experience associated with Alternative B (Enhanced Existing) would be expected under Alternative D; however some additional construction-related impacts would occur as a result of construction at currently undeveloped areas. Construction, relocation or improvements to each of the sites would involve some level of ground disturbance and thus increase the possibility of localized visitor impacts.

#### **4.10.7.1 Construction**

This alternative would result in significant construction activities at Marincello and Lower Redwood Creek. Construction of buildings and related construction visitor impacts at existing sites would be generally as described for Option B1 and B2. This alternative would require the construction of new buildings at the undeveloped sites; therefore construction-related impacts and mitigation for this alternative would be similar as those described under Option B1. The impacts at Lower Tennessee Valley would be similar to those described under Option B2 (short-term negligible to moderate adverse impacts with mitigation).

#### **4.10.7.2 Inside Equestrian Stables Permitted Areas**

Under Alternative D, the horse capacity would increase by 12, from 76 to 88 and the equestrian stables would increase by one, from four to five. In general, this increased use of the stables, due to public outreach programs, is expected to have beneficial impacts to visitor experience for equestrian users, park partners, and other park visitors. Golden Gate Dairy horses will be decreased from 11 to four. This use would be consistent with the purpose of the stables.

In addition, as with Alternative B, stable enhancements would include a variety of factors which would improve the visitor experience for equestrian users and general park visitors.

#### **4.10.7.3 Outside Equestrian Stables Permitted Areas**

As with Alternative B, the increased use of nearby trails due to public outreach programs has the potential to negatively affect visitor experience for those visiting park trails and beaches during times when equestrian groups are present. This alternative would require the same measures described under Alternative B such as Trail Etiquette Suggestions posted at the stables to increase equestrian awareness and consideration of other users and the "leave no trace" ethic (e.g., recommended use of sanitation sack, noise kept to minimum, efforts not to disturb other visitors etc.). Similarly, the selection of specific outreach programs should take into consideration the coordination of the use of trails to minimize potential impacts to other recreationists. For instance, some programs could be restricted as to how many groups may visit and when they may visit. It is likely with the implementation of these measures that the continued equestrian use at the stables sites would result in negligible, short-term, localized adverse effects to visitor experience, particularly for visitors in the area during weekdays.

#### **4.10.7.4 Cumulative Impacts**

Cumulative impacts of Alternative D are similar to those described for the No Action Alternative. The alternative would contribute to additional cumulative short-term impacts on visitor experience as a result of construction, while providing long-term benefits related to improved facilities and

infrastructure, and additional interpretive opportunities. Overall, while there may be some adverse impacts, cumulative visitor experience impacts are anticipated to be long-term and beneficial.

#### **4.10.7.5 Conclusion**

Project construction is anticipated to lead to short-term, localized minor to moderate adverse effects related to restricted access, circulation/parking alterations, and effects to soundscapes. Over the long term, impacts to visitor experience under Alternative D would be beneficial as a result of significant increased public outreach capacity, historic building rehabilitation, utility/infrastructure improvements, enhanced interpretation, improved signage, and resource monitoring. In addition, a variety of positive cumulative effects would influence visitor experience in the GGNRA.

### **4.10.8 Mitigation Measures**

#### ***VE-1: Construction Management Plan***

For each phase of work, a construction management plan would be developed to carefully sequence construction activities to minimize disruption to existing facilities and services. The plan shall be submitted and approved by NPS and would include information on days/hours of operation, times in which particularly loud or noisy operations could occur, how equipment would be maintained, how noise and disruption would be minimized, safety protocols, etc.

#### ***VE-2: Construction Exclusion Areas- Visitor Restrictions***

During construction, oversight would be provided to ensure that all active construction, staging, and stockpile areas are fenced to render them inaccessible to the public. To minimize visual intrusiveness of fencing, it would be designed and installed to blend into the surrounds as much as possible. All construction, staging, and stockpile access would be gated and kept locked except when in use. Signs would be conspicuously posted to inform the public about the need for caution and to safely route visitors around construction areas. Established and maintained walkways would be provided across the site, as well as barrier fencing along trails and paths.

#### ***VE-3: Construction Related Noise Control***

(see full description in section 4.10.2 and in **Table 2-12**)

#### ***VE-4: Posted Trail Etiquette Recommendations***

Trail Etiquette Recommendations would be posted at the stables/trailheads to increase equestrian awareness and consideration of other users and the "leave no trace" ethic. The signs could include recommended use of equestrian sanitation sack, noise kept to minimum, public safety around horses, protection measures concerning natural and cultural resource and efforts not to disturb other visitors, etc.

#### ***TR-1: Traffic Control Plan***

A traffic control plan would be developed in conjunction with the construction documents for review and approval by NPS. This plan would include information on construction phases and duration, traffic scheduling, staging area management, visitor safety, construction equipment travel routes, detour routes, parking area closures, and pedestrian and bicyclist movements on adjacent routes.

## 4.11 Transportation

### 4.11.1 Guiding Regulations and Policies

Under certain alternatives, equestrian visitors may need to share parking facilities with other park users (employees, other park visitors, park partners). An increase in visitors to certain equestrian sites could affect circulation and parking in and around these sites. Certain alternatives may result in increased vehicle trips and trail riders associated with various stable sites. This has the potential to affect the enjoyment of other recreational resources and soundscapes.

Other than access/circulation at the stable sites, the Plan does not propose changes to transportation facilities, and impacts to roads were not included in the scope of this analysis. However, each stable site has parking facilities that could be affected by Plan-related changes. NPS Management Policies (NPS 2006, section 9.2.4) **states that "permanent parking areas** would not normally be sized for the peak use day, but rather for the use anticipated on the average weekend day during the peak season."

### 4.11.2 Assessment Methods

Impact intensities for circulation in and around the stable sites and for parking utilization are defined below. This includes an analysis of trailer parking with a minimum ratio of one two horse trailer for every four horse stalls. It is important that visiting horses have access to trailers as there may be tack, feed, medications, etc. stored in the trailer.

Best professional judgment was used in comparing changes in circulation, parking, and enjoyment of other recreational resources and soundscapes with the threshold levels.

**Circulation.** The following impact thresholds were established for traffic circulation in and around the stable sites:

Negligible: The change in daily traffic at a stable site would not be perceptible.

Minor: The change in daily traffic at a stable site would be slightly perceptible.

Moderate: The change in daily traffic at a stable site would be moderately perceptible.

Major: The change in daily traffic at a stable site would be very perceptible.

**Parking Utilization.** The following impact thresholds were established for parking utilization, including trailer parking, at each site:

Negligible: There would not be a perceptible change in the current parking balances and/or imbalances.

Minor: A change in the current parking balances and/or imbalances would be slightly perceptible.

Moderate: A change in the current parking balances and/or imbalances would be moderately perceptible.

Major: A change in the current parking balances and/or imbalances would be very perceptible.

**Enjoyment of Other Recreational Resources and Soundscapes.** The following impact thresholds were established for enjoyment of other recreational resources and soundscapes at each site:

Negligible: There would not be a perceptible change in the enjoyment of other recreational resources and soundscapes.

Minor: A change in the enjoyment of other recreational resources and soundscapes would be slightly perceptible.

Moderate: A change in the enjoyment of other recreational resources and soundscapes would be moderately perceptible.

Major: A change in the enjoyment of other recreational resources and soundscapes would be very perceptible.

### 4.11.3 Impacts of Alternative A - No Action

Under this alternative, there would be no Plan-related changes to traffic circulation, parking utilization, or the enjoyment of other recreational resources or soundscapes. As such, there would be no impacts, cumulative or otherwise.

### 4.11.4 Impacts Common to All Action Alternatives

Under all alternatives, changes in sound levels from additional vehicular traffic associated with increased public programs would be imperceptible to the visiting public. Therefore, the impact of new traffic on the soundscape would be negligible.

All action alternatives include accommodation of the trail along State Route 1 at the Golden Gate Dairy. This would be a long-term moderately beneficial effect that facilitates human circulation at the stable site and helps implement a portion of GGNRA trail planning.

Under all alternatives, parking at the Golden Gate Dairy site would continue to be impacted by **volunteer firemen's cars at fire station events or meetings** as long as the volunteer fire department remains at the site. None of the alternatives would increase parking demands at the site; therefore, the impact on parking demands at the Golden Gate Dairy would be negligible.

### 4.11.5 Impacts of Alternative B - Enhanced Existing

#### OPTION B1

**Short-term impacts.** For each stable site, traffic volume associated with additional contractor vehicles and equipment would be very small. This would be anticipated to have negligible effects on traffic circulation on local access roads and in and around the stable sites. While construction activities would utilize some parking spaces, construction would occur on weekdays when excess parking is available. Minor adverse parking impacts are possible on an infrequent basis, but overall, parking impacts would be considered negligible. In addition, Mitigation Measure TR-1 (**Construction Traffic Control Plan**) would be implemented to further ensure that any adverse impacts are minimized.

**Long-term impacts.** Under Option B1, there would be no change in the number of horses stabled at each site. A small amount of additional vehicular traffic associated with an increase in public programs as called for in the business plan can be anticipated. The additional traffic at the stable sites could be slightly perceptible by some visitors, therefore minor long-term impacts to traffic circulation in and around Golden Gate Dairy, Tennessee Valley, and Rodeo Valley stables could occur on busy weekdays and on weekends. Tennessee Valley stables would be the least affected since that site already has public programming in place.

While the impact of additional public programs on parking utilization would generally be negligible, it is likely that a change in parking balance would be slightly perceptible. Therefore, there would be infrequent minor to moderate impacts on parking utilization on busy weekdays, as well as on weekends when parking capacities at Golden Gate Dairy, Tennessee Valley, and Rodeo Valley stables would already be affected by other park users. Similar to traffic effects, Tennessee Valley stables would be the least affected since that site already has public programming in place. This is consistent with NPS Management Policy, section 9.2.4, which directs that permanent parking areas are sized "... for the use anticipated on the average weekend day during the peak season." Implementation of Mitigation Measure TR-2 (*Parking Monitoring and Outreach*) would help alleviate impacts. Parking improvements described in the *Marin Headlands and Fort Baker Transportation Infrastructure and Management Plan* (NPS 2009b) for the Rodeo Valley stable are expected to reduce parking impacts at that location, resulting in minor long-term parking impacts at that site when the improvements are constructed.

The number of horses stabled and used at each location would not change, but with increases in public programs, there may be an increase in ridership on trails in the GGNRA. This change could be slightly perceptible to an aware public and represent a minor impact to the enjoyment of other recreational resources and soundscapes by some other park users.

**Cumulative Impacts.** Short-term construction impacts to circulation would be limited to the individual equestrian sites and have no direct, indirect or cumulative impacts elsewhere. Each stable is accessed by different public roads. The increase in traffic attributable to increased public programs at the stables would be imperceptible offsite. A negligible adverse cumulative impact on circulation throughout the GGNRA is expected. While Option B1 may intermittently create slightly higher parking demands at each stable site, parking supplies within the GGNRA are not reduced, and parking is not affected at other locations. Therefore, there is no cumulatively adverse impact to parking supplies. While there would be no change in the number of horses stabled at any of the equestrian sites, cumulative impacts throughout the GGNRA to the enjoyment of other recreational resources and soundscapes could be moderate due to the combination of existing trail uses, additional ridership of the trails associated with the Plan, and potential implementation of a trail ride rental horse program.

**Conclusions.** During construction under Option B1, negligible short-term impacts would occur to circulation in and around stable sites, and negligible to minor short-term effects to parking would occur. Minor long-term impacts to circulation would occur on busy weekdays and on weekends. Minor to moderate long-term impacts would occur to parking resources, and minor impacts to the enjoyment of other recreational resources by some other park users are expected. There would be negligible adverse cumulative impacts on circulation in the park, no cumulative impact to GGNRA parking supplies, and moderate cumulative impacts to the enjoyment of other recreational resources and soundscapes.

## OPTION B2

**Short-term impacts.** Option B2 would have the same short-term construction impacts as Option B1. In addition, there would, at times, be a perceptible change in the enjoyment of recreational resources and soundscapes on the multi-use Tennessee Valley trail with construction and hauling equipment accessing the Lower Tennessee Valley site. Since the equipment would use the trail on an intermittent basis, the short-term impact would be moderate. Mitigation Measure TR-1 (*Construction Traffic Control Plan*) would be implemented to further ensure that any adverse impacts are minimized.

**Long-term impacts.** Long-term impacts of Option B2 would be essentially the same as for Option B1. What is different for Option B2 is that traffic circulation at the Lower Tennessee Valley site would be reduced by approximately 12, to a total of 6 round trips because the Park Horse Patrol would no longer use the Tennessee Valley Trail for access. The Park Horse Patrol would continue to utilize Tennessee Valley Road, but would instead access its new facilities at the Tennessee Valley stables. Due to its low traffic numbers, Park Horse Patrol staff would have a negligible impact on circulation at the Tennessee Valley site. Therefore, the impact to traffic circulation in and around each stable site would remain negligible for Option B2.

Option B2 impacts on parking supply would be the same as for Option B1 because the Park Horse Patrol would have its own dedicated parking at the Tennessee Valley site, and would not reduce the amount of parking for other staff and visitors.

Option B2 would have the same minor impact to the enjoyment of other recreational resources and soundscapes by other park users as Option B1.

**Cumulative Impacts.** Cumulative impacts of Option B2 would be the same as for Option B1.

**Conclusion.** All transportation-related impacts of Option B2 would be the same as for Option B1.

### 4.11.6 Impacts of Alternative C - Consolidated

**Short-term impacts.** Alternative C would have the same short-term impacts as Option B1. In addition, there would, at times, be a perceptible change in the enjoyment of recreational resources and soundscapes on the multi-use Tennessee Valley trail with construction and hauling equipment accessing the Lower Tennessee Valley Site. Since the equipment would use the trail on an intermittent basis, the impact would be moderate. Mitigation Measure TR-1 (*Construction Traffic Control Plan*) would be implemented to further ensure that any adverse impacts are minimized.

**Long-term impacts.** Under Alternative C, operations would cease at two of the existing equestrian facilities, Golden Gate Dairy and Lower Tennessee Valley. Park Horse Patrol would be relocated to Tennessee Valley. The number of horses stabled at Tennessee Valley stables would increase by six and at Rodeo Valley stables by five. There would be decreased traffic circulation at Golden Gate Dairy and Lower Tennessee Valley sites. Because there are currently no public programs at the Golden Gate Dairy or Lower Tennessee Valley sites, Alternative C increases in traffic associated with increased public programs would be the same as for Option B1. However, increases in stabled horse-related traffic in combination with the increases in public programs would likely result in moderate impacts to traffic circulation in and around the Tennessee Valley and Rodeo Valley stable sites.

This same combination of additional horse and public program demand for parking would be moderately perceptible and result in moderate impacts to parking utilization on busy weekdays and on weekends when parking capacity in the area would already be affected by other park users.

Implementation of Mitigation Measure TR-2 (*Parking Monitoring and Outreach*) would help alleviate impacts. Parking improvements described in the *Marin Headlands and Fort Baker Transportation Infrastructure and Management Plan* (NPS 2009b) for the Rodeo Valley stable are expected to reduce parking impacts at that location, resulting in minor long-term parking impacts at that site when the improvements are constructed.

Although the number of horses stabled and used overall at the GGNRA would not substantially change, increases in public programs and a concentration of horses at the Rodeo Valley site would likely result in a noticeable increase in ridership on its surrounding trails. This change could be moderately perceptible and represent a moderate impact locally to the enjoyment of other recreational resources and soundscapes by some park users. At the Tennessee Valley site, a negligible increase on trail use is expected because of the already existing programs and because most programs are ring classes that utilize trails to a lesser extent than do boarders.

**Cumulative Impacts.** The small increase in traffic created by an increase of six horses stabled at Tennessee Valley and five horses stable at Rodeo Valley, along with increased public programs at the stables (primarily at Rodeo Valley) would likely be imperceptible on the major roads away from the equestrian sites. A negligible adverse cumulative impact on circulation throughout the GGNRA is expected. While, under Alternative C, the Plan may intermittently create moderately higher parking demands at each stable site, parking supplies within the GGNRA are not reduced, and parking is not affected at other locations. Therefore, there is no cumulatively adverse impact to parking supplies. The increase in horses on trails in combination with other uses, such as a trail ride rental horse program, could result in a moderately perceptible change by an aware public around the Tennessee Valley and Rodeo Valley stables. A moderate cumulative impact could result.

**Conclusion.** Short-term construction impacts of Alternative C would be the same as for Option B1 plus moderate short-term impacts to Tennessee Valley Trail. Moderate long-term impacts to circulation would occur at Tennessee Valley and Rodeo Valley sites. Moderate long-term impacts would occur to parking resources and to the enjoyment of other recreational resources and soundscapes by some other park users. Negligible adverse cumulative impacts on circulation in the park and no cumulative impact to GGNRA parking supplies would occur. There would be a moderate cumulative impact to the enjoyment of other recreational resources and soundscapes by some park users due to additional trail ridership.

#### 4.11.7 Impacts of Alternative D - Dispersed and Expanded

**Short-term impacts.** Alternative D would have the same short-term impacts as Option B1. In addition, there would, at times, be a perceptible change in the enjoyment of recreational resources and soundscapes on the multi-use Tennessee Valley trail with construction and hauling equipment accessing the Lower Tennessee Valley Site. Since the equipment would use the trail on an intermittent basis, the impact would be moderate. Mitigation Measure TR-1 (*Construction Traffic Control Plan*) would be implemented to further ensure that any adverse impacts are minimized at these locations. The two new sites, Lower Redwood Creek and Marincello, lack any formal recreational facilities, therefore there would be no short-term impact to parking resources at those locations.

**Long-term impacts.** The long-term traffic circulation impacts associated with Alternative D at existing equestrian sites would be similar to that of Alternative C (minor, with the Golden Gate Dairy site having four more horses than under Alternative C (instead of none) and the Tennessee Valley site having four fewer horses. Other differences between Alternatives C and D are that under D, the Park Horse Patrol would be relocated to the new Marincello site and the Lower Redwood Creek stables would be developed. The decrease at Golden Gate Dairy from 11 horses in Alternatives A and B to

four horses would have beneficial circulation impacts. Circulation at the new Lower Redwood Creek and Marinicello sites would be designed to accommodate demands, thus no new circulation or parking impacts would occur at those locations. There would be 12 additional horses stabled at GGNRA under Alternative D, and the Lower Redwood Creek site would offer additional public programs and associated traffic. However, some of this traffic is transferred from Golden Gate Dairy, and because of the relatively low number of additional vehicles per day generated in a regional context and the distribution of these vehicle trips among the three different access roads to the GGNRA equestrian sites (SR1 on the west, Tennessee Valley Road on the north, and Bunker Road connecting with Alexander Avenue in Sausalito at the south), the overall increase in horses stabled at the GGNRA would result in negligible impacts to the regional circulation system.

Impacts to parking utilization for Alternative D would be similar to that for Alternative C, with slightly lower impacts at Tennessee Valley. There would be no impacts to the Lower Redwood Creek and Marinicello sites because adequate parking would be part of facility design.

Alternative D would result in the highest number of horses stabled at GGNRA, with a 13.6% increase over the existing condition. This factor combined with increases in public programs, may result in a noticeable increase in ridership on trails in the GGNRA. This change could be moderately perceptible to an aware public and represent a moderate impact locally to the enjoyment of other recreational resources and soundscapes by some park users.

