RECLAMATION

Managing Water in the West

Draft Environmental Assessment

Lake Berryessa Recreation Areas Development

Bureau of Reclamation
Mid-Pacific Region

September 2017

Mission Statements

The Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Draft Environmental Assessment

Lake Berryessa Recreation Areas Development

prepared by

U.S. Department of the Interior
Bureau of Reclamation
Mid-Pacific Region
Central California Area Office

Contents

Tables

Figures

Appendices

Acronyms and Abbreviations

BAAQMD	Bay Area Air Quality Management District
BMPs	best management practices
CAA	Federal Clean Air Act
CAAQS	California Ambient Air Quality Standards
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
GHGs	greenhouse gases
gpd	gallons per day
LAFCO	Local Agency Formation Commission
LBRID	Lake Berryessa Resort Improvement District
Ldn	day/night average level
Leq	equivalent, sound level
Lmax	maximum sound level during a single noise event
mph	miles per hour
MBTA	Migratory Bird Treaty Act
msl	mean sea level
MTBE	methyl tertiary-butyl ether
NAAQS	National Ambient Air Quality Standards
Napa County Water District	Napa County Flood Control and Water Conservation District
NBRID	Napa Berryessa Resort Improvement District
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
PG&E	Pacific Gas and Electric Company
PM10	particulate matter with an aerodynamic diameter of 10 micrometers and less

PM2.5	particulate matter with an aerodynamic diameter of 2.5 micrometers and less
PUP	Public Use Plan
RA	recreation area
RAMP	Lake Berryessa Reservoir Area Management Plan
Reclamation	United States Department of the Interior, Bureau of Reclamation
Regional Water Board	Regional Water Quality Control Board
ROD	Record of Decision
RV	recreational vehicle
SFBAB	San Francisco Bay Air Basin
SFWD	Spanish Flat Water District
SHPO	State Historic Preservation Officer
SR	State Route
State Water Board	State Water Resources Control Board
SWPPP	stormwater pollution prevention plan
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VSP EIS	Visitor Services Plan/Future Recreation Use and Operation of Lake Berryessa Environmental Impact Statement

Summary

The U.S. Department of the Interior, Bureau of Reclamation (Reclamation) prepared this environmental assessment (EA) to evaluate the potential environmental consequences of re-developing recreation facilities at five recreation areas (RAs) at Lake Berryessa in northeastern Napa County, California: Putah Canyon, Monticello Shores, Berryessa Point, Spanish Flat, and Steele Canyon. This EA has been prepared in accordance with the Visitor Services Plan/Future Recreation Use and Operation of Lake Berryessa Environmental Impact Statement (VSP EIS) (Reclamation 2005) and VSP Record of Decision (ROD) (Reclamation 2006). The EA has been prepared in compliance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations 1500–1508) and related CEQ guidance, and Department of the Interior Department Manual 516 DM 1-15.

The proposed action described in this EA is based on detailed infrastructure plans for water supply, wastewater treatment and disposal, stormwater management, electrical distribution, and access (e.g., roads, parking areas) at four of the RAs—Putah Canyon, Berryessa Point, Spanish Flat, and Steele Canyon. At all five RAs the description of the proposed action also includes less detailed conceptual plans depicting where additional features needed to facilitate recreation may be proposed by concessionaires. At this time, Reclamation is seeking to authorize installation of infrastructure that is ready to be constructed (i.e., sixty percent designs are ready to finalize for construction purposes, and adequate site-specific environmental analysis has been completed). Reclamation's decision document will focus on the detailed infrastructure plan elements of the proposed action, and will rely on the effects analysis in the EA as a basis for its decisions.

Conceptual site plan elements described herein are more speculative than infrastructure plan elements. That is because, whereas the detailed infrastructure plans evaluated in this EA were developed by Reclamation based on the core, essential infrastructure needed to support the management direction in the Lake Berryessa Reservoir Area Management Plan (RAMP) and subsequent VSP, concessionaires would have opportunity to propose to Reclamation the designs, numbers, and precise locations of entry stations, marinas, boat launches, campgrounds, lodging units, RV campsites, day use amenities, and other conceptual elements of the proposed action. Concessionaires may choose to deviate from the conceptual plan elements as they are currently presented in this EA. For example, concessionaires may propose to change the siting of recreation facilities and/or the quantity of facilities and services, and these proposals may trigger a need to change the location or extent of essential core infrastructure. In these circumstances additional site-specific environmental analysis may be necessary.

The EA analyzes the impacts of the proposed action and no-action alternative. Implementation of the proposed action would result in overall minimal impacts on the environment because most facilities and infrastructure would be located in previously disturbed areas. Standard construction measures and best management practices (BMPs) would be implemented during all construction activities to avoid or minimize environmental impacts, and mitigation measures are identified in the EA to further reduce potential adverse impacts. Cumulative impacts of the

proposed action and other projects at Lake Berryessa would also be minimal through implementation of BMPs and project-specific mitigation measures. The proposed action would comply with federal environmental statutes and other authorities. Table S-1 summarizes the anticipated environmental consequences of the conceptual site plans and infrastructure plans and lists measures that would ensure minimal impacts.