**Cumulative Impacts.** Alternative D would have similar cumulative impacts to Alternative C.

**Conclusion.** During construction, short-term impacts of Alternative D would be the same as for Option B1, but with a moderate short-term impact to Tennessee Valley trail. Moderate long-term impacts to circulation would occur at Tennessee Valley and Rodeo Valley sites; reduced circulation at Golden Gate Dairy would have a beneficial effect. Moderate long-term impacts would occur to parking resources and to the enjoyment of other recreational resources and soundscapes by some other park users. Cumulative impacts would be the same as for Alternative C.

### 4.11.8 Mitigation Measures

**TR-1: Construction Traffic Control Plan.** A traffic control plan would be developed in conjunction with the construction documents for review and approval by NPS. This plan would include information on construction phases and duration, traffic scheduling, staging area management, visitor safety, construction equipment travel routes, detour routes, parking area closures, and equestrian, pedestrian and bicyclist movements on adjacent routes.

**TR-2: Parking Monitoring and Outreach.** NPS would require that each stable operator monitor parking to identify management issues in a timely manner and work with NPS and other partners to seek timely solutions. Operators would provide information on alternative transportation and parking availability to all visiting groups and encourage groups to provide that information to their members.

## 4.12 Visual Resources

### 4.12.1 Guiding Regulations and Policies

The Organic Act of 1916 act states that The National Park Service "shall promote and regulate the use of Federal areas known as national parks, monuments, and reservations hereinafter . . . to conserve the scenery and the natural and historic objects and the wildlife therein..." (16 USC 1).

NPS *Management Policies 2006* state that the enjoyment of park resources and values is part of the fundamental purpose of all parks, and that scenery is included in those resources. Scenic values are subject to the no-impairment standards (NPS 2006a, sec. 1.4.6).

The pastoral setting: Public comment was supportive of the value of viewing horses at the rural and old military sites. This pastoral value is recognized by the park service in this EA. In several of the action alternatives the stables where horses can be viewed changes; horses are removed from some sites or added to others.

## 4.12.2 Assessment Methods

### **Key Observation Points**

The analysis of effects to visual resources as a result of the alternatives is based on observation points in the vicinity of each of the stables locations. **These are referred to as "key observation points" (KOP)** herein. The key observation points were selected by the interdisciplinary team as likely points from which visitors would view the sites from nearby areas. The list below and **Figure 4-1 "Aerial View of Project Area with Key Observation Points"** identify the locations of the key observation points. **Figures 4-2 through 4-6** display the views to each site from each key observation point.

### **Key observation points for each stables site:**

#### **Golden Gate Dairy:**

1. Pacific Way at Highway 1 near Pelican Inn, view to north
2. Dias Ridge Trail, view to southwest
3. Dias Ridge Trail, view to west

#### **Tennessee Valley stables:**

1. Tennessee Valley Trailhead parking lot, view east
2. Tennessee Valley Trail, view east
3. Old Springs Trail, view north
4. Old Springs Trail, view north

#### **Lower Tennessee Valley stables:**

1. Tennessee Valley Trail, view east

#### **Rodeo Valley stables:**

1. Coastal Trail at Conzelman Road, view north
2. Bunker Road, view to southwest
3. Bunker Road at stables, view to south

#### **Lower Redwood Creek:**

1. Muir Woods Road at entrance drive to Muir Beach Community Services District, view to west
2. Heather Cutoff Trail, view to northeast
3. Franks Valley, view to south

#### **Marincello Road:**

1. Marincello Trail below site, view northeast
2. Marincello Trail above site, view southeast

The assessment of impacts considers whether the resulting visual changes would have an adverse or beneficial effect on a scenic vista, would substantially damage or improve scenic resources, or substantially degrade or improve the existing visual character of the site. The degree to which an alternative would affect the visual resources of the landscape (either adversely or beneficially) is linked to the degree of visual change or contrast that would be created by its implementation. Specifically, impacts to scenic resources are determined by analyzing the ability of the alternatives to preserve or improve the scenic qualities of the area, including scenic or historic vistas, vegetation, and landforms.

### ***Duration of Impacts***

**Short-term:** Effects would be temporary and related to construction, restoration, or demolition activities.

**Long-term:** Effects would be permanent and continual.

### ***Type of Impacts***

**Beneficial impacts** would enhance the existing landscape character, enhance access to historically important viewpoints or to a sequence of viewpoints, or enhance the visibility of a viewpoint or sequence of viewpoints.

**Adverse impacts** include effects that would reduce the existing landscape character, reduce access to historically important viewpoints or to a sequence of view-points, or reduce the visibility of a viewpoint or sequence of viewpoints.

### ***Thresholds***

**Negligible:** The impact to visual character and views would be imperceptible or not detectable. Effects would be noticed by few people within the vicinity of the impacts; however, the impacts would not dominate either the foreground or background.

**Minor:** The impact to the visual character and views would be slightly detectable or localized within a relatively small area. Most of the landscape character would be retained with the alteration of small elements. Changes to the visual character would be detectable but they would not appreciably alter important landscape characteristics or views, and scenic quality would not be negatively affected. The landscape would have the capability to visually absorb most of the changes.

**Moderate:** The impact to the visual character and views of the site would be readily apparent (e.g., the landscape character would change). One or more secondary features or views would be altered but key features or views would remain intact. Effects would dominate the foreground vistas and be noticeable by most people, but the effects would not dominate the broader landscape character and viewshed.

**Major:** The impact would be substantial, highly noticeable, and/or result in changing the character of the landscape in a way that would cause substantial degradation or improvement. Key features of views would change. A majority of foreground and background viewsheds would be dominated by changes and/or impacts would be noticed over large distances.

### 4.12.3 Impacts of Alternative A - No Action

Under this alternative, the stables configuration would remain unchanged from current conditions, as depicted in Chapter 2, **Figures 2-2** through **2-6**. Views from the key observation points under the No Action alternative are those shown in **Figures 4-1** to **4-11**.

#### **Construction**

There would be minor construction activities under this alternative; therefore there would be minor visual impacts from construction visible within the site.

#### **Views within the Stable Area**

There would be no changes except those described for accessibility under this alternative; therefore there would be minor visual impacts visible within the site.

#### **Views from Outside the Stables Areas**

There would be no enhancement activities under this alternative; therefore there would be no visual impacts.

#### **Cumulative Impacts**

The No Action Alternative would not contribute to any cumulative impacts.

#### **Conclusion**

There would be no changes except those described for accessibility under this alternative; therefore there would be minor visual impacts visible within the site.

### 4.12.4 Impacts Common to All Alternatives

#### **Elements Common to all Action Alternatives**

The facilities removed, remodeled or added in Common to all Action Alternatives are detailed in **Table 2-5**. Included are:

- The Balloon Hanger at the Rodeo Valley site would continue to be used by a lessee or the NPS after repair. Repair would be a minor beneficial visual impact.
- Each stable site would have a dwelling unit, water storage, feed and manure structures, toilets, parking, horse trailers and other structures associated with stables operations. These would be visible and developed to be visually compatible with such development within the park setting.
- Golden Gate Dairy would have a trail segment and a bus stop located along the highway, and non-historic stalls would be removed from the front center and rear of the site, a minor beneficial visual impact.

#### **Construction**

Under all action alternatives, construction-related visual impacts would vary in intensity over the term of construction activity. The primary visual effects would be related to areas of disturbed ground, buildings and landscaping in various states of construction/rehabilitation, the presence/use of staging areas for equipment, vehicles and stockpiles, and the use/presence of heavy equipment throughout the project area. The majority of the building rehabilitation activities would involve interior work and would not be visible.

Construction staging area(s) would be located within or in close proximity to the stables so as to minimize the area of disturbance. Specific sites would be established during the design phase. Equipment (e.g., graders, excavators, loaders, dump trucks, etc.) to be used in expansion and improvement activities would be stored at staging sites.

It is likely that the presence of construction activities, staging areas and heavy equipment would be visible from the key observation points during construction. From the key observation points from which analysis was conducted, views of many areas of the stables are masked by trees or structures which could mitigate visual impacts of staging and heavy equipment use. Implementation of Mitigation Measure **VR-1 (Minimization of Construction-Related Visual Impacts)** would help minimize impacts.

### **Views within the Stables Area**

Under all alternatives, at the historic sites (Golden Gate Dairy, Tennessee Valley and Rodeo Valley stables) any building rehabilitation and construction would be in compliance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* and would be guided by the *Marin Equestrian Stables Plan Cultural Resource Workshop Report*. As a result, when completed, all historic sites and structures would continue to resemble the general construction techniques of the existing structures. At the non-historic sites (Lower Redwood Creek, Marincello, and Lower Tennessee Valley) buildings and structures would be carefully sited, and would be of scale, design and material compatible with the site and surroundings. **Depending on a visitor's location and perspective, adverse effects to the park's visual resources could range from negligible to minor, long-term, direct, and localized.**

### **Views from Outside the Stables Area**

Impacts would be as described under *Views within the Stables Area*, above; with negligible to minor negative visual impacts and minor beneficial impacts.

### **Cumulative Impacts**

A variety of NPS projects have affected the visual character of surrounding lands in the last few decades. Under the MHFB Transportation Plan (NPS 2009), construction activities would have short-term minor adverse effects. However, minimizing the intrusion of automobiles and encouraging alternative modes of transportation to the area would have long-term benefits to the visual resources in the vicinity of the stables.

Under the Fire Management Plan for Golden Gate National Recreation Area, prescribed burns and the reduction of fuel hazards near historic structures and heavily developed areas would have short-term, adverse negligible to minor impacts and long-term benefits to visual resources (viewsheds) (NPS 2005a).

In summary, in combination with the Marin Equestrian Stables Plan, short-term negligible to minor adverse cumulative impacts are anticipated, along with long-term benefits to visual resources surrounding the area.

### **Conclusion**

Under all action alternatives, construction activities would result in negligible to moderate, localized short-term adverse effects. Over the long term negligible to minor localized impacts would result from the installation of new structures. Impacts and mitigation would be as described for Common to All Action Alternatives and would create minor benefits over the long term; **CR-5: Treatment of Historic Properties and Landscape; VR-1: Minimize Long-term Visual Impacts; VR-2:**

**Prepare Visual Simulations during Design Phase; and VR-3: Minimization of Construction-Related Visual Impacts.**

No impairment of park resources or values is anticipated under this alternative. Because the impacts previously described (1) are not inconsistent with the park's purpose and values, (2) do not prevent the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to visual resources in the park under all the alternatives.

**4.12.5 Impacts of Alternative B - Enhanced Existing****OPTION B1*****Visible Actions by Site***

Option B1 rehabilitates all existing stables sites as stables. Visual resources remain the same as Alternative A. Impact would be long-term, minor due to changes in facilities.

***Option B1 Visible Actions by Site*****Golden Gate Dairy stables**

As under Common to All, the front central open area (Historic Core Area) would have existing stalls and some fencing removed leaving this area open and fenced. The visual change would be unimpeded views of the Creamery and Milking Barn Buildings from Highway 1, Pacific Way road, and the Pelican Inn area. Under Alternative B, Options B1 and B2, to the north and behind the Creamery and Milking Barn there would be existing stalls removed and new stalls added; portions of these would be visible from Highway 1 and from the Dias Ridge Trail above the site. To the north of the north Windbreak; there would be a 60' x 60' covered riding ring added. Portions of the roof of this structure and the half-walls and pole structure would be visible from Highway 1 and from the Dias Ridge Trail. A shed would be removed at the north side of the barn and a new manure shed would be added in approximately the same location, visible from the front of the site. Minor adverse and minor beneficial long-term impacts are anticipated.

**Tennessee Valley stables**

As noted in Common to All, the non-historic sheds and a manure pad near the stream are removed and relocated to the rear of the site. The Red Barn would be reconstructed and covered paddocks would be removed from east of the Main Barn. Under Alternative B, Options B1 and B2, a manure shed would be added to the east of the main barn, dug into the hillside. These changes would be visible from within the site. The view would be unimpeded between the Bunkhouse and the Main Barn. Minor adverse and minor beneficial long-term impacts are anticipated.

**Lower Tennessee Valley stables**

Under Option B1 the stables would have a new residence, 60 foot diameter riding ring and manure shed; these changes would be visible from within or near the site. Minor adverse long-term impacts are anticipated.

**Rodeo Valley stables**

Under Alternative B, Options B1 and B2, the changes include moving manure storage and all stall into the East Motor Vehicle Shed, and moving hay and feed storage into the front of the Balloon Hangar. A place for an overnight caretaker would be built into the West Motor Vehicle Shed and a new turnout would be fenced near the upper outdoor arena. Paddock fencing changes and a new water tank would be visible from higher elevation trails above and from within the site. Negligible adverse and minor beneficial long-term impacts are anticipated.

**Lower Redwood Creek**

In Alternative B, Options B1 and B2, and C there would be no action occurring at this site; the visual changes would be the same as the No Action Alternative A, therefore there would be no impact.

**Marincello site**

In Alternative B, Options B1 and B2, and C there would be no action occurring at this site; the visual changes would be the same as the No Action Alternative A, therefore there would be no impact.

**Construction**

**Construction impacts under** Alternative B, Option B1 at four existing stables sites would be generally as described under Impacts Common to All Alternatives (minor short-term, localized adverse effects with mitigation).

**Views from Within the Stables Area**

Impacts would be generally as described above; minor adverse to long-term localized benefits.

**Views from Outside the Stables Area**

Horse viewing opportunities remain the same as Alternative A; therefore there would be no impact to horse viewing.

No stables sites would be relocated. Impacts would be negligible to minor visual impacts.

**Cumulative Impacts**

In combination with other local projects, short-term minor to moderate adverse cumulative impacts are anticipated.

**Conclusion**

Over the long term negligible to minor localized impacts would result from the installation of new structures. Impacts and mitigation would be as described for Common to All Action Alternatives and would create minor benefits over the long term; **CR-5: Treatment of Historic Properties and Landscape; VR-1: Minimize Long-term Visual Impacts; VR-2: Prepare Visual Simulations during Design Phase; and VR-3: Minimization of Construction-Related Visual Impacts.**

**OPTION B2****Option B2 Visible Actions by Site****Golden Gate Dairy**

Under Option B2 the actions and effects would be the same as B1; Minor adverse and minor beneficial long-term impacts are anticipated.

**Tennessee Valley Stables**

Under Option B2 the changes are the same as in Option B1, except with the addition of four stalls built west of the Dias Residence near the windbreak. The uses of the structures would differ such as that the Dias residence is rehabilitated as an office instead of a residence. These changes would be visible from on and near the site (the Tennessee Valley Trailhead parking lot). Minor adverse and minor beneficial long-term impacts are anticipated.

**Lower Tennessee Valley Stables**

Horses, stalls, paddocks, horse trailers and manure shed would be removed, and native vegetation would be planted in the prior paddock locations. These changes would be visible from within the site and via a screened view from the Tennessee Valley Trail. Minor adverse and minor beneficial long-term impacts are anticipated. The removal of horses from the view would be considered a negligible to minor impact. Park Horse Patrol, Tennessee Valley stables and visiting equestrians' horses would continue to be visible on the local trails. Visual impacts will be mitigated by the relocation of Park Horse Patrol horses to the nearby Tennessee Valley stables, where they can be viewed near the Tennessee Valley parking lot.

**Rodeo Valley Stables**

Under Option B2 the actions would be the same as for Option B1 except that NPS may utilize the Balloon Hangar for long-term interim use for approximately 10 years. In that case, the West Motor Vehicle Shed would be remodeled to create a small indoor exercise ring, and hay and feed would be placed in a steel container 25 feet south of the west Motor Vehicle Shed. These changes would be visible from higher elevation trails above and from within the site. Minor adverse and minor beneficial long-term impacts are anticipated.

**Lower Redwood Creek**

In Alternatives B, Options B1 and B2, and C there would be no action occurring at this site; the visual changes would be the same as the No Action Alternative A, therefore there would be no impact.

**Marincello site**

In Alternatives B, Option B1 and B2, and C there would be no action occurring at this site; the visual changes would be the same as the No Action Alternative A, therefore there would be no impact.

**Construction**

**Construction impacts at three existing stables sites under** Option B2 would be less than in Option B1 or Alternative D and generally as described under Impacts Common to All Alternatives (minor short-term, localized adverse effects with mitigation).

**Views from Within the Stables Area**

Impacts would be generally as described above; minor adverse to long-term localized benefits.

**Views from Outside the Stables Area**

Horse viewing opportunities are somewhat reduced but can be mitigated as described above under B2, Lower Tennessee Valley, resulting in negligible impacts to horse viewing. Visual impacts would be negligible to minor long-term adverse and minor beneficial long term impacts.

**Cumulative Impacts**

In combination with other local projects, short-term minor to moderate adverse cumulative impacts are anticipated.

### **Conclusion**

Over the long term negligible to minor localized impacts would result from the installation of new structures and the reduction in the number of stables sites. Mitigation would include measures **CR-5: Treatment of Historic Properties and Landscape; VR-1: Minimize Long-term Visual Impacts; VR-2: Prepare Visual Simulations during Design Phase; and VR-3: Minimization of Construction-Related Visual Impacts**, and would create minor benefits over the long term.

No impairment of park resources or values is anticipated under this alternative. Because the impacts previously described (1) are not inconsistent with the park's purpose and values, (2) do not prevent the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to visual resources in the park under all the alternatives.

## **4.12.6 Impacts of Alternative C - Consolidated**

### **Alternative C Visible Actions by Site**

#### **Lower Redwood Creek**

In Alternatives B, Option B1 and B2, and C there would be no action occurring at this site; the visual changes would be the same as the No Action Alternative A, therefore there would be no impact.

#### **Golden Gate Dairy**

Under Common to All, the Historic Core Area at Golden Gate Dairy would have existing stalls removed, leaving this area open and fenced. The visual change would be opened views of the Creamery and Milk Barn Buildings from Highway 1, Pacific Way, and the Pelican Inn. Under Alternative C, differing from B1 and B2, the stables operations would be removed and the front turnout would be available for short term day use for **visitors'** horses. To the north and behind the Creamery and Milking Barn there would be existing stalls removed and no new stalls or 60 foot diameter covered riding ring would be added. Sheds would be removed but not replaced at the north side of the barn visible from the front of the site. Minor adverse and minor beneficial long-term impacts are anticipated.

Horses would remain intermittently in the rural scene. This change is considered a minor impact and would be mitigated by **VR-4; Day Use for Horses**, additionally; horses would continue to access the site via the trail head for Dias Ridge Trail and would be visible on the local trails.

#### **Marincello site**

In Alternative B, Options B1, B2, and C there would be no action occurring at this site; the visual changes would be the same as the No Action Alternative A, therefore there would be no impact.

#### **Tennessee Valley Stables**

Along with the Common to All actions at Tennessee Valley stables, under Alternative C a new manure shed would be added on the edge of the central core area, a hay shed would be added in the location of two covered paddocks, east of the barn; new stalls would be added on the north side of the path north of the main barn, and next to the covered tie-up stalls. The

Bunkhouse would be relocated approximately 25 feet to the north. These changes would be visible from on-site. Minor adverse and minor beneficial long-term impacts are anticipated.

#### **Lower Tennessee Valley Stables**

Under Alternative C the changes are the same as in Option B2. The removal of horses from the view would be considered a negligible to minor impact to Park Horse Patrol and Tennessee Valley stables. **Visiting equestrians' horses would continue to be visible on the local trails.** Impacts would be mitigated by the relocation of Park Horse Patrol horses to the nearby Tennessee Valley Stables, where they are easily viewed near the Tennessee Valley parking lot. Minor adverse and minor beneficial long-term impacts are anticipated.

#### **Rodeo Valley Stables**

Under Alternative C a residence and water tank would be built southwest of the Balloon Hanger. These would be visible from trails above and partially from Bunker Road in front of the stables. A new manure shed north end of site would be visible from Bunker Road in the vicinity of the stables but partially screened by existing trees to Bunker Road to the east and to the higher elevation trails to the north. These changes would be visible from on-site. Minor adverse and minor beneficial long-term impacts are anticipated.

### **Construction**

**Construction impacts at two existing stables sites under** Alternative C would be less than in Alternatives B, Option B1 and B2, or D and would be generally as described under Impacts Common to All Alternatives (minor short-term, localized adverse effects with mitigation).

#### **Views from Within the Stables Area**

Impacts would be generally as described above; minor adverse to long-term localized benefits.

#### **Views from Outside the Stables Area**

Horse viewing opportunities are reduced by removing stabled horses from two sites but can be mitigated with Mitigation **VR-4 Day Use for Horses** at Golden Gate Dairy, and the nearby relocation of horses from Lower Tennessee Valley Park Horse Patrol to Tennessee Valley stables, resulting in minor impacts to horses in the rural scene. Visual impacts due to facilities changes would be negligible to minor adverse impacts.

#### **Cumulative Impacts**

In combination with other local projects, short-term minor to moderate adverse cumulative impacts are anticipated. Visual impacts would be negligible to minor long-term adverse and minor beneficial long term impacts.

#### **Conclusion**

Over the long term negligible to minor localized impacts would result from the installation of new structures and the reduction in the number of stables sites. Mitigation would include measures **CR-5: Treatment of Historic Properties and Landscape; VR-1: Minimize Long-term Visual Impacts; VR-2: Prepare Visual Simulations during Design Phase;** and **VR-3: Minimization of Construction-Related Visual Impacts,** and would create minor benefits over the long term.

No impairment of park resources or values is anticipated under this alternative. Because the impacts previously described (1) are not inconsistent with the park's purpose and values, (2) do not prevent the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or

contractor operations, there would not be unacceptable impacts to visual resources in the park under all the alternatives.

## 4.12.7 Impacts of Alternative D - Dispersed and Expanded

### ***Alternative D Visible Actions by Site***

#### **Golden Gate Dairy**

Under Alternative D, would be the same as Alternative B, Option B1 and B2, with the exception that to the north and behind the Creamery and Milking Barn there would be four new stalls added instead of 11; as in B1 and B2 a 60 foot diameter covered riding ring would be added, but differing from B1 and B2 it would be located south of the north windbreak in an area of existing stalls. Portions of these changes would be visible from Highway 1 and from the Dias Ridge Trail above the site. Minor adverse and minor beneficial long-term impacts are anticipated.

#### **Tennessee Valley Stables**

Under Alternative D the changes include those under Common to All. Additionally, the same as in C a new manure shed and a new hay shed would be added in the location of two covered paddocks, east of the barn, these changes would be visible from within the site. Minor adverse and minor beneficial long-term impacts are anticipated.

#### **Lower Tennessee Valley Stables**

Under Alternative D the changes are the same as in Alternative B, Option B2, and C. The removal of horses from the view would be considered a negligible to minor impact to Park Horse Patrol and Tennessee Valley stables. Visiting **equestrians' horses would continue to be** visible on the local trails. Potential impacts would be mitigated by the relocation of Park Horse Patrol horses to the nearby Marincello site, where they are easily viewed from Marincello and Tennessee Valley Trails. Minor adverse and minor beneficial long-term impacts are anticipated.

#### **Rodeo Valley Stables**

Under Alternative D a 60 foot long roof would be added to the south end of the upper outdoor arena and a hay shed would be added directly to the south of the new structure. These would be visible from the surrounding higher elevation trails, from the road in front of the site and to those approaching from the east on Bunker Road but would be partially screened by the Motor Vehicle Shed. This is anticipated as a moderate adverse long-term impact. An existing office space in the west Motor Vehicle Shed would be rehabilitated to residential use which may be apparent to some passers-by but not noticeable to others. This is anticipated as a negligible adverse long-term impact. A new manure shed at the south end of the east Motor Vehicle Shed would be visible from the new Coastal Trail link and somewhat visible to those approaching from the east on Bunker Road but would be partially screened by the Motor Vehicle Shed. Minor adverse and minor beneficial long-term impacts are anticipated.

#### **Lower Redwood Creek**

Under Alternative D there would be new stables facilities constructed in the developed area around the existing residence. Additionally, fenced paddocks would be developed in the field area below the house. This development would be visible from Muir Woods road at the entry drive to the MBCSD facility. An office/meeting room would be developed along with a parking pad and paddock or tie up at the north end of the site; this would be located in the proximity of the MBCSD development and visible from Santos Meadow. Results are anticipated to be

minor long-term adverse impacts. Increased horse viewing opportunities would have a long-term beneficial impact.

#### **Marincello site**

Under Alternative D a stables with facilities would be developed as described in Chapter 2. The stables facilities would be visible by bikers, pedestrians and hikers from Marincello Road trail in the vicinity of the development. Impacts of a new stable would be readily apparent to all passers-by; however the views into the stables would be localized to very near the stables from the Marincello Road Trail. Minor adverse long-term impacts are anticipated. The opportunity to view horses at this site would be a long-term negligible to minor beneficial impact.

#### **Construction**

Construction impacts at five existing stables sites under Alternative D would be greater than in Alternatives B, Option B1 and B2, or C and would be generally as described under Impacts Common to All Alternatives (minor short-term, localized adverse effects with mitigation).

#### **Views from Within the Stables Area**

Impacts would be generally as described above; minor adverse to long-term localized benefits.

#### **Views from Outside the Stables Area**

Horses viewed in the rural scene would increase by the addition of two new sites, Lower Redwood Creek and Marincello, and the removal of horses from one site, Lower Tennessee Valley, to Marincello site nearby, would result in minor beneficial long term impacts to horse viewing. The most noticeable visual impacts from facilities changes would be negligible to minor long-term adverse and minor beneficial long term impacts.

#### **Cumulative Impacts**

In combination with other local projects, short-term minor to moderate adverse cumulative impacts are anticipated.

#### **Conclusion**

Over the long term minor to moderate localized impacts would result from the installation of new structures and two new stables sites, including the Park Horse Patrol stables on now undeveloped land along the Marincello Trail. Mitigation would include measures **CR-5: Treatment of Historic Properties and Landscape; VR-1: Minimize Long-term Visual Impacts; VR-2: Prepare Visual Simulations during Design Phase; and VR-3: Minimization of Construction-Related Visual Impacts**, and would create minor benefits over the long term.

No impairment of park resources or values is anticipated under this alternative. Because the impacts previously described (1) are **not inconsistent with the park's purpose and values**, (2) **do not prevent** the attainment of desired future conditions for natural and cultural resources, (3) do not create an unsafe environment, (4) do not diminish opportunities for future enjoyment of the park, and (5) do not unreasonably interfere with park programs or activities, an appropriate use, or concessioner or contractor operations, there would not be unacceptable impacts to visual resources in the park under all the alternatives.

## **4.12.8 Mitigation Measures**

#### **CR-5: Treatment of Historic Properties and Landscape**

(See full description in section 4.9 and in **Table 2-12**)

***VR-1: Minimize Long-term Visual Impacts***

New construction would be designed to be compatible with existing structures and landscape features to ensure visual continuity. The design and placement would take into account elements of massing, scale, materials, and color. Site furnishings would be consistent with the *Parkwide Site Furnishings Guidelines* for similar features found elsewhere in the park. New design elements would be sited so that they would not compete with important views and vistas, and would be incorporated into the surrounding landscape.

***VR-2: Prepare Visual Simulations during Design Phase***

For those alternatives that include new facility construction, the NPS or lessee would prepare visual simulations or other visual aids during the schematic design phase to assist in studying and communicating to others the proposals and to determine the visual impacts.

***VR-3: Minimization of Construction-Related Visual Impacts***

Construction activities would be coordinated with other construction activities in the area to the greatest extent possible to minimize visual intrusion of construction equipment and activity in popular visitor areas.



**Golden Gate Dairy**  
1. Pacific Way at Highway 1 near Pelican Inn, view to north  
2. Dias Ridge Trail, view to southwest  
3. Dias Ridge Trail, view to west

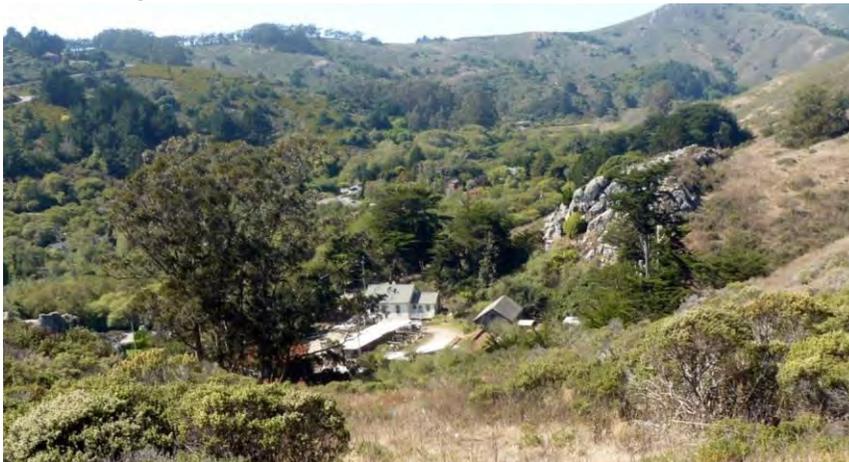
**Figure 4-1: Key Observation Points: Golden Gate Dairy**



1. Pacific Way at Highway 1 near Pelican Inn, view to north



2. Dias Ridge Trail, view to southwest



3. Dias Ridge Trail, view to west

**Figure 4-2: View from Key Observation Points - Golden Gate Dairy**



**Figure 4-3: Key Observation Points; Tennessee Valley stables**



1. Tennessee Valley Trailhead parking lot, view east



2. Tennessee Valley Trail, view east



3. Old Springs Trail, view north



4. Old Springs Trail, view north

**Figure 4-4: Views from Key Observation Points; Tennessee Valley stables**



**Lower Tennessee Valley stables**

1. Tennessee Valley Trail, view east

**Figure 4-5: Key Observation Point; Lower Tennessee Valley stables**



Tennessee Valley trail, view east

**Figure 4-6: View from Key Observation Point; Lower Tennessee Valley stables**



**Figure 4-7: Key Observation Points; Rodeo Valley**



1. Coastal Trail at Conzelman Rd; view north



2. Bunker Road, view to southwest



3. Bunker Road at stables, view to south

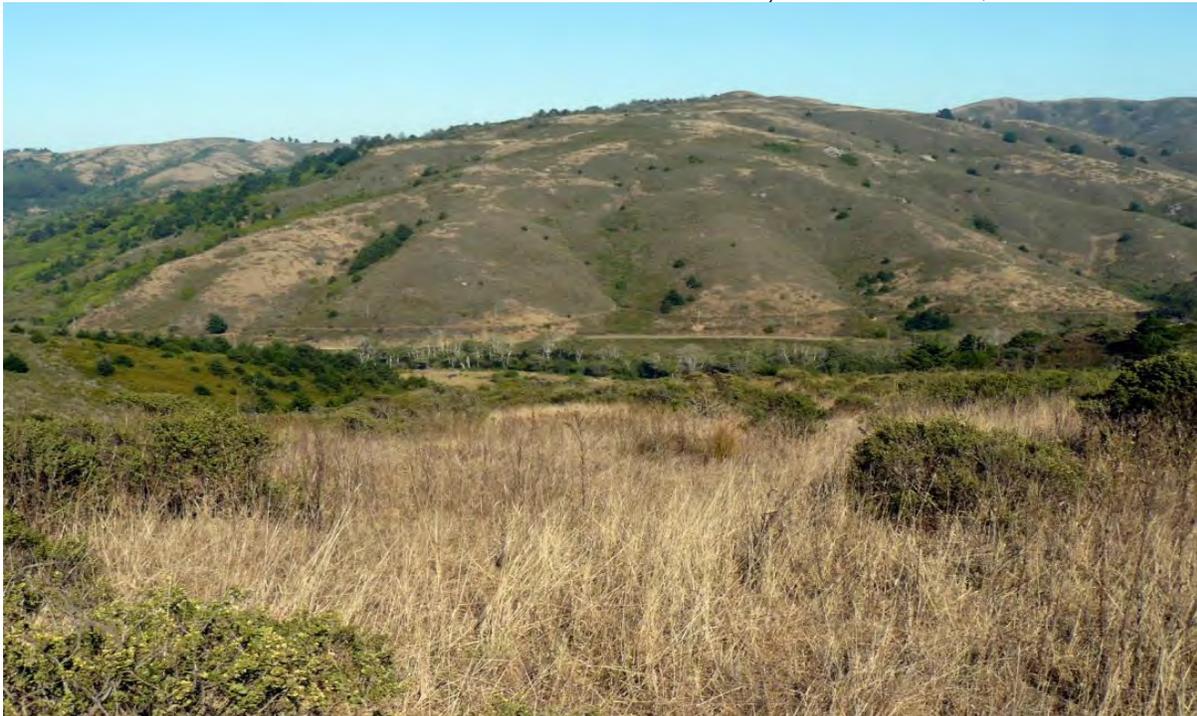
**Figure 4-8: Views from Key Observation Points - Rodeo Valley stables.**



**Figure 4-9: Key Observation Points - Lower Redwood Creek site**



1. Muir Woods Road at entrance drive to Muir Beach Community Services District, view to west



2 Heather Cutoff Trail, view to northeast

**Figure 4-10: Views from Key Observation Points - Lower Redwood Creek**



**Figure 4-11: Key Observation Points - Marincello site**



1. Marincello Trail below site, view northeast



2. Marincello Trail above site, view southeast

**Figure 4-12: Views from Key Observation Points - Marincello site**

## **4.13 Park Operations**

### **4.13.1 Guiding Regulations and Policies**

*NPS Management Policies* 2006 (NPS 2006a) detail the basic service-wide policies for implementation of the Organic Act, including NPS park operations. The Management Policies require that park operations achieve certain conditions related to the accomplishment of management goals through environmental leadership and the use of sustainable practices in planning, design siting, construction and maintenance.

### **4.13.2 Assessment Methods**

For the purposes of this assessment, park operations involve equestrian stable facilities and functions that could be affected by the project. Facilities have utilities including water, water for fire suppression, wastewater, surface water drainage, and electrical utilities/infrastructure related to the stable sites. Functions include activities of park partners (e.g., stable and public programs) and activities of park staff (e.g., management and maintenance).

Information on current park operations was provided by NPS, and best professional judgment was used to assess impacts based on the impact thresholds described below.

#### **Thresholds**

Negligible: Park operations would not be affected or the effect would not be noticeable or outside normal variability. No detectable changes to utility use patterns on site would occur.

Minor: The effect would be detectable but would be of a magnitude such that it would not have an appreciable effect on park operations. While possibly noticeable to staff or park partners, it would not be noticeable to the general public. Small-scale effects to utility use patterns may occur.

Moderate: The effect would be apparent, resulting in discernable changes in park operations noticeable to staff, park partners, and possibly to an aware general public. Changes to utility use patterns would be readily measurable.

Major: The effect would be readily apparent, resulting in substantial changes in park operations in a manner noticeable to staff, park partners, and the general public. Changes to utility use may mean capacity limits for an area are close to being reached.

### **4.13.3 Impacts of Alternative A - No Action**

Under this alternative, there would be no project-related changes to stable utilities/infrastructure or to park partner or park staff functions. As such, there would be no impacts, cumulative or otherwise.

### **4.13.4 Impacts Common to All Action Alternatives**

During construction, occasional disruptions in utilities or related infrastructure could temporarily affect the ability of park partners to carry out public programs and other activities at the stable sites. Operations of the Park Horse Patrol and other park management and maintenance activities could also be temporarily affected. These effects would be apparent to park partners, staff, and the general

public and would therefore be considered moderately adverse. With implementation of *Mitigation Measure PO-1 (Utilities)*, impacts related to occasional interruptions in utility service would be minor, short-term and localized.

### 4.13.5 Impacts of Alternative B - Enhanced Existing

#### OPTION B1

##### **Short-term Impacts**

During construction, occasional disruptions in utilities or related infrastructure could temporarily affect the ability of park partners to carry out public programs and other activities at the stable sites. Operations of the Park Horse Patrol, stewardship programs, and other park management and maintenance activities could also be temporarily affected. These effects would be apparent to park partners, volunteers, staff, and the general public and would therefore be considered moderately adverse. With implementation of *Mitigation Measure PO-1 (Utilities)*, impacts related to occasional interruptions in utility service would be minor, short-term and localized.

##### **Long-term Impacts**

The upgrading of existing water, wastewater, stormwater, and electric facilities is common to all action alternatives. These upgrades would provide substantial park operations benefits related to resource protection and reliability of future utility functions, including fire protection. **NPS' environmental leadership in meeting all appropriate sustainability benchmarks as required by Executive Order 13514 (see section 2.3.2 under the subheading "Sustainability") is consistent with NPS Management Policies.** Broader public programming at the stables would slightly increase the use of utility facilities, but the increase would not be noticeable, and the number of horses stabled at the sites would not substantially change. There would be no detectable changes to utility use patterns, park management, park maintenance operations, or operating costs. Therefore, the long-term impacts would be negligible.

##### **Cumulative Impacts**

Ongoing funding and budget constraints limit the amount of staff time available for park operations activities such as long-term maintenance commitments. Current operations include numerous efforts related to park goals involving construction and maintenance park facilities. Collectively these issues result in minor temporary cumulative adverse impacts to park operations. Future infrastructure and utility work planned at Fort Cronkhite and the Marin Headlands includes facilities that are independent of project components. Other project work that has had an effect on utility systems includes the Fort Baker rehabilitation and new construction projects, the new MMC, **and the MHFB Transportation Plan's** changes to roads, parking areas, and associated utilities. Collectively, these actions would result in future cumulative benefits to park operations related to utility services. Option B1 would have a negligible contribution to overall cumulative impacts due to the lack of substantial increase in facility demands and reliance primarily on independent water, wastewater, and stormwater systems.

##### **Conclusion**

Effects to park operations under Option B1 include minor short-term adverse effects from potential utility service interruptions during construction and negligible long-term impacts. Long-term benefits would derive from improved infrastructure and resource protection. Cumulative impacts to park operations would be negligible.

## OPTION B2

**Short-term impacts.** Short-term impacts of Option B2 would be similar to those of Option B1. With implementation of Mitigation Measure PO-2 (Staff and Programs), impacts related to staff disruptions and suspension of programs during relocation would be moderately adverse and short-term.

**Long-term impacts.** Except for the relocation of the Park Horse Patrol to Tennessee Valley stables, long-term impacts of Alternative B2 would be similar to those of Option B1. The relocation of the Park Horse Patrol would be detectable but would have no appreciable effect on park operations and effects on utility use patterns would not be apparent. Therefore, the long-term impact of Option B2 would be minor.