Table S-1. Summary of Environmental Consequences, Environmental Commitments, and Mitigation Measures

Resource Topic	Proposed Action Impacts	Proposed Action Environmental Commitments and Standard Construction Practices Included in the Proposed Action, and Mitigation Measures	No-Action Impacts
Global for All Resource Topics	All impacts	Environmental Commitments/Standard Construction Practices: ▪ Prior to approving proposals from concessionaires for development of conceptual site plan or infrastructure plan elements Reclamation shall ensure the areas of direct and indirect disturbance that would result from granting such approvals have been adequately surveyed for biological, cultural, and other resources and hazards, and that adequate documentation exists to support reasoned decision-making by Reclamation pursuant to NEPA and interconnected environmental statutes (e.g., NHPA Section 106, ESA Section 7, CWA Section 404).	▪ As described for individual resource topics
Air Quality	Development: ▪ Temporary construction emissions ▪ Long-term emissions from vehicle traffic due to increased visitors and operations Infrastructure: ▪ Temporary increase in fugitive dust due to soil disturbance ▪ Temporary increase in emissions due to construction equipment and vehicles ▪ Periodic emissions from long-term maintenance	Environmental Commitments/Standard Construction Practices: ▪ Concurrent construction across multiple recreation areas will require documentation by Reclamation in compliance with the General Conformity Rule for air quality prior to initiating construction. ▪ BMPs for soil erosion control ▪ Site restoration and landscaping plan to revegetate disturbed areas around facilities with consideration given to replacing non-native vegetation with native species Mitigation Measures: ▪ Mitigation Measure AIR-1. Fugitive Dust and Emissions Control Measures	▪ Minor emissions from small-scale construction activities and maintenance and visitor use of some of the RAs ▪ Similar air quality to current conditions

Resource Topic	Proposed Action Impacts	Proposed Action Environmental Commitments and Standard Construction Practices Included in the Proposed Action, and Mitigation Measures	No-Action Impacts
Biological Resources	Development: ▪ Periodic vegetation and habitat removal ▪ Periodic disturbance to wildlife from construction, visitor use, and operations ▪ Possible impacts on federally listed species ▪ Discharge of fill into waters of the U.S. Infrastructure: ▪ Minor vegetation and habitat removal ▪ Potential ground disturbance near elderberry shrubs (host plant of the valley elderberry longhorn beetle) ▪ Possible discharge of fill into waters of the U.S. ▪ Temporary disturbance to wildlife, including nesting birds and California red-legged frog	Environmental Commitments/Standard Construction Practices: ▪ BMPs for hazardous materials and water pollution ▪ Proper disposal of hazardous and solid waste ▪ Site restoration and landscaping plan to revegetate disturbed areas around facilities with consideration given to replacing non-native vegetation with native species ▪ Invasive plant control measures ▪ Protect native trees Mitigation Measures: ▪ Mitigation Measure BIO-1. Nesting Bird Impact Avoidance and Minimization Measures ▪ Mitigation Measure BIO-2. Elderberry Shrub Direct Impact Avoidance ▪ Mitigation Measure BIO-3. California Red-Legged Frog Impact Avoidance and Minimization Measures ▪ Mitigation Measure BIO-4. Waters of the United States/Waters of the State of California Avoidance and Minimization Measures	▪ Minor vegetation removal from small-scale construction activities ▪ Periodic disturbance to wildlife from visitor use and maintenance activities ▪ Similar biological setting to current conditions
Cultural Resources	Development: ▪ No impacts on known cultural resources ▪ Potential impacts on buried resources during ground-disturbing activities ▪ Ongoing potential for impacts on exposed cultural resources due to visitor use Infrastructure: ▪ No impacts on known cultural resources ▪ Potential impacts on buried resources during ground-disturbing activities	Environmental Commitments/Standard Construction Practices: ▪ Minimize amount of ground disturbance Mitigation Measures: ▪ Mitigation Measure CULT-1. Standard Contract Provisions for Inadvertent Cultural Resource Discovery ▪ Mitigation Measure CULT-2. Identification, Evaluation, and Mitigation (Treatment) of Impacts on Historic Properties ▪ Mitigation Measure CULT-3: Treatment of Impacts on Human Remains	▪ Ongoing potential for impacts on exposed cultural resources due to visitor use
Geology and Soils	Development: ▪ Temporary exposure of soils to wind and water erosion during construction	Environmental Commitments/Standard Construction Practices: ▪ SWPPP and BMPs for soil erosion control	▪ Minimal soil disturbance from maintenance and use

Resource Topic	Proposed Action Impacts	Proposed Action Environmental Commitments and Standard Construction Practices Included in the Proposed Action, and Mitigation Measures	No-Action Impacts
	▪ Low potential for disturbance to buried fossils ▪ Potential hazard from unstable or unsuitable soils and geologic hazards ▪ Ongoing potential for erosion from visitor use and wave action Infrastructure: ▪ Soil excavations and exposure to erosion during infrastructure installation ▪ Extensive cuts in some areas for roads ▪ Minimal operation-related impacts	▪ Compliance with laws and guidelines for discovery of paleontological resources ▪ Geotechnical recommendations for geologic and soil hazards Mitigation Measures: ▪ Mitigation Measure GEO-1. Soil Hazard Design and Siting Considerations	▪ Same hazard risks as current risks
Land Use	Development: ▪ Indirect land use effects from noise, traffic, visual changes, and recreational conflicts ▪ Periodic land use conflicts from high or concentrated visitor use ▪ Compliance with RAMP and VSP for Class I areas Infrastructure: ▪ Potential temporary disruptions to visitors during construction ▪ Periodic land use conflicts from wastewater facilities	Environmental Commitments/Standard Construction Practices: ▪ Construction schedule during low visitor use ▪ Minimize user disruptions during construction Mitigation Measures: ▪ None specific to Land Use, but see Air Quality and Noise	▪ Existing conflicts with the goals of the RAMP and VSP for Class I areas
Noise	Development: ▪ Temporary increased noise during construction ▪ Periodic high noise levels with peak visitor use Infrastructure: ▪ Temporary increased noise levels that are higher than background levels during construction ▪ Minimal operation-related noise	Environmental Commitments/Standard Construction Practices: ▪ Schedule construction between the hours of 7 a.m. and 7 p.m. Mitigation Measures: ▪ Mitigation Measure NOISE-1. Construction-Related Noise Reduction Measures ▪ Mitigation Measure NOISE-2. Design-Related Noise Reduction Measures	▪ Same periodic noise as current levels
Public Health and Safety	Development: ▪ Same fire hazard as current level, but increased potential for structure damage ▪ Potential disturbance of asbestos-bearing soils ▪ Increased potential for exposure to hazardous materials ▪ Increased potential for accidents and demand on emergency response providers	Environmental Commitments/Standard Construction Practices: ▪ Compliance with laws and guidelines for hazardous materials use and disposal, fire hazard, and recreational use of the lake ▪ Implement dust suppression measures including stabilizing unpaved road services and vehicle	▪ Same hazard risks as current risks ▪ Low risk of accidents and demand on emergency response providers with low visitor use

Resource Topic	Proposed Action Impacts	Proposed Action Environmental Commitments and Standard Construction Practices Included in the Proposed Action, and Mitigation Measures	No-Action Impacts
	▪ Improved roadways and traffic circulation for emergency response and access Infrastructure: ▪ Potential hazards from fire, asbestos, and hazardous materials during construction ▪ Improved circulation and flood control with infrastructure	speeds on unpaved roads during operations Mitigation Measures: ▪ Mitigation Measure HEALTH-1. Hazard Design and Siting Considerations ▪ Mitigation Measure HEALTH-2. Asbestos Control Measures During Construction	
Recreation	Development: ▪ Increased visitation to the lake (1.5 million visitors annually) ▪ Provision of diverse recreational opportunities ▪ Potential temporary disruptions during construction ▪ Periodic competition during peak use Infrastructure: ▪ Temporary disruptions to recreational uses during construction periods ▪ Minimal operation-related conflicts	Environmental Commitments/Standard Construction Practices: ▪ Schedule construction during off-peak season and away from active use areas Mitigation Measures: ▪ None specific to Recreation, but see Air Quality and Noise	▪ Limited recreational opportunities ▪ Ongoing competition for facilities and services
Socioeconomics	Development: ▪ Improved economic conditions in nearby communities with increased visitor use ▪ Increased expenditures for new facilities Infrastructure: ▪ Construction-related expenditures ▪ Overall economic benefit to local communities	Environmental Commitments/Standard Construction Practices: ▪ None Mitigation Measures: ▪ None	▪ Some revenue from visitor use ▪ Similar socioeconomic conditions to current conditions
Transportation and Circulation	Development: ▪ Increased traffic levels similar to historic peak use levels ▪ Periodic traffic impacts at peak use ▪ Improved internal circulation and access at RAs Infrastructure: ▪ Temporary increase in construction traffic ▪ Improved roadways and traffic conditions at RAs	Environmental Commitments/Standard Construction Practices: ▪ Traffic control measures ▪ Avoid major road closures Mitigation Measures: ▪ None	▪ Similar traffic conditions to current conditions ▪ Ongoing road concerns at RAs

Resource Topic	Proposed Action Impacts	Proposed Action Environmental Commitments and Standard Construction Practices Included in the Proposed Action, and Mitigation Measures	No-Action Impacts
Utilities	Development: ▪ Increased demand for utilities with increased visitor use ▪ Improved utility services with development ▪ Potential demand impacts on off-site providers Infrastructure: ▪ Improved infrastructure at four RAs ▪ Temporary service disruptions at open RAs ▪ Various impacts from infrastructure construction	Environmental Commitments/Standard Construction Practices: ▪ Proper disposal of solid waste ▪ Utility company notifications and coordination prior to construction Mitigation Measures: ▪ None specific to Utilities, but see Biological and Cultural Resources	▪ Limited utilities available at the RAs
Visual Resources	Development: ▪ Temporary localized visual disturbances during construction activities ▪ Modified visual setting due to new facilities ▪ Improved aesthetics overall with new facilities and landscaping Infrastructure: ▪ Temporary visual disturbance during infrastructure construction ▪ Modified visual setting where above-ground facilities installed ▪ Overall minimal visual changes	Environmental Commitments/Standard Construction Practices: ▪ Design facilities consistent with Reclamation guidelines ▪ Schedule construction during off-peak season and away from active use areas Mitigation Measures: ▪ None	▪ No changes to visual setting
Water Resources	Development: ▪ Periodic discharge of sediment and pollutants into surface waters during construction ▪ Increased potential for spills or contamination of lake water ▪ Possible localized changes in drainage patterns, but improved stormwater control ▪ Increased demand for water supply and potential impacts on ground and surface water resources Infrastructure: ▪ Temporary water quality impacts during construction ▪ Minimal operation-related water quality impacts ▪ Improved overall water quality with new infrastructure	Environmental Commitments/Standard Construction Practices: ▪ SWPPP and BMPs for water quality protection ▪ Landscaping and design measures to control runoff Mitigation Measures: ▪ Mitigation Measure WATER-1: Groundwater Study	▪ Minimal water quality impacts from maintenance and use