**Cumulative Impacts.** Cumulative impacts of Option B2 would be the same as for Option B1 (negligible).

**Conclusion.** Short-term impacts of Option B2 would be moderately adverse. Long-term effects to park operations under Option B2 would be minor due to the detectable change in the location of the Park Horse Patrol. Cumulative impacts would be negligible.

### 4.13.6 Impacts of Alternative C - Consolidated

**Short-term impacts.** During construction, apparent disruptions to the activities of park partners, including public programs, and to park administration and maintenance staff are expected. Some public and park programs, including the Park Horse Patrol, could be temporarily suspended due the relocations proposed under Alternative C. With implementation of *Mitigation Measure PO-2 (Staff and Programs)*, impacts related to staff disruptions during relocation would be moderately adverse and short-term.

**Long-term impacts.** The upgrading of existing water, wastewater, stormwater, and electric facilities would provide park operations benefits related to resource protection and reliability of future utility functions at the two remaining sites. While these utilities would serve more people at these two sites, the upgrades would be designed to meet demands, generally maintaining existing use patterns. There would be a reduction in the number of stable sites, and the overall number of horses stabled in South Marin would be reduced by four. Therefore, the long-term impacts to utilities would be minor.

Locating all horses and programs at the two remaining stables, including the Park Horse Patrol Program, would provide beneficial efficiencies in maintenance and supervision by NPS staff. The Park Horse Patrol would have most of its own facilities at Tennessee Valley, but would share some facilities in common with other users at the stables. The use and maintenance of these common facilities would be determined through consultation with park partners and appropriate design during planning. A local change in Park Horse Patrol operations at Tennessee Valley stables may be discernable to staff and park partners, but not at a magnitude such that it would have an appreciable effect on general park operations.

**Cumulative Impacts.** Removal of stables from the Golden Gate Dairy and increased activity and density at Tennessee Valley and Rodeo Valley stables under Alternative C would be site-specific. With continued availability of essentially the same level of equestrian opportunities at the GGNRA, there would not be an appreciable cumulative effect throughout the park. Otherwise, cumulative impacts of Alternative C would be similar to that described for Option B1 (negligible) due to overall similar demands for utilities and other park operations.

**Conclusion.** Effects to park operations under Alternative C include moderate short-term adverse effects from potential program interruptions during construction and program relocation. There would be minor long-term impacts to utilities and moderate long-term impacts to operations. Cumulative impacts would be negligible.

### 4.13.7 Impacts of Alternative D - Dispersed and Expanded

#### Short-term Impacts

During construction, occasional disruptions in utilities or infrastructure at the existing equestrian sites would be similar to that described for Option B1. Construction of new facilities at the Marincello site may increase utility disruptions at the Tennessee Valley site due to proximity and access. However, with implementation of *Mitigation Measure PO-1 (Utilities)*, impacts related to occasional interruptions in utility service would still be minor, short-term and localized. Disruption of park partner and park staff and programs, including the Park Horse Patrol, could occur but to a lesser degree than for Alternative C due to the ability to make a more seamless transition to new facilities. With implementation of *Mitigation Measure PO-2 (Staff and Programs)*, impacts would be minor adverse and short-term. Because of the greater number of equestrian stable sites, this alternative would have substantially higher short-term construction capital costs. Because costs would be substantial for the new facilities, funding would be considered from various sources such as line item construction, lessee capital improvement investments, loans, fund raising, donations, or other sources that might be available to the NPS or to the lessee.

#### Long-term Impacts

The upgrading of existing water, wastewater, stormwater, and electrical facilities would provide park operations benefits related to resource protection and reliability of future utility functions at the existing sites. Utility facilities at Lower Redwood Creek and Marincello would be designed consistent with anticipated demands. Although upgrades and new construction of utility infrastructure would be designed to conserve resources, there would be an unavoidable noticeable and readily measureable increase in utility use (water and electricity in particular) because of the increased number of horses and new separate facilities. Therefore, the long-term impacts of utilities for Alternative D would be moderate.

An overall increase in the number of stable sites would increase demand for maintenance and supervision, most of which would be borne by stable lessees as required by adherence to BMPs (Appendix B). Some maintenance costs (e.g., roads) and NPS administrative oversight would also increase, requiring 1-2 new NPS positions, resulting in moderate impacts to staffing and annual operating budgets.

The impact to park operations would be negligible at Golden Gate Dairy and Rodeo Valley sites, since there would be no apparent change in park operations outside normal variability. At the Tennessee Valley site, there would be a moderate impact to park operations due to the proximity of the Marincello site. Although the Marincello site is not visible from the Tennessee Valley stables, discernable change in Park Horse Patrol operations at Marincello may be noticeable to staff and park partners, but not at a magnitude such that it would have an appreciable effect on park operations. These effects would not be noticeable to the general public throughout the GGNRA. Park operations effects are considered moderate overall.

#### Cumulative Impacts

With increased efficiency, cumulative demand impacts on utilities for Alternative D would be minor in terms of impacts to regional utility systems. Cumulative impacts associated with capital costs and

park operations would be moderate due to the development of additional facilities and slightly increased demands on maintenance and supervision services.

**Conclusion**

Effects to park operations under Alternative D include minor short-term adverse effects from potential utility service interruptions during construction and moderate short-term capital cost effects. MHFB Transportation Plan's car-free days would increase congestion at the vicinity of Rodeo Valley. There would be a moderate impact to staffing and annual operating budgets, and moderate long-term impacts on utilities and operations. Cumulative impacts to regional utility systems would be minor. Cumulative impacts to capital costs and park operations would be moderate.

**4.13.8 Mitigation Measures****PO-1: Utilities**

Utility and infrastructure work that requires interruptions in service would be coordinated at least 60 days in advance between NPS and appropriate park partners at each stable site.

**PO-2: Staff and Programs**

NPS planning would include development and implementation of a Relocation Plan for all staff and programs to be relocated from Golden Gate Dairy and Lower Tennessee Valley. The Relocation Plan would be coordinated at least 90 days in advance between NPS and appropriate park partners at each stable site.

## CHAPTER 5. CONSULTATION AND COORDINATION

### 5.1 Project Scoping

Project scoping is designed to gather early input in the NEPA process. These efforts include both internal scoping and public involvement. In addition to notifying interested parties about the proposed project, the purpose of scoping is to solicit input on the conceptual range of alternatives being contemplated and to identify issues and concerns that should be studied in the environmental document.

A summary of any communications between the agencies or the public and NPS resulting from the scoping process (as well as additional information regarding this project) can be accessed online at the NPS Planning, Environment and Public Comment (PEPC) website (<http://parkplanning.nps.gov.goga>).

#### 5.1.1 Internal Scoping

A number of internal scoping meetings were conducted with NPS staff to identify the project's purpose, need, and objectives, to develop preliminary alternatives, and to identify associated issues and impact topics. In addition, an Interdisciplinary Team (IDT) consisting of NPS representatives was formed to provide guidance for the improvement plan. In 2006 the IDT developed a set of planning guidelines for the development of alternatives for the Plan (see the *Alternatives Development Process* section of Chapter 2 for more detail).

In April 2010, an internal NPS workshop was held to further refine the Plan alternatives. Comments obtained through public scoping efforts (see below) were considered in this effort. As a result, three action alternatives in addition to the No Action Alternative, were identified for analysis in the EA. In May 2010, the alternatives for the project were further refined.

The NPS used a decision-making process called Choosing by Advantages (CBA) to help make value-based decisions and identify a preferred alternative for the Marin Equestrian Stables Plan project. The timing of this CBA coincided with the drafting of the Administrative Draft Environmental Assessment for the project. This value engineering process is used by NPS to improve value or make selections in many types of construction and planning projects. The CBA was customized to meet the needs of the park with this particular project at this particular phase of the planning and environmental review process. The two day CBA workshop took place in June 2010 and included NPS staff, managers, and consultants. At the workshop, of the alternatives which were developed through project scoping and refined over time by the IDT, the Alternative B, Enhanced Existing (Option B1 as included in this EA) was selected as the preferred alternative by NPS. Through the CBA process, Alternative B was revised to develop an Option B2, which was identified as having the best combination of long-term benefits for achieving project objectives while also ensuring a high level of resource protection and enhancement consistent with the requirements of NEPA and the NPS management policies.

#### 5.1.2 Public Scoping

Public scoping occurred from May 24 to June 21, 2006, and again from February 3 to March 5, 2010, and included public meetings and open houses. The results of earlier scoping were used to develop concept alternatives that provided the basis for preliminary alternatives presented at the public meeting and open house held February 3, 2010. Scoping meetings were designed to receive input regarding the stated purpose, need, and objectives of the Plan, the preliminary action alternatives, and to identify issues of concern to the public related to the planning effort. Communication with

USFWS, the SHPO, and other agencies has also occurred. A more detailed description of scoping activities, including agency consultation, is presented in the *Consultation and Coordination* chapter of this EA.

Public scoping resulted in 237 written comments. Issues and concerns related to the potential environmental effects of the proposed action were identified through input from individuals, organizations, federal agencies, and NPS public scoping efforts. Subsequently, the issues identified were used to help formulate the alternatives and mitigation measures.

### 5.1.3 Agency Scoping

NPS prepared scoping materials which were posted on the NPS website. The materials included descriptions of the conceptual alternatives, issues identified for study, the draft environmental screening form, and the dates of public scoping for interested or affected public agencies. Agencies were notified about the project and were provided links to the NPS website by mail. No agency comments were received during initial public scoping.

A list of regulatory and/or interested agencies included in this scoping notification is presented in **Table 5-1**.

<b>Table 5-1 Agencies Included in Initial Scoping Efforts</b>	
<b>Federal Agencies</b>	<b>State and Local Agencies, Commissions, Boards and Officials</b>
National Marine Fisheries Services	California Coastal Commission
U.S. Army Corp of Engineers	San Francisco Bay Regional Water Quality Control Board
	CA State Department of Fish and Game, Central Coast Region
U.S. Fish and Wildlife Service	State Environmental Protection Agency
U.S. Environmental Protection Agency, Region IX	State Historic Preservation Officer
Advisory Council on Historic Preservation	Marin Municipal Water District
	Sausalito Marin City Sanitary District
	Governor's Office of Planning and Research
	California State Parks
	Local Cities

*Note:* Agencies were informed of the project by mail; they were invited to a public meeting and to view information on the park website on April 27, 2006 and on January 13, 2010.

## 5.2 Agency Consultation

### 5.2.1 U.S. Fish and Wildlife Service

The Endangered Species Act of 1973 requires that each federal agency, in consultation with the USFWS and/or NOAA Fisheries, ensure that proposed agency actions do not jeopardize the continued

existence of a listed species or result in destruction or adverse impact to designated critical habitat. A list of listed threatened and endangered species in the general area was obtained through the U.S. Fish and Wildlife Service website. The NPS will initiate formal consultation with the USFWS with the submittal of a Biological Assessment. The USFWS will also be provided a copy of this EA for their review and determination of concurrence with the Biological Assessment's findings.

### 5.2.2 California Coastal Commission

The California Coastal Zone Management Act protects coastal environments. While the act transferred regulatory authority to the states and excluded federal installations from the definition of the "coastal zone," it requires that federal actions be consistent with the state coastal management plans. Activities taking place within the coastal zone under the definition established by the California Coastal Management Plan require a federal consistency determination. Because this project will take place in the coastal zone, the EA will need to be submitted to the California Coastal Commission for a federal consistency determination.

### 5.2.3 California State Historic Preservation Officer and the Advisory Council on Historic Preservation

The NPS initiated consultation with the California SHPO and Advisory Council on Historic Preservation by letter in October 2011 regarding the equestrian planning process. The NPS did not receive any comments from these agencies at the scoping phase. NPS staff then met with the SHPO to discuss several park projects that have sustainability components, including the equestrian plan. At this meeting, the NPS received feedback on the project and this feedback has been incorporated into the document.

#### ***Native American Consultation***

The park will consult with the Liaison for Federated Indians of Graton Rancheria on the aspects of the project related to the potential for indigenous archeology.

## 5.3 List of Environmental Assessment Preparers

- Andrea Lucas, Project Manager, Landscape Architect, NPS
- Karen Quidachay, Project Manager and Land and Recreation Resource Specialist, Garcia and Associates

### 5.3.1 NPS Interdisciplinary Team

<b>NPS Staff</b>	<b>Representing Title or Area of Expertise</b>
Leo Barker	Archeologist
Jason Biscombe	Historic Landscape Architect
Robert Cirese	Business Management Analyst
Kim Coast	Acting Chief of Law Enforcement
Frank Dean	General Superintendent
Carey Feierabend	Environmental Protection Specialist
Abby Sue Fisher	Acting Chief of Cultural Resources
Darren Fong	Ecologist
Sue Fritzsche	Vegetation Specialist
Andrew Georgeades	Ecologist
Stephen Haller	Historian
Daphne Hatch	Chief of Natural Resources

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## **5.4 List of Recipients**

Following is the list of agencies and libraries that will receive a copy of this EA.

### **5.4.1 Federal Agencies**

U.S. Fish and Wildlife Service  
 Advisory Council for Historic Preservation  
 Gulf of the Farallones National Marine Sanctuary  
 National Marine Fisheries Service  
 Natural Resources Conservation Service  
 U.S. Army Corps of Engineers  
 Environmental Protection Agency

## 5.4.2 State Agencies

California Coastal Commission  
California Coastal Conservancy  
California Department of Fish and Game  
California Department of Parks and Recreation  
California Department of Transportation  
California Native American Heritage Commission  
California Office of Planning and Resources State Clearinghouse  
California State Lands Commission  
California Resources Agency  
State Historic Preservation Office

## 5.4.3 Regional, County, and Municipal Agencies

Association of Bay Area Governments  
Bay Area Air Quality Management District  
San Francisco Bay Regional Water Quality Control Board  
Marin County Community Development Agency  
Marin County Department of Public Works  
Muir Beach Community Services District  
Federated Indians of Graton Rancheria  
City of Sausalito Department of Community Development  
Sausalito-Marin City Sanitary District  
Marin County Board of Supervisors  
San Francisco Bay Conservation and Development Commission  
Tamalpais Valley Community Services District

## 5.4.4 Libraries

The following is a list of public venues where the public can access this EA and review the document onsite.

- Mill Valley Library, 375 Throckmorton Ave., Mill Valley, CA; (415) 389-4292
- Marin Headlands Visitor Center, Fort Barry, Marin Headlands, CA; (415) 331-1540
- Sausalito Public Library, 420 Litho Street, Sausalito, CA; (415) 289-4121
- Pacific West Regional Office Visitor Center, Fort Mason, Building 201, San Francisco; (415) 561-4700
- San Francisco Civic Center Public Library, 100 Larkin Street, San Francisco, CA

## CHAPTER 6. REFERENCES

- Air Resources Board. 2010. *Data Statistics Homepage*. Website:  
<http://www.arb.ca.gov/adam/select8/sc8display.php>. Accessed, June 10, 2010.
- Audubon. 2010. *Waterbird species*. Website:  
<http://web1.audubon.org/waterbirds/species.php?speciesCode=blarai>. Accessed, August 2010.
- Barker, L. 2005. *Big Lagoon Wetland and Creek Restoration Project: Cultural Resources Survey*, Muir Beach, Marin County, California. Prepared by Leo Barker, Golden Gate National Recreation Area, National Park Service Presidio Archaeology Lab. Draft February 2005.
- Barker, L. and H. Barnaal. 2005. *Road Work Ahead: A Supplemental Archaeological Survey of the Marin Headlands – Fort Baker Transportation Infrastructure and Management Plan EIS*, Forts Baker, Barry, and Cronkhite Historic District, Point Bonita Historic District, Golden Gate National Recreation Area, Marin County, California
- Barnhart, R.A. 1986. *Species profiles: Life histories and environmental requirements of coastal fishes and invertebrates (Pacific Southwest) Steelhead*. U.S. Fish and Wildlife Service Biological Report 82(11.60). U.S. Army Corps of Engineers, TR EL-82-4. Pp. 21.
- Beardsley, R. 1954. *Temporal and Areal Relationships in Central California Archaeology*. University of California Archaeological Survey Reports No. 24 and 25. University of California, Berkeley.
- Behnke, R.J. 1992. *Native trout of western North America*. American Fisheries Society Monograph 6. Pp. 275.
- Berkeley Natural History Museum (BNHM). 2010. *Berkeley Natural History Museum Paleontological Database*. Website: <http://bnhm.berkeley.edu/index.php>. Accessed, June, 2010.
- Bowles, A. 1995. Responses of Wildlife to Noise. Pps 109-156 in *Wildlife and Recreationists: Coexistence Through Management and Research*. Edited by Richard L. Knight and Kevin J. Gutzwiller.
- California Department of Fish and Game (CDFG). 1996. *Steelhead Restoration and Management Plan for California*. State of California, Sacramento, CA. Pp. 246.
- California Department of Health Services (DHS). 2006. *Regulations for Ocean Beaches and Ocean Water-Contact Sports Areas Pursuant to AB411*. Title 17 of the California Code of Regulations. Website:  
<http://www.cdph.ca.gov/healthinfo/vironhealth/water/Documents/Beaches/Regulations-OceanBeaches.pdf>. Accessed, June 11, 2010.
- California Geological Society (CGS). 2010. *Alquist-Priolo Earthquake Zones; Table 4. Cities and Counties Affected by Alquist-Priolo Earthquake Fault Zones as of May 1, 1999*. Website:  
<http://www.conservation.ca.gov/cgs/rghm/ap/Pages/affected.aspx>. Accessed, May, 2010.
- California Native Plant Society (CNPS). 2010. *Inventory for Marin County*. Website:  
<http://cnps.site.aplus.net/cgi-bin/inv/inventory.cgi>. Accessed, August 2010.