Chapter 1 Introduction and Purpose and Need

Introduction

In compliance with the National Environmental Policy Act (NEPA), the U.S. Department of the Interior, Bureau of Reclamation (Reclamation) prepared this Environmental Assessment (EA) to evaluate the potential environmental consequences of re-developing recreation facilities and ancillary infrastructure at five recreational areas (RAs) at Lake Berryessa in accordance with the Visitor Services Plan/Future Recreation Use and Operation of Lake Berryessa Environmental Impact Statement (VSP EIS) (Reclamation 2005) and VSP Record of Decision (ROD) (Reclamation 2006). Lake Berryessa, Reclamation's reservoir for the Solano Project, lies behind Monticello Dam on Putah Creek in northeastern Napa County (Figure 1-1). The five RAs for which the environmental consequences of re-development are evaluated in this EA, are situated around the western and southwestern shores of the lake, and comprise (listed from north to south):

- Putah Canyon RA
- Monticello Shores RA
- Berryessa Point RA
- Spanish Flat RA
- Steele Canyon RA

Federal agencies are required under NEPA (42 United States Code 4321 et seq.) to evaluate the environmental consequences of their actions before reaching decisions on those actions, and to involve the public in the decision-making process. This EA has been prepared in compliance with NEPA, the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500–1508) and related CEQ guidance, and Department of the Interior Department Manual 516 DM 1-15.

This EA provides documentation to assist Reclamation in determining whether to prepare an EIS or a Finding of No Significant Impact (FONSI) for the action alternative described in Chapter 2 (i.e., "proposed action"). This EA meets the fundamental purposes of NEPA: to provide environmental information that informs federal decision-making and to identify feasible ways to avoid and minimize adverse impacts on the environment. The EA also documents the consistency of the proposed action with the VSP EIS and VSP ROD, which provide direction for the management and operation of recreation facilities at Lake Berryessa. This EA, together with the VSP EIS and ROD, describes the environmental evaluation performed by Reclamation to inform its decisions regarding implementation of the proposed action. Additional environmental documentation pursuant to NEPA may be required if facilities, infrastructure, or uses not already evaluated in this EA are proposed to be located within the five RAs, or if Reclamation finds that conceptual site plan elements identified in this EA are located in portions of RAs for which the

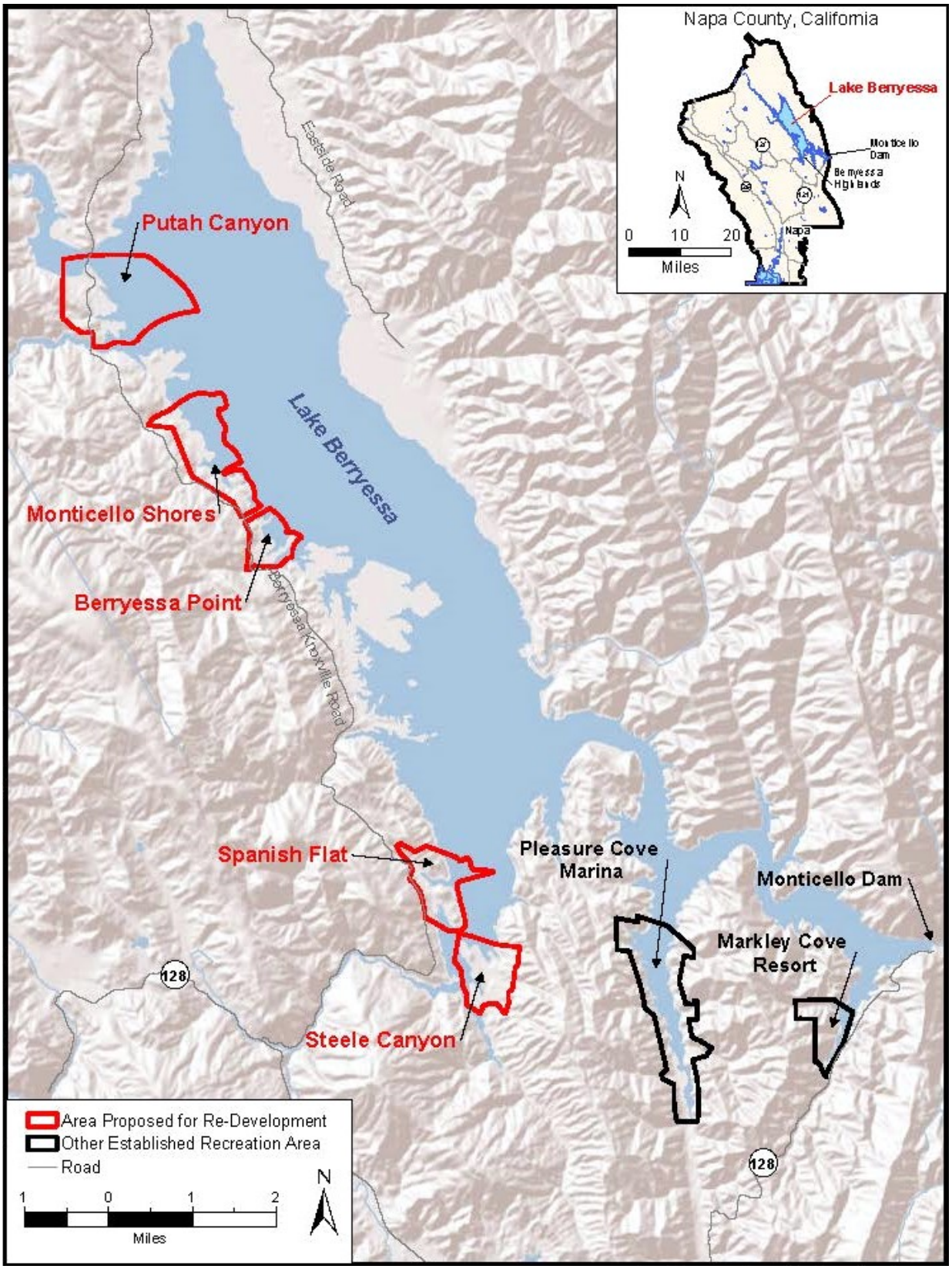

Figure 1-1. Recreation Areas Location Map

documentation of biological, cultural, and other resources and hazards is not adequate to support reasoned decision-making by Reclamation pursuant to NEPA and interconnected environmental statutes.

Compliance with other federal, state, and/or local laws may also be necessary, as more fully described in Chapter 5.

Location of Recreation Areas

Lake Berryessa is in the Coast Range in northeastern Napa County, approximately 60 miles northeast of San Francisco and 40 miles west of Sacramento. The lake has a storage capacity of approximately 1.6 million acre-feet and is one of the largest bodies of fresh water in California. The lake is 23 miles long by 3 miles wide and has 165 miles of shoreline. The lake was created in the late 1950s by construction of Monticello Dam across Devil's Gate Canyon, which is at the southeastern edge of the lake. Putah Creek flows into the lake from the northwest and was dammed to create the lake. To manage recreational development at the lake, seven RAs (also referred to as resorts or concession areas/sites in other documents) were established, including the five RAs listed above that are the subject of this EA and two additional areas (Pleasure Cove Marina and Markley Cove Resort). Pleasure Cove Marina and Markley Cove Resort are currently operated by concession contractors, and decisions regarding their development and the potential environmental consequences thereof are not part of this EA. The five RAs that are the subject of this EA are described below and throughout this document from north to south, as depicted on Figure 1-1.

Putah Canyon RA encompasses approximately 808 acres, most of which is water, on the west shore of Lake Berryessa. It is the northernmost RA at Lake Berryessa. The RA boundary encompasses land on both sides of Berryessa Knoxville Road, as well as an island on the lake. Putah Creek flows into the lake just north of the RA. Camp Berryessa, on the north side of Putah Creek across from Putah Canyon RA, is a former Boy Scout Camp on Reclamation-managed lands that has been developed with recreation facilities.

Monticello Shores RA encompasses approximately 503 acres on the west shore of the lake and is 1 mile south of Putah Canyon RA. It is one of the longer RAs at the lake, extending approximately 1.5 miles along the shoreline. All of the land within the RA boundary is on the east side of Berryessa Knoxville Road.

Berryessa Point RA encompasses approximately 199 acres on the west shore of the lake, just south of Monticello Shores RA. It is one of the smaller RAs at the lake. All of the land within the RA boundary is on the east side of Berryessa Knoxville Road. Some islands lie within the RA boundary near the shore.

Spanish Flat RA encompasses approximately 339 acres on the southwest shore of the lake. All of the land within the RA boundary is on the east side of Berryessa Knoxville Road. Spanish Flat RA is across a cove from Steele Canyon RA.

Steele Canyon RA encompasses approximately 321 acres in the cove on the southwestern portion of the lake, across the water from Spanish Flat RA. All of the land within the RA boundary is on the west side of Steele Canyon Road.

Background and History of Lake Berryessa

This section presents an overview of the management and operations of the RAs at Lake Berryessa and provides background information for the purpose and need for the action, described in the next section. The information is summarized from the management documents prepared for Lake Berryessa and other information available on Reclamation's Lake Berryessa website at <https://www.usbr.gov/mp/ccao/berryessa/rec-updates/index.html >.

Management and Development of Lake Berryessa

Napa County was the original administering agency responsible for developing and managing recreation facilities at Lake Berryessa under a management agreement with Reclamation, signed in 1958. Initially, no recreation facilities were provided at the lake, but various recreational opportunities were available, with boating being the most popular. In 1959, a Public Use Plan (PUP) was prepared to guide recreational development based on the capabilities of the land and water to accommodate public use and the recreation needs and desires of the people who would use the area (National Park Service 1959). The PUP recommended development of various facilities to provide diverse recreational opportunities around the lake, and it identified several areas that were deemed most suitable and feasible for development of recreation facilities. The PUP and the management agreement authorized Napa County to establish concession contracts with concessionaires to develop and manage facilities at the lake. Napa County established concession contracts for the seven RAs shown in Figure 1-1. These sites were developed with various facilities over a period of about 15 years. Although some recreation facilities were constructed, the majority of the new development consisted of mobile home parks.

After a review of the status of development at Lake Berryessa, it was determined that the development at the RAs did not comply with the PUP and did not provide sufficient recreational opportunities for the public. Napa County withdrew from management of the lake in 1975, and Reclamation assumed the management role under the Reclamation Development Act of 1974, Public Law 93-493 (dated October 27, 1974), including management of the concession contracts that expired in 2009. Reclamation subsequently amended the PUP to revise the management objectives for the lake to emphasize aquatic-related recreational opportunities, recognize the development of long-term uses (i.e., mobile home parks) at the lake, and reconcile conflicts between short-term and long-term uses. Reclamation also developed day use facilities and a boat launch ramp outside the RA boundaries to gage public interest and demand. The facilities were well received, demonstrating a demand for short-term uses.

In 1992, Reclamation completed the Lake Berryessa Reservoir Area Management Plan (RAMP) to update the PUP, respond to the need for adequate public use facilities, and address resource degradation concerns that resulted from activities at the reservoir (Reclamation 1992). The RAMP identified a number of actions to improve management and operation of the lake, including the removal or relocation of long-term use facilities at the RAs. It was designed to be

a broad-scale planning document, and more site-specific plans would be provided in subsequent planning documents.