- California Natural Diversity Database (CNDDDB). 2010. *Search for special status species within 5 miles of MESP plan area*. Website: <http://www.dfg.ca.gov/biogeodata/>. Accessed, June 2010.
- California Office of Historic Preservation (SHPO). 2008a. Letter from Milford Wayne Donaldson, State Historic Preservation Officer, to Paul Scolari, Golden Gate National Recreation Area, National Park Service, regarding "National Register of Historic Places from Determination of Eligibility for the Miwok Stables." Dated September 17, 2008.
- \_\_\_\_\_. 2008b. Letter from Milford Wayne Donaldson, State Historic Preservation Officer, to Steven Haller, Park Historian, Golden Gate National Recreation Area, National Park Service, regarding "Determination of Eligibility for Ranch M, Golden Gate Dairy, Shoreline Highway/California Route 1, Marin County, CA." Dated March 4, 2008.
- Carlisle, S., M. Reichmuth, E. Brown and S.C. Del Real. 2008. *Long-term coho salmon and steelhead trout monitoring in coastal Marin County 2007: annual monitoring progress report*. Natural Resource Technical Report NPS/SFAN/NRTR—2009/269. National Park Service, Fort
- City of San Rafael. 2010. *Target Store Draft Environmental Impact Report Table 4.4-1*. September 2008. Website: <http://www.cityofsanrafael.org/Assets/CDD/Planning/air+quality.pdf>. Accessed, June 9.
- College of Marin. 2010. *Point Reyes Field Geology, Further submergence and deposition of the Monterey Formation*. Website: <http://www.marin.edu/~jim/ring/ptreyes/ptrey1.html>. Accessed, June, 2010.
- Cowardin, L.M., V. Carter, F.C. Golet and E.T. LaRoe. 1979. *Classification of wetlands and deepwater habitats of the United States*. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Pp.131.
- Craig, D. and P.L. Williams. 1998. *Willow Flycatcher (Empidonax traillii)*. In: *The riparian bird conservation plan: a strategy for reversing the decline of riparian-associated birds in California*. California Partners in Flight. Website: [http://www.prbo.org/calpif/htmldocs/riparian\\_v-2.html](http://www.prbo.org/calpif/htmldocs/riparian_v-2.html).
- Deas M.L. and G.T. Orlob. 1999. *Assessment of Alternatives for Flow and Water Quality Control in the Klamath River below Iron Gate Dam*. Klamath River Modeling Project. Sponsored by the United States Fish and Wildlife Service Klamath Basin Fisheries Task Force. Center for Environmental and Water Resources Engineering Department of Civil and Environmental Engineering Water Resources Modeling Group. University of California, Davis. Project #96-HP-01. Report No. 99-04. Pp. 379.
- Evens, J. 2000. *Mystery of the marsh: the California Black Rail*. Tideline Vol 19, No. 4. Pp. 1-3.
- Federal Register. 1996. *Endangered and threatened species: Threatened status for Central California Coast coho salmon evolutionarily significant unit (ESU), Final Rule*. October 31, 1996. Pp.61 (212): 56138-56149. Website: <http://www.nwr.noaa.gov/Publications/FRNotices/1996/loader.cfm?csModule=security/getfile&ageid=20651>. Accessed, June 1, 2010.
- Federal Register. 1997. *Endangered and threatened species: Listing of several evolutionary significant units (ESU's) of west coast steelhead, Final Rule*. August 18, 1997. Pp. 62(159): 43937-43954. Website:

- <http://www.nwr.noaa.gov/Publications/FRNotices/1997/loader.cfm?csModule=security/getfile&ageid=20606>. Accessed, June 1, 2010.
- Federal Register. 2006a. *Endangered and Threatened Wildlife and Plants; Revised Critical Habitat for the Tidewater Goby (Eucyclogobius newberryi)*. November 28, 2006. Pp. 71(228): 68914-68942. Website: <http://frwebgate.access.gpo.gov/cgi-bin/getpage.cgi>. Accessed, June 1, 2010.
- Federal Register. 2006b. *Endangered and threatened species: Final listing determinations for 10 distinct population segments of west coast steelhead, Final Rule*. January 5, 2006. Pp. 71(3): 834-862. Website: <http://www.nwr.noaa.gov/Publications/FRNotices/2006/loader.cfm?csModule=security/getfile&ageid=26415>. Accessed, June 1, 2010.
- Federal Transit Administration. 1995. *Transit noise and vibration impact assessment*. Final Report. April 1995. Washington, DC.
- Fellers, G.M. 2005. *Acoustic Inventory and Monitoring of Bats at National Parks Golden Gate National Recreation Area, 2005 Progress Report*. Western Ecological Research Center, USGS, Point Reyes National Seashore, CA.
- Flannery, M.D., Humple, G. Ballard and G. Geupel. 2001. *Landbird Inventory of the National Parks of the San Francisco Bay Area Report*. Prepared for Point Reyes National Seashore and the Golden Gate National Recreation Area. PRBO Contribution # 1004.
- Fong, D. March 2000. *1999 tidewater goby (Eucyclogobius newberryi) sampling in Rodeo Lagoon, Golden Gate National Recreation Area, Marin Co*. Unpublished report prepared the Division of Resource Management and Planning, Golden Gate National Recreation Area. Pp. 9. Cited in: National Park Service's unpublished Fort Baker Transportation Management Plan EIS.
- Fong, D. 2006. *Tidewater Goby (Eucyclogobius newberryi) Sampling in Rodeo Lagoon, Golden Gate National Recreation Area, Marin Co Year 2005*. Prepared for the National Park Service, Golden Gate National Recreation Area. Division of Natural Resource Management and Science. U.S. Fish and Wildlife Service, Portland Regional Office. Pp. 26.
- Fong, D., C. Crooker, S. Bennett, R. Bianco, J. Campo and M. Reichmuth. 2010. *California Red-legged Frog (Rana draytonii) Surveys, Golden Gate National Recreation Area, Year 2006-2009*. Prepared for: National Park Service, Golden Gate National Recreation Area Division of Resource Management and U.S. Fish and Wildlife Service, Endangered Species Permits Ecological Services. Portland Regional Office. March 2010.
- Gardali, T., S.E. Scoggin and G.R. Geupel. 1999. *Songbird use of Redwood and Lagunitas Creeks: Management and Restoration Recommendations Report*. Golden Gate National Recreation Area. Point Reyes Bird Observatory, Stinson Beach, CA. Pp. 26.
- Garza, C. and Gilbert-Horvath 2003. *Genetics of coho salmon (Oncorhynchus kisutch) held at the Warm Springs (Don Clausen) Hatchery for recovery efforts in the Russian River Report*. NOAA Southwest Fisheries Science Center. Santa Cruz Laboratory, Santa Cruz, California.
- Golden Gate National Recreation Area (GOGA). 2002. Lower Redwood Creek Interim Flood Reduction Measures and Floodplain/Channel Restoration Environmental Assessment. Pp. 55.

- Golden Gate National Recreation Area (GGNRA). 2005. *Fire Management Plan, Final Environmental Impact Statement*. Golden Gate National Recreation Area. November 2005. Website: <http://parkplanning.nps.gov/goga>.
- Gramann, J. 1999. The Effect of Mechanical Noise and Natural Sound on Visitor Experiences in Units of the National Park System. *Social Science Research Review*, Vol. 1, No. 1, Winter 1999.
- Halterman, M. and S. Laymon. 2000. *The Effects of Brown-headed Cowbird Parasitism on Neotropical Migrants in Golden Gate National Recreation Area Report*. Prepared by Kern River Research Center.
- Jones and Stokes. 2002. *Farad Diversion Dam Replacement Project DEIS*. Prepared for CA State Water Resources Control Board, March 2002.
- Jones and Stokes. 2007. *Wetland and Creek Restoration at Big Lagoon, Muir Beach, Marin County Final Environmental Impact Statement, Environmental Impact Report*. Prepared for, Golden Gate National Recreation Area, National Park Service, San Francisco, CA and Marin County Community Development Agency, San Rafael. December 2007.
- Jones and Stokes. 2007. "Wetland and Creek Restoration at Big Lagoon, Muir Beach, SCH#2004042143, Final Environmental Impact Statement/Environmental Impact Report." Prepared for National Park Service, Golden Gate National Recreation Area and Marin County Community Development Agency.
- Kennedy Jencks Consulting. 2010. Golden Gate National Recreation Area; Storm Water Management Plan, Appendix C – BMP Handbook.
- Lendvay, J.M. and T.L. Benning. 2006. *Redwood Creek Watershed Environmental Assessment, 2004-2006*. Department of Environmental Science. University of San Francisco. Pp. 69.
- Lile, Thomas. 1973. "Forts Baker, Barry, and Cronkhite National Register of Historic Places Nomination Form."
- Marin County. 1994. *Community Development Agency-Countywide Plan, Marin Countywide Plan*. Website: <http://www.co.marin.ca.us/depts/CD/main/comdev/ADVANCE/cwp/ENVHAZ.cfm>. Accessed, May, 2010.
- Marin County. 2004. *Marin County Watershed Management Plan Administrative Draft*. Prepared by, Prunuske Chatham, Inc. Website: [http://co.marin.ca.us/depts/CD/main/comdev/Watershed/WMP\\_Pt1.pdf](http://co.marin.ca.us/depts/CD/main/comdev/Watershed/WMP_Pt1.pdf). Accessed, June 1, 2010.
- Marin County. 2005. *Geology, Mineral Resources and Hazardous Materials Technical Background Report*. Marin County Community Development Agency, Planning Division. March 2002; Updated November 2005. Website: [http://www.co.marin.ca.us/depts/CD/main/pdf/planning/Geology\\_Background\\_Report.pdf](http://www.co.marin.ca.us/depts/CD/main/pdf/planning/Geology_Background_Report.pdf). Accessed, June 2010.
- May and Associates. 2005. *Biological and Essential Fish Habitat Assessment for Federally-Listed and Candidate Species Potentially Affected by the Golden Gate National Recreation Area's Fire Management Plan*. Prepared for GGNRA Natural Resources Division, San Francisco CA.

- May and Associates. 2007. *Biological Assessment Marin Headlands - Fort Baker Transportation Management Plan and Coastal Corridor Enhancement Project*. Prepared for, GGNRA Natural Resources Division, San Francisco CA.
- Merkle, B. 2010. *Wildlife Biologist, Golden Gate National Recreation Area*. October 2010.
- Meyer, J. 2005. *Geoarchaeological Study of Big Lagoon, Lower Redwood Creek, Marin County, California*. Anthropological Studies Center, Sonoma State University, Rohnert Park, California. Prepared for Golden Gate National Recreation Area, National Park Service, San Francisco.
- \_\_\_\_\_. 2003. "An Overview of Geoarchaeological Issues." In *Archaeological Research Issues for the Point Reyes National Seashore and Golden Gate National Recreation Area*, edited by Suzanne Stewart and Adrian Praetzelis. Prepared by the Anthropological Studies Center, Sonoma State University, Rohnert Park, California. Prepared for Golden Gate National Recreation Area, National Park Service, San Francisco.
- Moyle, P. 2002. *Inland Fishes of California*. University of California Press. Pp. 502.
- National Institute for Occupational Safety and Health. 2006. *Occupational Noise Exposure, Recommendations for a Noise Standard*.
- National Marine Fisheries Service (NMFS). 2000. *NMFS California Anadromous Fish Distributions: California Coastal Salmon and Steelhead Current Stream Habitat Distribution Table*. Prepared by Weldon Jones, Southwest Regional Office of the National Oceanic and Atmospheric Administration. Website: <http://swr.nmfs.noaa.gov/hcd/marin.pdf>. Accessed, June 3, 2010.
- National Park Service (NPS). 1980. *General Management Plan and Environmental Analysis*. Golden Gate National Recreation Area and Point Reyes.
- \_\_\_\_\_. 1992 "Memorandum from Park Historian to Chief, Division of Resource Management and Planning regarding Cultural Resources Assessment of Fort Barry Balloon Hangar (FA-905)."
- \_\_\_\_\_. 1994. GGNRA vegetation GIS layers. Point Reyes National Seashore, Unpublished Material, Vegetation Map - Point Reyes National Seashore and Golden Gate National Recreation Area - 1994 Aerial Photos.
- \_\_\_\_\_. 1998. GGNRA Vegetation GIS Layers.
- \_\_\_\_\_. 1999. *Fort Baker Plan, Final Environmental Impact Statement*.
- \_\_\_\_\_. 2001. *Director's Order 12: Conservation Planning, Environmental Impact Analysis, and Decision making*. Washington, DC. Website: <http://www.epa.gov/EPA/IMPACT/2001/January/Day3/11876.htm>.
- \_\_\_\_\_. 2004. *Golden Gate National Recreation Area Marine Mammal Center Site and Facilities Improvements Environmental Assessment*. Golden Gate National Parks, San Francisco CA.
- \_\_\_\_\_. 2005. *Fire Management Plan, Final Environmental Impact Statement*. Golden Gate National Recreation Area. November 2005. Website: <http://parkplanning.nps.gov/goga>.
- \_\_\_\_\_. 2005a. *Golden Gate National Recreation Area Fire Management Plan Draft Environmental Impact Statement*. Golden Gate National Parks, San Francisco, CA.

- \_\_\_\_\_. 2005b. *Cultural Landscape Report for Fort Baker, Golden Gate National Recreation Area*. Golden Gate National Parks. July 2005.
- \_\_\_\_\_. 2005c. Fort Barry Balloon Hangar and Motor Vehicle Sheds, Golden Gate National Recreation Area, Abbreviated Historic Structures Report.
- \_\_\_\_\_. 2006. *Management Policies 2006*.
- \_\_\_\_\_. 2007. *Big Lagoon Environmental Impact Statement*. Chapter 3-15 (See attached file: Sea level Rise Big Lagoon FEIS NPS 2007 Chapter 3 p.docx).
- \_\_\_\_\_. 2008. *Annual Report*. Tennessee Valley Mounted Patrol.
- \_\_\_\_\_. 2008a. Ranch A/B (Miwok Stables), Golden Gate National Recreation Area, Cultural Landscapes Inventory.
- \_\_\_\_\_. 2008b. Ranch M/Golden Gate Dairy, Golden Gate National Recreation Area, Cultural Landscapes Inventory.
- \_\_\_\_\_. 2009a. *Headlands Institute Campus Improvement and Expansion Plan Environmental Assessment*. Golden Gate National Recreation Area. United States Department of the Interior, National Park Service. June, 2009.
- \_\_\_\_\_. 2009b. Marin Headlands and Fort Baker Transportation Infrastructure and Management Plan, Marin County, California, Final Environmental Impact Statement. Golden Gate National Recreation Area. March.
- Natural Resources Conservation Service (NRCS). 2007. *Marin County, California (CA041) Soil Survey*. United States Department of Agriculture- Natural Resources Conservation Service, National Soil Information System (NASIS). NRCS National Soil Survey Center, Lincoln, NE. Website: <http://soildatamart.nrcs.usda.gov/ssurgometadata.aspx>. Accessed, May 2010.
- Natural Resources Conservation Service (NRCS). 2010. *Websoil survey website to find properties of soils in and around stables*. Available: <<http://websoilsurvey.nrcs.usda.gov>>. Accessed May 2010.
- Osanna, Dan, and Warren Wulzen. 2007. "Dias Ridge and Coast View Trails Rehabilitation and Access Improvement Project, Historic Property Summary Report with Finding of Effect." Prepared by California Department of Parks and Recreation Acquisition and Development Division, Northern Service Center Resources Section. Prepared for National Park Service, Golden Gate National Recreation Area and California Department of Parks and Recreation, Tamaulipas State Park.
- Williams, P. and Associates, Ltd. (PWA). 2003. *Big Lagoon Wetland and Creek Restoration Project Muir Beach, California, Part I*. Site Analysis Report. Prepared for, the National Park Service. September 26, 2003.
- Platts, W.S., W.F. Megahan and G.W. Minshall. 1983. *Methods for Evaluating Stream, Riparian, and Biotic Conditions*. U.S. Department of Agriculture.

- Psota, S. 2007. A Late Period Site Near Big Lagoon, Muir Beach: Archaeological Evaluation of Shell Midden CA-MRN-674, Marin County, California. Prepared by the Anthropological Studies Center for National Park Service.
- Regional Water Quality Control Board (RWQCB). 2007. *Water Quality Control Plan (Basin Plan) for the San Francisco Bay Basin*. San Francisco Bay Regional Water Quality Control Board. Website: [http://www.waterboards.ca.gov/sanfranciscobay/basin\\_planning.shtml](http://www.waterboards.ca.gov/sanfranciscobay/basin_planning.shtml). Accessed, June 1, 2010.
- Regional Water Quality Control Board (RWQCB). 2009. *Draft 2008 California 303(d)/305(b) Integrated Report: Supporting Information*. San Francisco Bay Regional Water Quality Control Board. Website: [http://www.waterboards.ca.gov/sanfranciscobay/water\\_issues/programs/TMDLs/303dlist.shtml](http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/TMDLs/303dlist.shtml). Accessed, June 10, 2010.
- Regional Water Quality Control Board (RWQCB). 2010a. *Basin Plan Amendments Under Development: Addition of Water Bodies and Beneficial Uses to San Francisco Bay Basin Water Quality Control Plan*. San Francisco Bay Regional Water Quality Control Board. Website: [http://www.waterboards.ca.gov/sanfranciscobay/basin\\_planning.shtml](http://www.waterboards.ca.gov/sanfranciscobay/basin_planning.shtml). Accessed, June 1, 2010.
- Regional Water Quality Control Board (RWQCB). 2010b. *Proposed 2010 Integrated Report (Clean Water Act 303(d) List and 305(b) Report)*. April 2010. Website: [http://www.waterboards.ca.gov/water\\_issues/programs/tmdl/records/state\\_board/2010/ref2772.zip](http://www.waterboards.ca.gov/water_issues/programs/tmdl/records/state_board/2010/ref2772.zip). Accessed, June 10, 2010.
- Reichmuth, M., D. Fong and D. Press. 2005. *Long-term Coho Salmon and Steelhead Trout Monitoring Program in Coastal Marin County – Redwood Creek Summer Basinwide Monitoring Report*. Unpublished report prepared for California Department of Fish and Game, Point Reyes Seashore Association, and San Francisco Area Network Inventory and Monitoring Program. National Park Service. Pp. 20.
- Schanz, R.W., J. Florsheim and P.B. Williams. 1995. *Analysis of land use impacts on water quality and quantity in Redwood Creek*. Prepared for the National Park Service, Golden Gate National Recreation Area. Phillip Williams & Associates, Ltd. San Francisco, CA. Pp. 65.
- Semenhoff-Irving, M. and J.A. Howell. 2005. *Pilot Inventory of Mammals, Reptiles, and Amphibians*. Golden Gate National Recreation Area, California, 1990-1997. US Geological Survey, Open-File Report 2005-1381, Pp. 107.
- Shaw, D.S. 2006. *Wetland Processes and Restoration Opportunities in the Rodeo Lagoon Watershed, Golden Gate National Recreation Area, Marin County, California*. Master's Thesis. Submitted in partial satisfaction of the requirements for the degree of Master of Landscape Architecture in Landscape Architecture and Environmental Planning. University of California, Berkeley. Pp. 137.
- Siskin, Barb, and Jennifer Lang. 2010. Final Marin Equestrian Stables Plan Summary of the National Park Service (NPS) Cultural Landscape Workshop, June 1 and 2, 2010. Submitted to Andrea Lucas, National Park Service. Golden Gate National Recreation Area, California.
- Smith, J.J. 1994. *The Effect of Drought and Pumping on Steelhead and Coho in Redwood Creek from July to October 1994*. Prepared for the National Park Service, Golden Gate National Recreation Area. San Jose, CA. Pp. 6.