In anticipation of the expiration of the concession contracts, Reclamation prepared the VSP EIS to identify and assess various alternatives for the redevelopment and management of visitor services to better provide traditional, short-term, non-exclusive, and diverse outdoor recreational opportunities at Lake Berryessa (Reclamation 2005). In June 2006, Reclamation signed the VSP ROD to memorialize its decision on how to manage recreational opportunities and facilities at Lake Berryessa (Reclamation 2006). The selected alternative provided direction for the management and development of the RAs, which included establishing new long-term concession contracts through a competitive bid process, removing long-term use facilities (mobile homes and trailers), and increasing and improving short-term use opportunities. The VSP ROD outlines the minimum required recreation services to be provided by concessionaires in order to enhance public use and enjoyment of Lake Berryessa. Since 2006 Reclamation has removed much of the existing infrastructure and facilities at the RAs.

Per the terms of the VSP ROD, recreation services at Lake Berryessa's seven RAs are to be provided through commercial concession services. The previous long-term concession contracts for six of the seven RAs expired in 2008–2009 and were not renewed. The seventh RA, Pleasure Cove Marina, continues to be operated under a long-term contract, which expires at the end of 2050. Markley Cove Resort is currently operated by a private concessionaire under a new long-term contract with Reclamation that expires in December 2047. Similarly, for three of the five RAs being evaluated in this EA, interim concession contracts have been awarded by Reclamation until decisions about development of the areas are made and concessionaires are selected. These three RAs are Putah Canyon, Spanish Flat, and Steele Canyon. Two of the RAs - Monticello Shores and Berryessa Point - are currently closed to the public.

Reclamation intends to initiate a managing partner agreement (MPA) for management of concession areas at Lake Berryessa. The managing partner would be responsible for awarding and managing contracts for the development and operation of concession areas to commercial concession contractors. Throughout this EA the terms "concessionaire" or "concessionaires" means either or both the managing partner or the commercial concession contractor. The target goal for initiating a managing partner agreement is spring of 2018.

Public Involvement

In early 2013, Reclamation established the Lake Berryessa Community Forum in accordance with the VSP ROD, which required Reclamation to establish and sponsor a forum of public agencies, with meetings open to the public, to promote communication and collaboration in implementing the VSP ROD and addressing issues of mutual concern. Since then, Reclamation has held several community forum meetings and solicited input from other agencies, stakeholders, and the general public to guide management of the lake and determine the appropriate levels and types of recreational developments that would benefit the public. Meeting topics have included general discussions about the forum, its purpose, the status of recreational developments at the lake, and updates on the environmental review process; selecting names for the RAs; identifying recreational needs and desires at the lake; and getting feedback on preliminary design plans for the RAs. On January 16, 2014, Reclamation held an open house to obtain public input on conceptual design drawings for the five RAs. On November 19, 2014,

Reclamation initiated a 30-day NEPA scoping period to solicit input on the scope of this EA. A NEPA scoping open house was also held on December 10, 2014. The report in Appendix A summarizes the scoping process. Input received during these meetings was considered during the planning and design process and in preparation of this EA. Forum meetings held during 2015–2016 afforded the public additional opportunities to provide input and comments on the proposed development plans.

Visitor Services Plan

Development of the RAs at Lake Berryessa is required to comply with the management direction in the VSP ROD. The VSP ROD amended the RAMP ROD (Reclamation 1993) by updating management direction for certain concessions and recreation management activities, and it incorporated management direction from the RAMP for items the VSP did not address. As a result, development and operation of the RAs must comply with the combined management direction in the VSP and RAMP RODs.

The RAMP is a broad-scale planning document; accordingly, the EIS prepared for the RAMP is very general in terms of the analysis of environmental consequences. The VSP EIS tiered off of the RAMP EIS. While the VSP EIS presented the development framework for each RA and provided a more detailed analysis of environmental consequences than the RAMP EIS, the analysis was still general and did not address conceptual or site-specific design plans for the RAs. Both documents present an overview of the types of environmental impacts anticipated with development of the RAs, and the information contained in those EISs has been considered during preparation of this EA. Because the VSP EIS alone was not intended to support authorizations to construct specific facilities, the proposed enhancements at the five RAs trigger the need for additional analysis of the environmental consequences of implementing development plans in compliance with NEPA and various interconnected statutes (e.g., Clean Water Act [CWA], Endangered Species Act [ESA], National Historic Preservation Act [NHPA]). This EA documents that compliance and tiers off of, and references as applicable, the EISs prepared for the VSP and RAMP.

Purpose and Need

The overall purpose of the proposed action described in Chapter 2 is to implement the level of recreation facilities at five RAs at Lake Berryessa in a manner that is consistent with Public Law 93-493, the RAMP ROD, and the VSP ROD. Under Public Law 93-493, recreation is an authorized use of the Solano Project, which includes Lake Berryessa. Specifically, the development would achieve the purpose of the VSP, which is “to support traditional, short-term, non-exclusive and diverse outdoor recreation opportunities at Lake Berryessa” (Reclamation 2005). In addition, implementing the proposed action would enable Reclamation to achieve its management responsibilities for the lake, as identified in the RAMP EIS, which include “the preservation and conservation of natural resources and providing a wide range of outdoor recreational opportunities in a healthy and safe environment consistent with other authorized functions of the Solano Project” (Reclamation 1992).