- Smith, J.J. 1997. *Distribution and Abundance of Coho and Steelhead in Redwood Creek in Fall 1997*. Prepared for the National Park Service, Golden Gate National Recreation Area. San Jose, CA. Pp. 9.
- Smith, J.J. 2001. *Distribution and Abundance of Juvenile Coho and Steelhead in Redwood Creek in Fall 2001*. Prepared for the National Park Service, Golden Gate National Recreation Area. San Jose, CA. Pp. 9.
- Stafford, S. and A. Horne. 2004. *A Review of the Water Quality Monitoring Programs in the National Parks in Central Coastal California* Report. National Park Service. Prepared for Ecological Engineering Group, Department of Civil & Environmental Engineering. University of California, Berkeley. Pp. 80.
- Stillwater Sciences. 2005. *Redwood Creek Watershed Assessment – Draft Chapter 1: Watershed Characterization*. Prepared for, Golden Gate National Recreation Area. Stillwater Sciences. Berkeley, CA.
- Stralberg, D. and T. Gardali. 2007. *Developing Habitat-based Landbird Models as Planning Tools*. Prepared for the Golden Gate National Recreation Area, and the Point Reyes National Seashore. Golden Gate National Parks Conservancy, and the Golden Gate National Recreation Area. PRBO Contribution #1551.
- Thompson, Erwin N. 1979. *Seacoast Fortifications, San Francisco Harbor, Golden Gate National Recreation Area, Historic Resource Study*. Prepared by National Park Service. United States Code (USC). 2010.
- United States Council on Environmental Quality (CEQ). 1978. Section 1501.2.
- United States Environmental Protection Agency (USEPA). 1986. *Quality Criteria for Water Report*. U.S. EPA Office of Water, Regulations and Standards.
- United States Environmental Protection Agency (USEPA). 1997. *Volunteer Stream Monitoring: A Methods Manual*. U.S. EPA, Office of Water. EPA 841-B-97-003. Website: <http://www.epa.gov/owow/monitoring/volunteer/stream/>. Accessed, June 7, 2010.
- United States Environmental Protection Agency (USEPA). 2000. *Ambient Water Quality Criteria Recommendations: Information Supporting the Development of State and Tribal Nutrient Criteria for Rivers and Streams in Nutrient Ecoregion III - Xeric West*. U.S. EPA Office of Water, Office of Science and Technology. Health and Ecological Criteria Division Washington, D.C. EPA 822-B-00-016.
- United States Fish and Wildlife Service (USFWS). 2004. *Draft Recovery Plan for the Tidewater Goby (Eucyclogobius newberryi)*. U.S. Fish and Wildlife Service, Portland, Oregon. Pp. 163.
- United States Fish and Wildlife Service (USFWS). 2005. *Recovery Plan for the Tidewater Goby (Eucyclogobius newberryi)*. U.S. Fish and Wildlife Service, Portland, Oregon. Pp. 199.
- United States Fish and Wildlife Service (USFWS). 2010. *Endangered and Threatened Wildlife and Plants: Revised Designation of Critical Habitat for California Red-Legged Frog; Final Rule*. Federal Register. Pp. 75(51):12815-12864. March 17, 2010.

- United States Geological Survey (USGS). 1997. *Summary Distribution of Slides and Earth Flows in the San Francisco Bay Region; Open-File Report 97-745C*. United States Geological.
- United States Geological Survey (USGS). 2010. *Water Science for Schools: Common Water Measurements*. Website: <http://ga.water.usgs.gov/edu/characteristics.html>. Accessed, June 7, 2010.
- Van de Grift, J. 2009. *Slope Failure*. Website: <http://www.naturalhazards.org/hazards/slope/index.html>. Accessed, June, 2010.
- Vore, D. 1997. *Water Quality Associated with GGNRA Stables*. Memorandum to Dale Hopkins and Alan Friedman. Regional Water Quality Control Board. Golden Gate National Recreation Area. February. Cited in Headlands Institute EA, 2009.
- Weeks, Nicholas, and Elizabeth McKee. 2006a. "Ranch A/B/Cunha Ranch, Golden Gate National Recreation Area, National Register of Historic Places Nomination Form." Prepared for National Park Service.
- \_\_\_\_\_. 2006b. "Ranch M/Golden Gate Dairy, Golden Gate National Recreation Area, National Register of Historic Places Nomination Form." Prepared for National Park Service.
- Wood, L.L. 2004. *Big Lagoon Amphibian Surveys Final Report*. GGNRA Tennessee Valley Seep and Stream Amphibian Surveys. Prepared for, Darren Fong, Golden Gate National Recreation Area, National Park Service. July 15, 2004.

# **APPENDIX A**

## **Public Programs for Public Stables**

**Below is a list of public programs found at stables operating on public lands. These are listed to provide ideas for programs for GGNRA stables.**

### **General**

Public access to and around the stable  
Disabled access to stables and the equestrian experience  
Programs for disabled riders  
Programs for non-riders  
Scholarships or sponsored equestrian activities  
Volunteerism and stewardship

### **Interpretation**

Interpretation- live  
Interpretation- displays; permanent and temporary  
Park education, cultural and natural history

### **Learning with horses**

General riding and horse mastership lessons  
School visits  
Environmental/Horse care horsemanship  
At-risk youth program  
Inner-city youth and adult programs  
Therapy with horses; physical and emotional  
Veterans, programs  
Trail rides  
Park tours

### **Events**

For "horse people"; children and adults  
Horse shows and competitions  
Barn tours  
Trail rides; group events  
Overnight ride and camp  
Clinics  
Specialty training and demonstrations

### **For non-riders**

Hands-on for non-riders  
"Day at the ranch"  
Wagon and carriage rides  
Displays  
Horsemanship for non-riders  
Good-neighbor outreach  
Runners, hikers and bikers outreach  
4-H club  
Horse art, drawing or painting  
Pony walks; horses on lead-line for children and adults

Demonstrations such as shoeing, trick riding, specialty horses)  
Parades

### **Special facilities**

Equestrian-oriented Trailhead, watering, tie-ups, picnicking, manure bins

**Trail "rest-stops" with watering, tie-ups, picnicking**

Overnight guest horse accommodations;

Trailer parking, paddocks or stalls for overnight horse guests

Horse stalls and office for volunteer trail patrols

### **Sources of Income**

Lessons

Pony clubs, lead-line walks

Trail rides, sightseeing

Boarding

Tours

Summer camp

Clinics

Horse Masters Program

Sponsorship Program

Vending machine

Hats, t-shirts, photos

Special events

### **Miscellaneous**

Provide hand cleaning, restroom

Wait list: develop open wait lists for each site and for programs, consider lottery and no wait-list

Safety and education: Animal safety program

Rider safety

Education and behavior program for equestrian trail users: could include manure pick-up, passing behavior

# **APPENDIX B**

## **BEST MANAGEMENT PRACTICES FOR GGNRA STABLES**

Best Management Practices (BMPs) will be “common to all alternatives” and become part of whichever alternative is chosen. The BMPs are attached as an appendix to the environmental documents.

Purpose: The purpose of the GGNRA Stables BMPs are to protect park natural resources, and water quality, cultural resources, domestic animals and wildlife, and the safety of park users and visitors.

Below is a list of techniques that will be required of the stable lessee to meet these goals. If a particular BMP is determined not to be applicable, or if other technology serves the same purpose, it would not be required.

The techniques are divided into categories, some of which crossover such as “Water Quality” and “Manure Management”.

### **BMP Categories**

#### **1. Manage Storm Water and Runoff to Protect Water Quality**

A note about water and soil quality: There are natural sources of bacteria and sediment in streams, however, keeping horses concentrated in confined sites such as stalls, paddocks and arenas can have a marked increased impact on soil and water quality. The pounding of horse hooves, daily distribution of feed, constant production and collection of horse manure, and the use of horse health products such as shampoos and de-wormers each have potential impacts to soils and waters near a stable.

The goal is the protection of clean water and natural water sources such as streams and groundwater. Objectives are to:

- Divert clean runoff to streams – bypassing potentially polluted water found in horse use areas.
- Collect potentially polluted water found in horse use areas and send to settling or treatment zones prior to running into streams.
- Manage manure and horse areas to reduce impacts to water of manure, urine, stables products, and soil.

#### **2. Control Erosion and Sediment**

The goal is the protection of clean water and natural water sources such as streams and groundwater. The goal is to protect air from air-borne soil and manure particles, and to preserve the soil resource. Objectives are to:

- Keep soil in place and in good condition.
- Keep vegetation and soil protectors such as mulch or paving in good condition.
- Keep bare dirt areas at a low slope and away from fast flowing water.
- Divert runoff around potentially bare soil areas especially paddocks and turnouts.
- Reduce speed of runoff across bare soil areas.

### **3. Manage Manure**

The goal is the protection of clean water, clean air and natural resources such as soil, vegetation, streams and groundwater. Objectives are to:

- Divert clean runoff to streams – bypassing potentially polluted water found in horse use areas.
- Collect potentially polluted water found in horse use areas and sending to settling or treatment zones prior to running into streams.
- Manage manure and horse areas to reduce impacts to water of manure and urine.
- Control manure to interrupt insect reproduction.

### **4. Manage Stables**

The goal is the protection of clean water and soils, and the creation of low-impact stables. Objectives are to utilize environmentally-friendly products in a minimally impactful way, and to cut or control use and runoff of pesticides and medications, or other products that potentially harm biota. Products might include soaps, pest control products, medications, cleaners, and feed.

### **5. Protect Cultural Resources**

The goal is to identify, preserve and protect historic and cultural resources per Park and federal law. Objectives are to rehabilitate and reuse historic structures and landscapes in a compatible manner that preserves them for future generations, and to add new structures or changes to cultural landscapes in a compatible way.

### **6. Enhance Stables Safety**

The goal is to enhance the safety of the animals, lessees, park users, and visitors. Objectives include site planning for safe operations and emergency access, and safe operations.

### **The BMPs**

#### **1. Manage Storm Water and Runoff to Protect Water Quality**

Storm water, runoff, and separation of clean and polluted water

- Manage clean water

Clean water is defined herein as rain, as surface water, as runoff from pasture and vegetated landscapes that surround the stables, as water in streams and drainages that do not originate within the stables, and as groundwater.

- Manage polluted water

Polluted water is surface water, ground water and runoff that contain pollutants. Pollutants include manure, urine, feed, wash water, detergents, surface soils, sediment, chemicals, pesticides, medicine, vehicles products, and horse grooming products. Clean water can be negatively affected when flowing across stables areas by picking up potential pollutants describes above. Sources of polluted water include horse confinement areas, stalls, feeding sites paths, paddocks, manure storage, septic systems, feed and washing sites, septic systems, vehicles, and parking areas.

### Runoff and Drainage

Site drainage will be managed and maintained to create a well-draining site and to prevent water pollution by separating clean runoff from polluted runoff.

Runoff from animal areas will not come in contact with, or drain directly into surface waters and will be controlled by diverting runoff from animal areas, by covering manure collection containers.

Clean runoff will be drained around or away from animal use area and enclosures.

### Water Quality Monitoring

Perform regular testing for bacteria, nitrates, pH, and total dissolved solids downstream of the stables, per a defined plan.

### Setbacks

Horse stalls, paddock and turnouts will maintain a 50 foot setback from seasonal streams that dry out in the summer, and a 100 foot setback from streams that run all year.

### Underground Drainage System

The stables may have a connected series of drain inlets and piping in which either clean or polluted runoff is separately collected and transported to a drainage, or field, roadside ditch or other location.

### Roof Drains

The stables will collect roof water, considered here a clean water source, via gutters and downspouts. This water will be transported to drainages without crossing over horse use areas.

### Interceptor Ditch and Conveyance

Provide an interceptor ditch for clean water that collects surrounding surface water flowing toward the stable site and conveys it around - rather than through - the site. Within the stable site an interceptor ditch can also pick up polluted runoff and convey it to a pasture, seasonal pond or biofilter.

Berms: Raised linear mounds may be used to guide surface flow and runoff.

Swales: A shallow, vegetated or lined ditch may be used to collect and guide runoff.

Drain Inlets: A point of collection that may be used to guide runoff to an underground drainage system, for example for collection and diversion of horse wash water, or parking lot runoff.

Grading for Drainage: Slope paving, bare soils and vegetated areas at a minimum of one-quarter inch per foot. Maintain and correct grading seasonally.

Culverts: A pipe that allows water to flow beneath a road, walk, or highway may be used for separation of runoff from stables use areas.

Seasonal Treatment Ponds/Sediment Ponds: These may be used to settle polluted runoff, providing a cleaner runoff to streams. The ponds may be lined or unlined depending on soil and groundwater conditions. They are characterized by being above flooding elevations, having a two foot freeboard, being of a volume to contain runoff based on a certain size storm such as 1 inch of rain within 24 hours. These must be maintained and inspected prior to storms, cleaned of solids annually, and sites may be rotated. Such ponds must be professionally located, designed, permitted and inspected and per NPS permits.

Biofilters: Biofilters are similar to seasonal treatment ponds but are filled with vegetation. These may be utilized to provide cleaning or filtering to polluted water. They must be maintained and must be professionally located, designed, permitted and inspected and per NPS permits.

Septic Systems: Various technologies for septic systems that treat sewer and polluted water exist. These must be maintained and must be professionally located, designed, permitted and inspected and per NPS permits.

Drain Fields: Part of a septic system, these areas should be kept covered with grass or small shrubs. Avoid compaction of soil, minimal activity must occur there; no grazing, high-use horse activity, vehicles, paving, construction, or storage of heavy equipment.

## **2. Control Erosion and Sediment**

Soil Management: Soil shall be maintained to avoid loss from erosion, to avoid compaction and to maintain conditions necessary to promote healthy vegetation in non-facility use areas such as buffers and sloped areas. Soil erosion can occur from wind, water or mechanical disturbance, especially on bare, unprotected soils, saturated soils, and steep soils. Hooves cutting and loosening soils on slopes can create dusty soils which can blow away in windy weather. Rain water washing across bare or sparsely vegetated soils causes soil to quickly erode.

Vegetation Management: Vegetation shall be in place to stabilize soils, to settle sediments and to protect water quality. Existing native, historic, or ornamental vegetation will be protected from trampling, being driven or parked on, or other damage.

Vegetated Swale: The vegetated swale is a shallow ditch typically 3 feet wide and 1 foot deep. It has grass or other vegetation growing to keep soil in place and is gently sloped. The swale directs water around structures and site to its destination; for clean runoff to drainage, for polluted runoff to a treatment area.

Lined Swale: Swales shall be lined when sloping or carrying large amounts of runoff. The lined swale is a shallow ditch typically 3 feet wide and 1 foot deep. It is lined with gravel, rock or erosion control fabric to keep soil in place and is gently to moderately slope. The swale directs water around structures and site to its destination; for clean runoff to a drainage, for polluted runoff to a treatment area.

Lined Waterways: Lined waterways have an erosion resistant surface - typically concrete, rock, or synthetic fabric - that extends above the anticipated water flow. These transport water to a final discharge area. The designer needs to calculate speed and velocity of water, noting that flows greater than 5 cubic feet per second may require permanent linings.

Seasonal Restrictions - for paddock or out-doors facility use: Seasonal restrictions to dry season use may be required to protect bare, sloped or lightly vegetated areas in order to reduce soil loss from those areas.

Grading: Gently slope outdoor areas at 2% minimum for drainage, which allows stables use areas to drain, dry, and remain in good condition.

Berms: Earthen mounds that direct or deflect water flow to less erodible zones; used as a slope length reducer and to reduce the speed of water, sheeting, and peak flows

Sediment Trapping: Sediment basins, vegetation, vegetated filter strips, straw wattles, silt fences, and vegetated riparian buffers are all methods of slowing runoff to allow sediment to settle out before water reaches a drainage. Use sandbags in emergencies.

Sediment Basins: A temporary pond used to trap sediment from eroded or disturbed soils; it requires regular cleaning out of sediment, debris and inspection after storms. Trash racks may be required.

Filter Strip: A vegetated strip of land may be used and is designed specifically to trap sediment and horse manure. The strip allows water to move slowly in a sheet formation over the vegetation, which can filter out the sediment. Use around bare, high-use areas such as arenas and paddocks.

Free-draining Layers: Free draining layers can be placed underneath high use areas such as under paddocks, trails, paths, parking and driveways. These include drain rock, geotextile fabrics, subdrains, and cellular confinement systems. Fast-draining materials such as sands, gravels, and mulches, matting or boardwalks can be used to protect the ground.

Rolling Dips: A combination of a water bar and a swale that crosses a path may be used to intercept runoff. It prevents runoff from running down, and eroding, the path or trail.

Water Bars: A trench or interceptor berm or log is placed at intervals along a road or trail to prevent water erosion on sloping trails and roads. This carries water off the road and prevents flooding, washouts and accelerated erosion.

Exclusion Fencing: Fencing will be utilized to keep livestock out of certain areas to prevent hoof impacts to soils and vegetation, and resultant soil loss.

Seasonal Seeding: Seeding before rainy or windy seasons to vegetate bare areas may be required to keep soils in place.

Mulches: Mulches may be utilized to protect soils from erosion. Typically Mulches are bark, wood chips, straw or vegetable material applied on slopes or flat areas to keep soil in place in rainy or windy seasons.

Coir or Straw Rolled Erosion Control Fabrics: Biodegradable fabrics that are stapled onto slopes may be utilized to keep soils in place.

Dust Control: Dust control to prevent airborne erosion may be required. Examples include spraying bare ground or arena footing with water, or mulching or seeding bare ground.

### 3. Manage Manure

Manure will be managed to avoid water pollution, airborne contaminants and dust, and to reduce pests such as fly infestations.

- A Manure Management Plan shall be required.
- Daily collection: Manure and dirty bedding will have daily collection, storage in waterproof and rain-protected containers on site.
- The manure and used stall bedding shall be removed from the site weekly, and will be responsibly disposed of per the plan.
- There will be no open waste storage.
- Manure Shed: Manure shall be stored on a contained, curbed concrete slab that has at least three walls and a roof that fully protects the stored manure from blowing rain and wind. Manure storage containers must be of sufficient capacity to hold greater than the expected weekly manure.
- Divert Runoff- The manure management plan will specify the measures that will be used to assure that clean water runoff is directed away from manure storage areas.

### 4. Manage Stables

Stables Products and Chemicals: In general, stables products and chemicals will be used minimally, only as necessary for the health and safety of the animals and users. Use those that are safe for the environment. Runoff that may contain these products shall be treated as polluted runoff.

Weed-free Feed Weed-free feed may be required to prevent the introduction and spread of invasive plant species to sensitive habitats within the Park. For example, when stables horses use nearby trails, the stables may be required to purchase animal feed that has been certified weed-free by a California County Agricultural Commissioner.

Low Water Use: There will be in place practices to control and minimize water use. Examples that may be required include:

Float valve type or nose pumps activated by the animal for stall or turnout watering bowls.

Low water use vegetation

Efficient (even water distribution), professionally designed sprinkler systems for dust control in arenas.

Rainwater collection for allowed uses.

### 5. Enhance Stables Safety

Stables Safety Practices

Emergency response: For stables safety these elements will be required:

- Telephone (landline) shall be installed on site with emergency and important contact information posted nearby.
- An overnight caretaker shall be on site.
- Horse Trailer(s): A minimum number of horse trailers shall be stored on site to provide emergency horse evacuation.
- Marin County Equine Safety Program: The Marin County Equine Evacuation and Rescue Program (EQEVAC) shall be incorporated or adapted
- Stables Safety Plan for emergency response, including for fire, earthquake, flooding, drought and veterinary emergencies shall be required.

- Site and Facility Planning for emergency access, horse rescue, fire and earthquake safety will include:
  - Separate combustibles from animals: hay and feed and fuel/fueled equipment shall be separated at least 25 feet from horse stalls.
  - Open safety egress horses, for trailers and large vehicles.
  - Safety turnout or zone to take horses in case of emergency.
  - Water storage, generator, pump and fire hose easily accessible to lessee or emergency personnel.
  - Hazard tree program: Trees that are deemed hazardous to animals or humans shall be identified, treated or removed.