The specific purposes of the proposed action are to:

- develop a variety of permanent recreation facilities for short-term uses to provide diverse recreational opportunities in response to visitor and market demand;
- provide adequate facilities at build-out to support a greater number of annual visitors;
- design the developments with consideration for environmentally sensitive resources, economic feasibility, and environmentally sustainable techniques;
- distribute recreation facilities across the five RAs based on visitor demand, accessibility, and feasibility; and
- establish recreational development across the five RAs that is cohesive and complementary.

The proposed action is necessary to implement the management direction in the VSP and RAMP. Development of the five RAs would generate new jobs in the county, increase visitation to the area, and provide economic benefits to the region. The level of development at each RA would vary in response to demand, but would provide the necessary facilities to meet the anticipated number of visitors to the area.

Scope and Organization of This Environmental Assessment

This EA documents NEPA compliance for the proposed recreational development of five RAs at Lake Berryessa. The intent of this EA is to disclose to the public, and for consideration by Reclamation in reaching its management decisions, the effects on the human environment of implementing the proposed action for re-development of the RAs to support permanent short-term recreation use facilities. The analysis in this EA addresses both conceptual site plans and infrastructure plans, as these are described in Chapter 2 for the proposed action, at levels commensurate with the degree of design detail conveyed in those plans. This analytical approach is intended to enable implementation of the infrastructure plans upon completion of the decision document without the need for additional NEPA evaluation and upon receipt of any applicable permits, unless future concessionaires request modifications to the infrastructure plans. Similarly, the NEPA analysis is intended to inform decision-making for implementation of the conceptual plans by incorporating by reference into subsequent NEPA evaluations information and analyses included in this EA when site-specific development plans are submitted by concessionaires to Reclamation. Potential needs for subsequent NEPA analysis and/or permits are more fully described in Chapter 5.

The analyses contained in Chapter 3 of this EA also address the requirements of the ESA and the NHPA. The specific approach to compliance with these acts is described in Chapter 3 and summarized in Chapter 5.

This EA is organized as follows:

- Chapter 1. Introduction and Purpose and Need - provides background information on the development of the RAs at Lake Berryessa and defines the purpose of and need for the proposed action.

- Chapter 2. Description of Alternatives - describes the no-action alternative and the proposed action.

- Chapter 3. Affected Environment and Environmental Consequences - describes the affected environment for each RA and evaluates the environmental consequences of the no-action alternative and the proposed action.

- Chapter 4. Consultation and Coordination - identifies agencies contacted to date and discusses agency consultations that have been initiated.

- Chapter 5. Compliance with Environmental Statutes - discusses compliance with applicable federal laws and regulations.

- Chapter 6. List of Preparers and Contributors - lists the persons responsible for preparation of this document.

- Chapter 7. References - lists the references cited throughout the document.

- Appendices - provide supporting materials for the information presented in this EA.

Chapter 2 Description of Alternatives

Introduction

This chapter describes the no-action alternative and proposed action, which are evaluated in Chapter 3, Affected Environment and Environmental Consequences. The alternatives described in this chapter cover recreational development of five RAs at Lake Berryessa under current conditions (summer 2015) and future conditions (through 2040). The RAs are described from north to south throughout this document, as follows:

- Putah Canyon RA
- Monticello Shores RA
- Berryessa Point RA
- Spanish Flat RA
- Steele Canyon RA

A single action alternative is described in this EA because it encompasses the maximum amount of development that would be allowed by Reclamation at each RA.

As previously mentioned, recreation services at Lake Berryessa's RAs are to be provided through commercial concession services. These services would be procured by Reclamation via competitive commercial concession contracts, or alternately through a managing partner agreement. Regardless of the procurement mechanism, each would distinguish between two types of services:

- "Required Services" are the minimum services required to facilitate providing public services and conveniences consistent with the concession contract and specified under the VSP ROD.

- "Authorized Services" are those services not specifically required under the concession contract, but identified and approved by Reclamation and requested by the concession contractor, which facilitate providing public services and conveniences consistent with the concession contract.

Additionally the concession contract or MPA would distinguish between two types of re-development improvements, mainly on the basis of whether an improvement would be property of Reclamation upon expiration or termination of the concession contract:

- "Concession Area Infrastructure" includes all road surfaces, landscape, utilities, and appurtenant structures affixed to the assigned lands in such a manner as to be a part of the realty including but not limited to parking stalls (for camping, lodging, and day use),

parking lots and roadways, launch ramps, electrical transmission and connection services, street lighting, telephone and internet or other methods of information technology, potable water and waste water systems. All such items are concession area infrastructure, regardless of whether they are Reclamation improvements assigned to the concession contractor or managing partner for use during the term of this concession contract, or are improvements provided by the concessionaire during the term of the concession contract or MPA. All concession area infrastructure shall be the property of Reclamation upon expiration or termination of the concession contract or MPA, and no compensation shall be due the concessionaire for any concession area infrastructure at contract expiration or termination.

- "Concession Contractor Improvements" are fixed assets provided by the concessionaire pursuant to the terms of the concession contract or MPA and with the written approval of Reclamation for the purposes of the concession contract or MPA during the term of the concession contract or MPA, including certain concession area infrastructure, buildings, structures, fixtures, equipment, and other improvements affixed to the assigned lands in such a manner as to be a part of the realty. Docks and other floating structures currently in place or that may be constructed by the concessionaire are included in this category. Concessionaire improvements affixed to the lands assigned to the concessionaire do not include any interest in the land upon which the improvements are located. Concessionaire improvements exclude Reclamation improvements, pre-existing facilities or any site preparation work such as grading, cutting and filling of soil or rock.