## 6. Additional Requirements:

- A. Educational Opportunities:** Provide opportunities to educate the public about BMPs by classes, signs and by stewardship opportunities.
- B. Light Pollution:** Light pollution will be controlled at each site per NPS guidelines and policies for Protection of the Night Sky. New and existing lighting will use full cut-off fixtures and will be placed only where needed for safety or night operations.
- C. Management and maintenance plans:** The stables lessee will provide management and maintenance plans to the park as a condition of their lease. The lessee must provide to NPS for NPS approval a *Storm Water Management Plan* and a *Manure Management Plan*. A *Vegetation Management Plan* or *Winterizing Plan* may be part of the *Storm Water Management Plan* or the *Maintenance Management Plan*.
- D.** The *Storm Water Management Plan* will show the drainage system on a site plan or aerial photograph; the separation and conveyance of clean and polluted waters, treatment areas, slope directions, along with activities and zones such as for erosion control revegetation, vegetated strip maintenance, and will describe the minimum frequency of upkeep. It will show wells, creeks, drainage structures, and septic systems. The plan will include the contact information for the person responsible and his or her title. GGNRA is in the process of creating a park-wide storm water management plan for construction activities.
- E.** The *Manure Management Plan* will include an aerial plan showing the location of the covered manure bin and shed or other storage techniques. It will state the frequency of manure maintenance such as cleaning of stalls and grounds, and storage. It will explain the manure disposal technique including covered hauling, destination, and a statement about the disposal, treatment, or composting process and location. It will include the contact information for the person responsible and his or her title.
- F. Motorized Equipment**
  - Vehicle pollution control
    - Fuel, lubricants, fluids, solvents shall be kept in legal containers away from animals or residences.
    - Cleaning and Fueling
      - Cleaning and fueling shall not be done on site except for small equipment if necessary.
      - Fueling areas must use drip pans and treat fuel as a hazardous material

- Maintenance of motorized equipment and vehicles shall be performed off-site.
  - Fluids from motorized equipment shall be disposed of legally.
- Parking and soil compaction; park from streams and control runoff from parking areas.

**G. Waste and Recycling**

- Keep all assigned areas free of litter, garbage, abandoned equipment, vehicles, furniture or fixtures.
- Use adequate GGNRA approved trash and garbage containers within the assigned areas.
- To prevent pest attraction and breeding, all garbage will be adequately protected.
- **All materials generated as solid waste must be removed from the Park at the lessee's expense and disposed of at an approved land fill or disposal site outside the boundary of GGNRA, unless otherwise allowed by NPS.**
- Slash, untreated wood, and tree branches from on-site will be allowed to be mulched and used on site.
- Participate in park recycling programs, including composting programs if requested or permitted by the Superintendent.

**References**

Website:

<http://www.mcstoppp.org/> An excellent, up-to-date source for BMPs and technologies  
[www.extendinc.com/weedfreefeed/](http://www.extendinc.com/weedfreefeed/)

Two books oriented to Marin County horse and rural properties and are illustrative guides for many of these Best Management Practices:

Horsekeeping: A Guide to Land Management for Clean Water (San Francisco Bay Resource and Development Council, 2001) and

Groundwork (L. Prunuske, Marin Resource Conservation District, 1987)

## APPENDIX C

### **National Park Service Management Policies 2006**

With conservation as its predominant mandate, the NPS seeks to avoid or to minimize adverse impacts on park resources and values. While the NPS has discretion to allow negative impacts when necessary, the NPS cannot allow an adverse impact that constitutes resource impairment (NPS, 2006a). The NPS *Management Policies 2006* that are particularly relevant to the Marin Equestrian Stables Plan are outlined below.

**Accessibility for Persons with Disabilities (1.9.3).** "All practicable efforts will be made to make NPS facilities, programs, services, employment, and meaningful work opportunities accessible and usable by all people, including those with disabilities."

Relationship to Plan – Planning for equestrian facility components will include all practical efforts to make the equestrian facilities, programs, and services accessible to all people.

**Introduction or Maintenance of Exotic Species (4.4.4.1).** " ... Domestic livestock such as ... horses ... are exotic species that are maintained in some parks for ... recreational use; or for administrative use for maintaining the cultural scene or supporting park operations. ... The Service will ... manage recreational and administrative uses of livestock to prevent those uses from unacceptably impacting park resources."

Relationship to Plan – Maintaining horses and stables within the GGNRA for purposes of recreational or administrative use is appropriate where management prevents unacceptable impacts.

**Sustainable Facility Planning and Design (9.1.1).** "Designs for park facilities, regardless of their origin (NPS, contractor, concessioner, or other), will use NPS facility models for space and function requirement and will be harmonious with and integrated into the park environment. They will also be subject throughout all phases of design and construction to the same code compliance; the same high standards of sustainable design, universal design, and functionality; and the same review and approval processes. NPS requirements for sustainable design and functionality include protection of the natural and cultural environments, resource conservation, energy conservation, pollution prevention, defensible space for fire safety, and fostering education about sustainable design and practices."

**Historic Property Leases and Cooperative Agreements (5.3.3).** "The National Park Service may permit the use of a historic property through a lease or cooperative agreement if the lease or cooperative agreement will ensure the property's preservation."

Relationship to Plan – Stable leases will include appropriate requirements necessary to ensure the property's preservation.

**Treatment of Cultural Resources (5.3.5).** "The Park Service will provide for the long-term preservation of, public access to, and appreciation of the features, materials, and qualities contributing to the significance of cultural resources."

Relationship to Plan – The project provides for appropriate restoration, management and interpretation of cultural resources for preservation and public appreciation.

**Appropriate Use (8.1.1).** “In exercising its discretionary authority, the Service will allow only uses that are (1) appropriate to the purpose for which the park was established, and (2) can be sustained without causing unacceptable impacts.”

Relationship to Plan – Equestrian use and stables are appropriate uses which tier from the park’s enabling legislation and were anticipated in the park’s 1980 General Management Plan.

**Process for Determining Appropriate Use (8.1.2).** “In all cases, impacts from park uses must be avoided, minimized, or mitigated through one or more of the following methods:

- Visitor education and civic engagement
- Temporal, spatial, or numerical limitations on the use
- The application of best available technology
- The application of adaptive management techniques”

Relationships to Plan – These filters described in section 8.1.2 are applied to existing and proposed sites for equestrian use in this plan.

**Leases (8.12).** “In accordance with 36 CFR Part 18, the National Park Service may enter into a lease for the use of any park property—historic or nonhistoric (except nonhistoric land)—if certain determinations are first made by the appropriate regional director (who may re-delegate this authority to superintendents).”

Relationship to Plan – Equestrian leases on historic and non-historic properties must protect the park resources, provide fair market value to the park, and will not deprive the park of property necessary as described.

**Recreational Activities (8.2.2).** “Examples of the broad range of recreational activities that take place in parks include, but are not limited to, boating, camping, bicycling, fishing, hiking, horseback riding and packing, outdoor sports, picnicking, scuba diving, cross-country skiing, caving, mountain and rock climbing, earth caching, and swimming.”

Relationship to Plan – Horseback riding is an activity that is determined appropriate and allowable on the basis of park-specific planning.

**Recreational Pack and Saddle Stock Use (8.2.2.8).** “...Planning for recreational stock use should be conducted in the context of visitor use planning to address social, biological, and physical carrying capacity considerations, and to make allocation decisions that minimize potential conflicts between and among user groups, identify the need for supporting infrastructure.”

Relationship to Plan – The EA addresses these issues throughout the Plan per section 8.2.2.8. **Park Facilities – General (9.1).** “The Service must also recognize the ongoing operations and maintenance costs of its facilities and be able to sustain them over time.”

Relationship to Plan – Continued use and occupancy of the existing sites allows for the continued preservation of those historic resources and non-historic facilities. For these and any new development the filters above apply.

**Integration of Facilities into the Park Environment (9.1.1.2).** “If facilities must be located inside park boundaries, the preferred locations will be those that minimize impacts on park resources and are situated to stimulate the use of alternative transportation systems, bicycle routes, and pedestrian walkways. When structures are no longer functional in their present locations or are determined to be inappropriately placed in important resource areas, they will be removed subject to appropriate compliance. When the determination has been made through a planning process that it is appropriate for a facility to be constructed within park boundaries, all facilities will be integrated into the park landscape and environs with sustainable designs and systems to minimize environmental impact.”

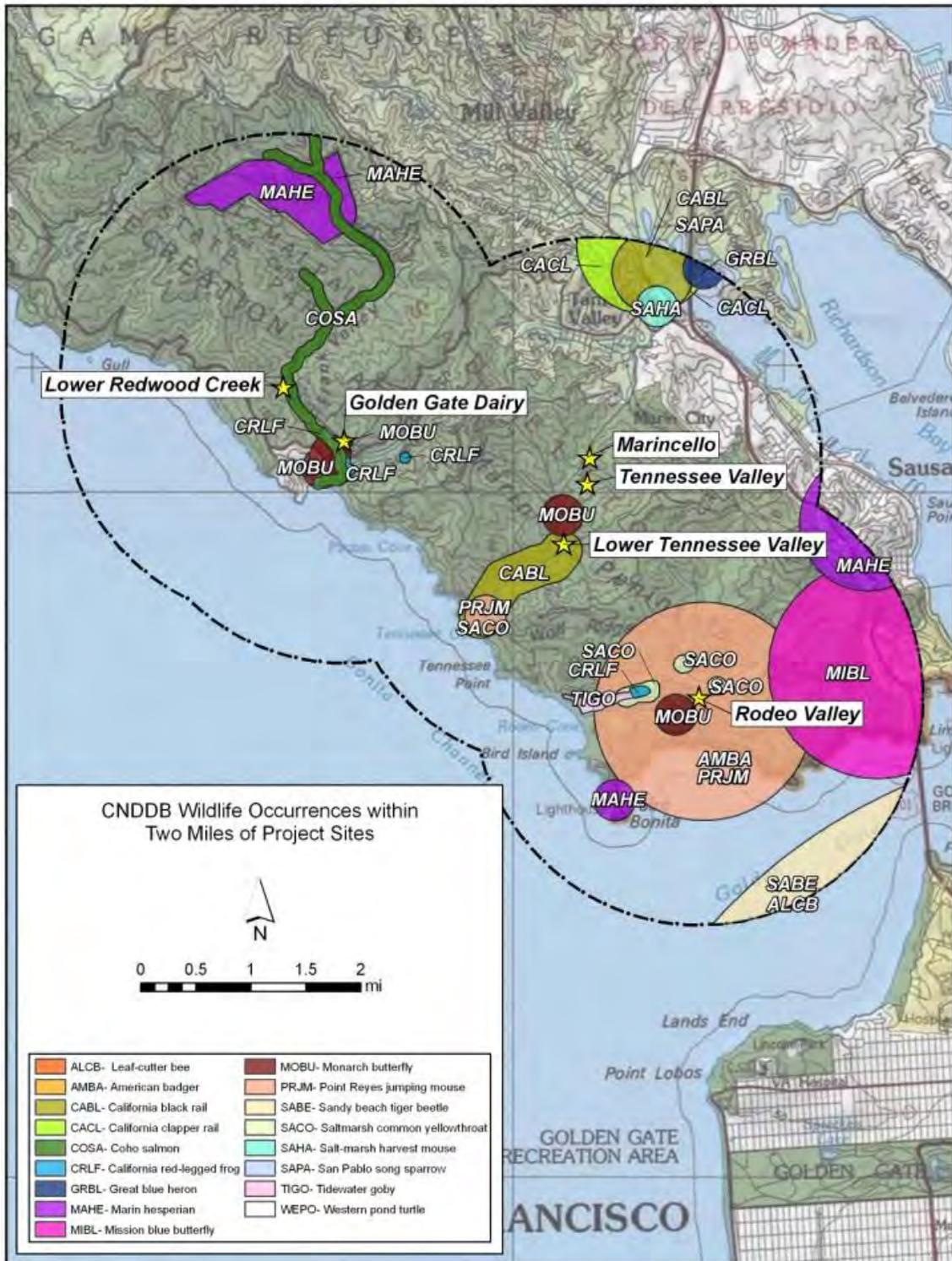
Relationship to Plan – Sites is evaluated for relationship to trails and public transportation. Structures are evaluated for use or removal. For these and any new development the filters above apply.

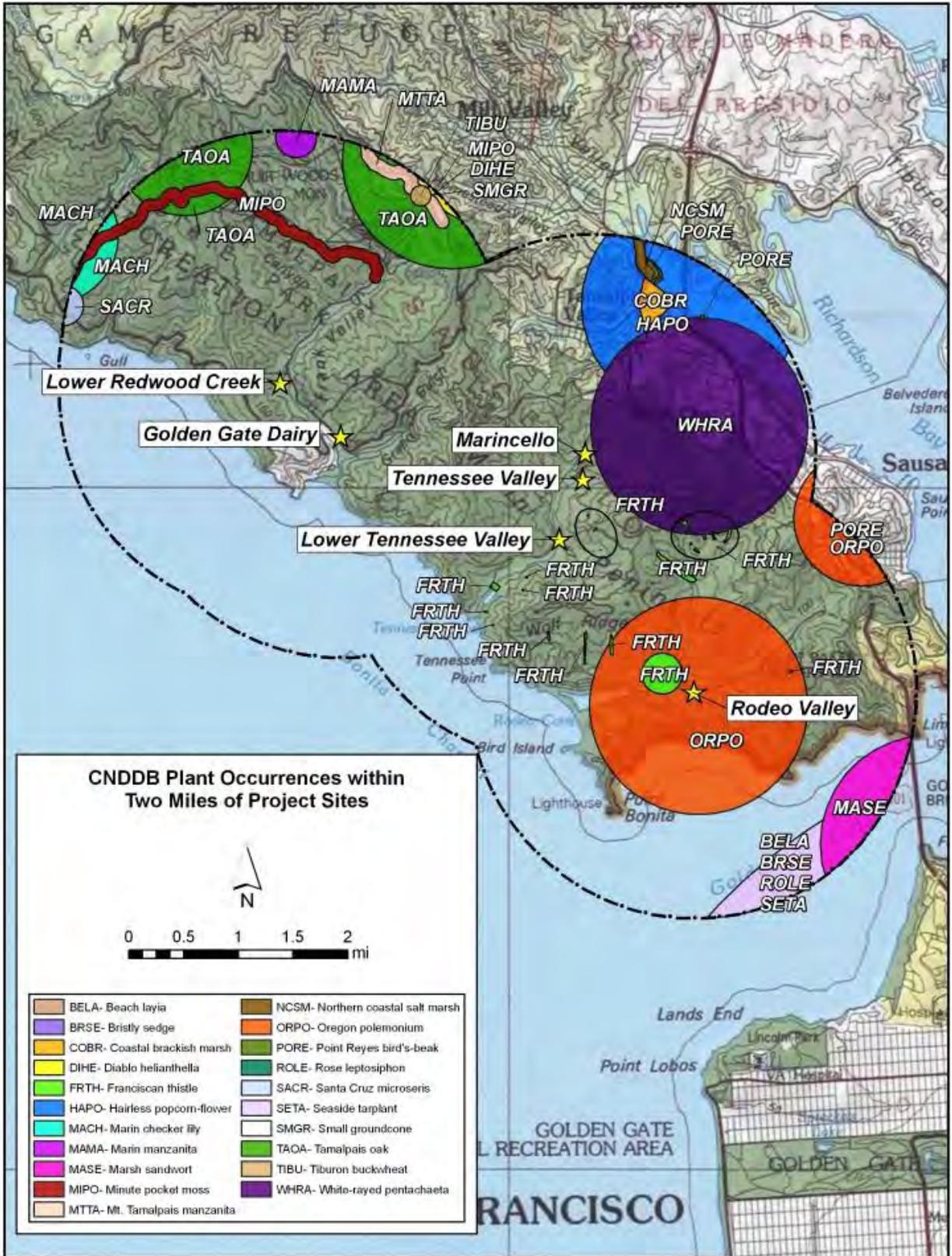
**Management Facilities (9.4).** “When management facilities must be located inside the park, they will be located away from primary resources and features of the park and sited so as to not adversely affect park resources or values or detract from the visitor experience.”

Relationship to Plan – Structures are evaluated for consistency with this policy; for these and any new development, the filters described in section 9.1.1.2 apply.

# Appendix D

Results of CNDDB search within two miles of MEP sites.





## Appendix E

### Special Status plant species with potential to occur in the Plan region.

Table E-1. Special Status Plant Species with Potential to Occur in the MESP Region

Common Name	Scientific Name	CNPS	State	Federal	Communities	Blooming Time	Elevation (ft)	
Blasdale's bent grass	<i>Agrostis blasdalei</i>	List 1B.2			Coastal bluff scrub, Coastal dunes, Coastal prairie	May-Jul	5	150
Sonoma alopecurus	<i>Alopecurus aequalis var. sonomensis</i>	List 1B.1		FE	Marshes and swamps (freshwater), Riparian scrub	May-Jul	5	365
bent-flowered fiddleneck	<i>Amsinckia lunaris</i>	List 1B.2			Coastal bluff scrub, Cismontane woodland, Valley and foothill grassland	Mar-Jun	3	500
coast rock cress	<i>Arabis blepharophylla</i>	List 4.3			Broadleafed upland forest, Coastal bluff scrub, Coastal prairie, Coastal scrub/rocky	Feb-May	3	1100
Mt. Tamalpais manzanita	<i>Arctostaphylos hookeri ssp. montana</i>	List 1B.3			Chaparral, Valley and foothill grassland/serpentinite, rocky	Feb-Apr	160	760
Brewer's milk-vetch	<i>Astragalus breweri</i>	List 4.2			Chaparral, Cismontane woodland, Meadows and seeps, Valley and foothill grassland (open, often gravelly)/often serpentinite, volcanic	Apr-Jun	90	730
ocean bluff milk-vetch	<i>Astragalus nuttallii var. nuttallii</i>	List 4.2			Coastal bluff scrub, Coastal dunes	Jan-Nov	3	120
coastal marsh milk-vetch	<i>Astragalus pycnostachyus var. pycnostachyus</i>	List 1B.2			Coastal dunes (mesic), Coastal scrub, Marshes and swamps (coastal salt, streamsides)	Apr-Oct	0.0E+01	30
Point Reyes blennosperma	<i>Blennosperma nanum var. robustum</i>	List 1B.2	CR		Coastal prairie, Coastal scrub	Feb-Apr	10	145
Thurber's reed grass	<i>Calamagrostis crassiglumis</i>	List 2.1			Coastal scrub (mesic), Marshes and swamps (freshwater)	May-Jul	10	45

**Table E-1. Special Status Plant Species with Potential to Occur in the MESP Region**

Common Name	Scientific Name	CNPS	State	Federal	Communities	Blooming Time	Elevation (ft)	
serpentine reed grass	<i>Calamagrostis ophitidis</i>	List 4.3			Chaparral (open, often north-facing slopes), Lower montane coniferous forest, Meadows and seeps, Valley and foothill grassland/serpentinite, rocky	Apr-Jul	90	1065
Brewer's calandrinia	<i>Calandrinia breweri</i>	List 4.2			Chaparral, Coastal scrub/sandy or loamy, disturbed sites and burns	Mar-Jun	10	1220
Tiburon mariposa lily	<i>Calochortus tiburonensis</i>	List 1B.1	CT	FT	Valley and foothill grassland (serpentinite)	Mar-Jun	50	150
Oakland star-tulip	<i>Calochortus umbellatus</i>	List 4.2			Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland/often serpentinite	Mar-May	100	700
large-flowered mariposa lily	<i>Calochortus uniflorus</i>	List 4.2			Coastal prairie, Coastal scrub, Meadows and seeps, North Coast coniferous forest	Apr-Jun	10	1070
Mt. Saint Helena morning-glory	<i>Calystegia collina ssp. oxyphylla</i>	List 4.2			Chaparral, Lower montane coniferous forest, Valley and foothill grassland/serpentinite	Apr-Jun	279	1010
coastal bluff morning-glory	<i>Calystegia purpurata ssp. saxicola</i>	List 1B.2			Coastal dunes, Coastal scrub, North Coast coniferous forest	May-Sep	10	105
swamp harebell	<i>Campanula californica</i>	List 1B.2			Bogs and fens, Closed-cone coniferous forest, Coastal prairie, Meadows and seeps, Marshes and swamps (freshwater), North Coast coniferous forest/mesic	Jun-Oct	1	405
Buxbaum's sedge	<i>Carex buxbaumii</i>	List 4.2			Bogs and fens, Meadows and seeps (mesic), Marshes and swamps	Mar-Aug	3	3300
bristle-stalked sedge	<i>Carex leptalea</i>	List 2.2			Bogs and fens, Meadows and seeps (mesic), Marshes and swamps	Mar-Jul	0.0E+01	700
Lyngbye's sedge	<i>Carex lyngbyei</i>	List			Marshes and swamps (brackish or	May-Aug	0.0E+01	10

**Table E-1. Special Status Plant Species with Potential to Occur in the MESP Region**

Common Name	Scientific Name	CNPS	State	Federal	Communities	Blooming Time	Elevation (ft)	
		2.2			freshwater)			
Tiburon paintbrush	<i>Castilleja affinis ssp. neglecta</i>	List 1B.2	CT	FE	Valley and foothill grassland (serpentine)	Apr-Jun	60	400
Johnny-nip	<i>Castilleja ambigua ssp. ambigua</i>	List 4.2			Coastal bluff scrub, Coastal prairie, Coastal scrub, Marshes and swamps, Valley and foothill grassland, Vernal poolsmargins	Mar-Aug	0.0E+01	435
Humboldt Bay owl's-clover	<i>Castilleja ambigua ssp. humboldtiensis</i>	List 1B.2			Marshes and swamps (coastal salt)	Apr-Aug	0.0E+01	3
Point Reyes ceanothus	<i>Ceanothus gloriosus var. gloriosus</i>	List 4.3			Coastal bluff scrub, Closed-cone coniferous forest, Coastal dunes, Coastal scrub/sandy	Mar-May	5	520
Mt. Vision ceanothus	<i>Ceanothus gloriosus var. porrectus</i>	List 1B.3			Closed-cone coniferous forest, Coastal prairie, Coastal scrub, Valley and foothill grassland	Feb-May	25	305
San Francisco Bay spineflower	<i>Chorizanthe cuspidata var. cuspidata</i>	List 1B.2			Coastal bluff scrub, Coastal dunes, Coastal prairie, Coastal scrub/sandy	Apr-Jul(Aug)	3	215
woolly-headed spineflower	<i>Chorizanthe cuspidata var. villosa</i>	List 1B.2			Coastal dunes, Coastal prairie, Coastal scrub/sandy	May-Jul(Aug)	3	60
robust spineflower	<i>Chorizanthe robusta var. robusta</i>	List 1B.1		FE	Chaparral (maritime), Cismontane woodland (openings), Coastal dunes, Coastal scrub/sandy or gravelly	Apr-Sep	3	300
Sonoma spineflower	<i>Chorizanthe valida</i>	List 1B.1	CE	FE	Coastal prairie (sandy)	Jun-Aug	10	305
Bolander's water-hemlock	<i>Cicuta maculata var. bolanderi</i>	List 2.1			Marshes and swamps Coastal, fresh or brackish water	Jul-Sep	0.0E+01	200
Franciscan thistle	<i>Cirsium andrewsii</i>	List 1B.2			Broadleafed upland forest, Coastal bluff scrub, Coastal prairie, Coastal scrub/mesic, sometimes serpentine	Mar-Jul	0.0E+01	150

**Table E-1. Special Status Plant Species with Potential to Occur in the MESP Region**

Common Name	Scientific Name	CNPS	State	Federal	Communities	Blooming Time	Elevation (ft)	
Mt. Tamalpais thistle	<i>Cirsium hydrophilum</i> var. <i>vaseyi</i>	List 1B.2			Broadleafed upland forest, Chaparral, Meadows and seeps/serpentinite seeps	May-Aug	240	620
Raiche's red ribbons	<i>Clarkia concinna</i> ssp. <i>raichei</i>	List 1B.1			Coastal bluff scrub	Apr-May	0.0E+01	100
Point Reyes bird's-beak	<i>Cordylanthus maritimus</i> ssp. <i>palustris</i>	List 1B.2			Marshes and swamps (coastal salt)	Jun-Oct	0.0E+01	10
soft bird's-beak	<i>Cordylanthus mollis</i> ssp. <i>mollis</i>	List 1B.2	CR	FE	Marshes and swamps (coastal salt)	Jul-Nov	0.0E+01	3
California lady's-slipper	<i>Cypripedium californicum</i>	List 4.2			Bogs and fens, Lower montane coniferous forest/seeps and streambanks, usually serpentinite	Apr-Aug	30	2750
Baker's larkspur	<i>Delphinium bakeri</i>	List 1B.1	CE	FE	Broadleafed upland forest, Coastal scrub, Valley and foothill grassland/decomposed shale, often mesic	Mar-May	80	305
golden larkspur	<i>Delphinium luteum</i>	List 1B.1	CR	FE	Chaparral, Coastal prairie, Coastal scrub/rocky	Mar-May	0.0E+01	100
western dichondra	<i>Dichondra occidentalis</i>	List 4.2			Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland	(Jan)Mar-Jul	50	500
supple daisy	<i>Erigeron supplex</i>	List 1B.2			Coastal bluff scrub, Coastal prairie	May-Jul	10	50
Tiburon buckwheat	<i>Eriogonum luteolum</i> var. <i>caninum</i>	List 1B.2			Chaparral, Cismontane woodland, Coastal prairie, Valley and foothill grassland/serpentinite, sandy to gravelly	May-Sep	0.0E+01	700
San Francisco wallflower	<i>Erysimum franciscanum</i>	List 4.2			Chaparral, Coastal dunes, Coastal scrub, Valley and foothill grassland/often serpentinite or	Mar-Jun	0.0E+01	550

**Table E-1. Special Status Plant Species with Potential to Occur in the MESP Region**

Common Name	Scientific Name	CNPS	State	Federal	Communities	Blooming Time	Elevation (ft)	
					granitic, sometimes roadsides			
Marin checker lily	<i>Fritillaria lanceolata</i> var. <i>tristulis</i>	List 1B.1			Coastal bluff scrub, Coastal prairie, Coastal scrub	Feb-May	15	150
fragrant fritillary	<i>Fritillaria liliacea</i>	List 1B.2			Cismontane woodland, Coastal prairie, Coastal scrub, Valley and foothill grassland/often serpentinite	Feb-Apr	3	410
blue coast gilia	<i>Gilia capitata</i> ssp. <i>chamissonis</i>	List 1B.1			Coastal dunes, Coastal scrub	Apr-Jul	2	200
woolly-headed gilia	<i>Gilia capitata</i> ssp. <i>tomentosa</i>	List 1B.1			Coastal bluff scrub (rocky, outcrops)	May-Jul	15	155
dark-eyed gilia	<i>Gilia millefoliata</i>	List 1B.2			Coastal dunes	Apr-Jul	2	30
San Francisco gumplant	<i>Grindelia hirsutula</i> var. <i>maritima</i>	List 1B.2			Coastal bluff scrub, Coastal scrub, Valley and foothill grassland/sandy or serpentinite	Jun-Sep	15	400
Diablo helianthella	<i>Helianthella castanea</i>	List 1B.2			Broadleafed upland forest, Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland, Valley and foothill grassland	Mar-Jun	60	1300
pale yellow hayfield tarplant	<i>Hemizonia congesta</i> ssp. <i>congesta</i>	List 1B.2			Valley and foothill grassland/sometimes roadsides	Apr-Nov	20	560
short-leaved evax	<i>Hesperervax sparsiflora</i> var. <i>brevifolia</i>	List 1B.2			Coastal bluff scrub (sandy), Coastal dunes	Mar-Jun	0.0E+01	215
Marin western flax	<i>Hesperolinon congestum</i>	List 1B.1	CT	FT	Chaparral, Valley and foothill grassland/serpentinite	Apr-Jul	5	370
Santa Cruz tarplant	<i>Holocarpha macradenia</i>	List 1B.1	CE	FT	Coastal prairie, Coastal scrub, Valley and foothill grassland/often clay, sandy	Jun-Oct	10	220
Kellogg's horkelia	<i>Horkelia cuneata</i> ssp.	List 1B.1			Closed-cone coniferous forest, Chaparral (maritime), Coastal dunes,	Apr-Sep	10	200

**Table E-1. Special Status Plant Species with Potential to Occur in the MESP Region**

Common Name	Scientific Name	CNPS	State	Federal	Communities	Blooming Time	Elevation (ft)	
	<i>sericea</i>				Coastal scrub/sandy or gravelly, openings			
Point Reyes horkelia	<i>Horkelia marinensis</i>	List 1B.2			Coastal dunes, Coastal prairie, Coastal scrub/sandy	May-Sep	5	350
thin-lobed horkelia	<i>Horkelia tenuiloba</i>	List 1B.2			Broadleafed upland forest, Chaparral, Valley and foothill grassland/mesic openings, sandy	May-Jul	50	500
coast iris	<i>Iris longipetala</i>	List 4.2			Coastal prairie, Lower montane coniferous forest, Meadows and seeps/mesic	Mar-May	0.0E+01	600
Baker's goldfields	<i>Lasthenia californica ssp. bakeri</i>	List 1B.2			Closed-cone coniferous forest (openings), Coastal scrub, Meadows and seeps, Marshes and swamps	Apr-Oct	60	520
perennial goldfields	<i>Lasthenia californica ssp. macrantha</i>	List 1B.2			Coastal bluff scrub, Coastal dunes, Coastal scrub	Jan-Nov	5	520
Contra Costa goldfields	<i>Lasthenia conjugens</i>	List 1B.1		FE	Cismontane woodland, Playas (alkaline), Valley and foothill grassland, Vernal pools/mesic	Mar-Jun	0.0E+01	470
beach layia	<i>Layia carnosa</i>	List 1B.1	CE	FE	Coastal dunes, Coastal scrub (sandy)	Mar-Jul	0.0E+01	60
bristly leptosiphon	<i>Leptosiphon acicularis</i>	List 4.2			Chaparral, Cismontane woodland, Coastal prairie, Valley and foothill grassland	Apr-Jul	55	1500
coast yellow leptosiphon	<i>Leptosiphon croceus</i>	List 1B.1			Coastal bluff scrub, Coastal prairie	Apr-May	10	150
large-flowered leptosiphon	<i>Leptosiphon grandiflorus</i>	List 4.2			Coastal bluff scrub, Closed-cone coniferous forest, Cismontane woodland, Coastal dunes, Coastal prairie, Coastal scrub, Valley and foothill grassland/usually sandy	Apr-Aug	5	1220
rose leptosiphon	<i>Leptosiphon rosaceus</i>	List 1B.1			Coastal bluff scrub	Apr-Jul	0.0E+01	100

**Table E-1. Special Status Plant Species with Potential to Occur in the MESP Region**

Common Name	Scientific Name	CNPS	State	Federal	Communities	Blooming Time	Elevation (ft)	
woolly-headed lessingia	<i>Lessingia hololeuca</i>	List 3			Broadleafed upland forest, Coastal scrub, Lower montane coniferous forest, Valley and foothill grassland/clay, serpentinite	Jun-Oct	15	305
Tamalpais lessingia	<i>Lessingia micradenia</i> var. <i>micradenia</i>	List 1B.2			Chaparral, Valley and foothill grassland/usually serpentinite, often roadsides	(Jun)Jul-Oct	100	500
Mason's lilaepsis	<i>Lilaeopsis masonii</i>	List 1B.1	CR		Marshes and swamps (brackish or freshwater), Riparian scrub	Apr-Nov	0.0E+01	10
coast lily	<i>Lilium maritimum</i>	List 1B.1			Broadleafed upland forest, Closed-cone coniferous forest, Coastal prairie, Coastal scrub, Marshes and swamps (freshwater), North Coast coniferous forest/sometimes roadside	May-Aug	5	475
Point Reyes meadowfoam	<i>Limnanthes douglasii</i> ssp. <i>sulphurea</i>	List 1B.2	CE		Coastal prairie, Meadows and seeps (mesic), Marshes and swamps(freshwater), Vernal pools	Mar-May	1	140
Delta mudwort	<i>Limosella subulata</i>	List 2.1			Marshes and swamps	May-Aug	0.0E+01	3
harlequin lotus	<i>Lotus formosissimus</i>	List 4.2			Broadleafed upland forest, Coastal bluff scrub, Closed-cone coniferous forest, Cismontane woodland, Coastal prairie, Coastal scrub, Meadows and seeps, Marshes and swamps, North Coast coniferous forest, Valley and foothill grassland/wetlands, roadsides	Mar-Jul	0.0E+01	700
Mt. Diablo cottonweed	<i>Micropus amphibolus</i>	List 3.2			Broadleafed upland forest, Chaparral, Cismontane woodland, Valley and foothill grassland/rocky	Mar-May	45	825
marsh microseris	<i>Microseris paludosa</i>	List 1B.2			Closed-cone coniferous forest, Cismontane woodland, Coastal scrub, Valley and foothill grassland	Apr-Jun(Jul)	5	300
curly-leaved	<i>Monardella</i>	List			Closed-cone coniferous forest,	May-Sep	0.0E+01	305

**Table E-1. Special Status Plant Species with Potential to Occur in the MESP Region**

Common Name	Scientific Name	CNPS	State	Federal	Communities	Blooming Time	Elevation (ft)	
monardella	<i>undulata</i>	4.2			Chaparral, Coastal dunes, Coastal prairie, Coastal scrub, Lower montane coniferous forest (ponderosa pine sandhills)/sandy			
cotula navarretia	<i>Navarretia cotulifolia</i>	List 4.2			Chaparral, Cismontane woodland, Valley and foothill grassland/adobe	May-Jun	4	1830
Baker's navarretia	<i>Navarretia leucocephala ssp. bakeri</i>	List 1B.1			Cismontane woodland, Lower montane coniferous forest, Meadows and seeps, Valley and foothill grassland, Vernal pools/mesic	Apr-Jul	5	1740
white-rayed pentachaeta	<i>Pentachaeta bellidiflora</i>	List 1B.1	CE	FE	Cismontane woodland, Valley and foothill grassland (often serpentinite)	Mar-May	35	620
Gairdner's yampah	<i>Perideridia gairdneri ssp. gairdneri</i>	List 4.2			Broadleafed upland forest, Chaparral, Coastal prairie, Valley and foothill grassland, Vernal pools/vernally mesic	Jun-Oct	0.0E+01	365
North Coast phacelia	<i>Phacelia insularis var. continentis</i>	List 1B.2			Coastal bluff scrub, Coastal dunes/sandy, sometimes rocky	Mar-May	10	170
Point Reyes rein orchid	<i>Piperia elegans ssp. decurtata</i>	List 1B.1			Coastal bluff scrub	Jul-Oct	15	185
Michael's rein orchid	<i>Piperia michaelii</i>	List 4.2			Coastal bluff scrub, Closed-cone coniferous forest, Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest	Apr-Aug	3	915
hairless popcorn-flower	<i>Plagiobothrys glaber</i>	List 1A			Meadows and seeps (alkaline), Marshes and swamps (coastal salt)	Mar-May	15	180
North Coast semaphore grass	<i>Pleuropogon hooverianus</i>	List 1B.1	CT		Broadleafed upland forest, Meadows and seeps, North Coast coniferous forest/open areas, mesic	Apr-Jun	10	671
nodding semaphore grass	<i>Pleuropogon refractus</i>	List 4.2			Lower montane coniferous forest, Meadows and seeps, North Coast coniferous forest, Riparian forest/mesic	Apr-Aug	0.0E+01	1600
Oregon	<i>Polemonium</i>	List			Coastal prairie, Coastal scrub, Lower	Apr-Sep	0.0E+01	1830

**Table E-1. Special Status Plant Species with Potential to Occur in the MESP Region**

Common Name	Scientific Name	CNPS	State	Federal	Communities	Blooming Time	Elevation (ft)	
polemonium	<i>carneum</i>	2.2			montane coniferous forest			
Marin knotweed	<i>Polygonum marinense</i>	List 3.1			Marshes and swamps (coastal salt or brackish)	(Apr)May-Aug(Oct)	0.0E+01	10
Lobb's aquatic buttercup	<i>Ranunculus lobbii</i>	List 4.2			Cismontane woodland, North Coast coniferous forest, Valley and foothill grassland, Vernal pools/mesic	Feb-May	15	470
California beaked-rush	<i>Rhynchospora californica</i>	List 1B.1			Bogs and fens, Lower montane coniferous forest, Meadows and seeps (seeps), Marshes and swamps (freshwater)	May-Jul	45	1010
Point Reyes checkerbloom	<i>Sidalcea calycosa ssp. rhizomata</i>	List 1B.2			Marshes and swamps (freshwater, near coast)	Apr-Sep	3	75
purple-stemmed checkerbloom	<i>Sidalcea malviflora ssp. purpurea</i>	List 1B.2			Broadleafed upland forest, Coastal prairie	May-Jun	15	85
Santa Cruz microseris	<i>Stebbinsoseris decipiens</i>	List 1B.2			Broadleafed upland forest, Closed-cone coniferous forest, Chaparral, Coastal prairie, Coastal scrub, Valley and foothill grassland/open areas, sometimes serpentinite	Apr-May	10	500
beach starwort	<i>Stellaria littoralis</i>	List 4.2			Bogs and fens, Coastal bluff scrub, Coastal dunes, Coastal scrub, Marshes and swamps	Mar-Jul	5	40
Mount Tamalpais bristly jewel-flower	<i>Streptanthus glandulosus ssp. pulchellus</i>	List 1B.2			Chaparral, Valley and foothill grassland/serpentinite	May-Jul(Aug)	150	800
Tiburon jewel-flower	<i>Streptanthus niger</i>	List 1B.1	CE	FE	Valley and foothill grassland (serpentinite)	May-Jun	30	150
two-fork clover	<i>Trifolium amoenum</i>	List 1B.1		FE	Coastal bluff scrub, Valley and foothill grassland (sometimes serpentinite)	Apr-Jun	5	415
San Francisco owl's-clover	<i>Triphysaria floribunda</i>	List 1B.2			Coastal prairie, Coastal scrub, Valley and foothill grassland/usually	Apr-Jun	10	160

**Table E-1. Special Status Plant Species with Potential to Occur in the MESP Region**

Common Name	Scientific Name	CNPS	State	Federal	Communities	Blooming Time	Elevation (ft)	
					serpentinite			
coastal triquetrella	<i>Triquetrella californica</i>	List 1B.2			Coastal bluff scrub, Coastal scrub/soil		10	100
marsh zigadenus	<i>Zigadenus micranthus var. fontanus</i>	List 4.2			Chaparral, Cismontane woodland, Lower montane coniferous forest, Meadows and seeps, Marshes and swamps/vernally mesic, often serpentinite	Apr-Jul	15	1000