The proposed action evaluated in this EA comprises (1) detailed plans for the core, essential infrastructure needed to support the management direction in the VSP and RAMP (referred to hereinafter as "infrastructure plans" or "infrastructure plan elements"), and (2) less detailed conceptual plans for re-development of those areas within the RAs, but generally outside the limits of the infrastructure plans, within which concessionaires would locate recreational and ancillary facilities upon specific approval by Reclamation (referred to hereinafter as "conceptual site plans" or "conceptual plan elements").

Reclamation applied the management guidance from the VSP EIS and ROD to develop the planning and initial design criteria that are the bases for the detailed infrastructure and less detailed conceptual plans. Alternative locations for the RAs were not considered because the boundaries were established via federal regulations and encompass the areas managed by Reclamation and established for the purpose of providing short-term recreation facilities at Lake Berryessa.

Appendix B summarizes the project planning and initial design criteria developed by Reclamation. Detailed infrastructure plans evaluated in this EA are based on the *Lake Berryessa Concession Infrastructure Design – Draft Infrastructure Basis of Design Report, Napa County, CA Appendix A* (Reclamation 2015a). Drawings depicting the detailed infrastructure plans and the conceptual plan elements at each of the five RAs are presented in Appendix C.

Many options exist for the locations and designs of recreation facilities at each RA, and the siting and construction details may be refined by the concessionaires in coordination with Reclamation before construction of any facilities. Further NEPA analysis will be performed on future design

plans, if determined necessary by Reclamation. The level of subsequent NEPA compliance is expected to be either focused EAs that incorporate by reference information and analyses contained in this EA or categorical exclusions for individual or groups of facilities, once specific details for facilities are available. Applicable permits and approvals are identified in Chapter 5 of this EA; additional environmental permits or approvals may also be necessary before construction.

No-Action Alternative

The no-action alternative in this EA is defined as the conditions of the five RAs at the end of the summer season in 2015. Under this alternative, new facilities would only be constructed or installed at the RAs if they are authorized under existing interim concession contracts and they are implemented in compliance with the EA/FONSI for interim recreation services (Reclamation 2013a), the EA/FONSI for dump stations (Reclamation 2014a), and the EA/FONSI for water distribution systems (Reclamation 2014b) as appropriate. The interim facilities and services currently available at some of the RAs would continue to be available to the public as long as the interim concession contracts remain in place. The locations of existing facilities managed by concession contractors under interim concession contracts are shown in Figures 2-1 (Putah Canyon RA), 2-2 (Spanish Flat RA), and 2-3a and 2-3b (Steele Canyon RA). At each of the five RAs evidence remains of the locations of previous facilities (e.g., power poles and lines, fencing, areas devoid of vegetation), and a number of roads currently provide access through the RAs. Facilities associated with previous developments at the RAs (e.g., launch ramps, paved roads) would continue to be used, at Reclamation's discretion.

This alternative would not meet the purpose and need defined in Chapter 1 and would not provide a wide range of opportunities for recreation at Lake Berryessa and permanent short-term uses to support those opportunities. It also would not meet the objectives detailed in the VSP ROD and RAMP ROD with regard to the quality of recreation and associated facilities.

Putah Canyon RA

Access to the Putah Canyon RA is from Berryessa Knoxville Road at the north gate on the west side of the road and the south gate on the east side of the road, near the center of the RA. The south and north gate entrances contain temporary entry station buildings to welcome visitors. Much of this RA was disturbed as a result of the previous development and is sparsely vegetated in some areas. Current use of the RA is restricted to the previously disturbed areas to minimize impacts on native vegetation and other resources.

Royal Elk Park Management Incorporated provides interim services at Putah Canyon RA under an interim concession contract with Reclamation that expires December 31, 2018), in compliance with the EA and FONSI for Interim Services at Lake Berryessa (Reclamation 2013a). The interim contract identifies the following required facilities: a boat launch ramp with associated amenities; day use sites with parking spaces, picnic tables, barbeques, trash receptacles, and restrooms; campsites for tents and recreational vehicles (RVs) with associated amenities like those for the day use sites; and a retail sales area for water and firewood. The RA currently has a campground with about 36 standard campsites for RV or tent use, 16 RV sites, and about 46 tent-only campsites; a day use area with 15 sites; two boat launch ramps; two vault toilets; and

Figure 2-1. Putah Canyon RA Existing Facilities

parking areas (Figure 2-1). Boat launch ramps are provided on both sides of the RA for access to the main part of the lake and a cove on the west side.

A groundwater well was installed at the northern end of the RA, east of Berryessa Knoxville Road, with a limited distribution system that extends from the well to several water spigots at the campgrounds on the east and west sides of the road. The distribution pipelines follow existing roads and other previously disturbed areas. Hookups for RVs are not currently available. A dump station and non-potable water are provided just south of the southern entrance station near a campground.

Reservation, security, and resource protection services are also provided to support the short-term uses. Authorized services that Reclamation may also approve under the interim contract include a fueling station, rental operations, wet slip rentals, additional day use and campsites, and additional retail sales. Installation of new facilities would be subject to additional environmental review under NEPA, separate from this EA.

About 1.72 acres of the RA are currently rescinded from use. This includes a fenced area with tanks near the main parking lot and monitoring wells on the southern end of the peninsula.

Monticello Shores RA

Monticello Shores RA is not currently open to the public for recreational uses. No recreation facilities are currently available at this RA.

Most facilities associated with the previous development have been removed. Some areas show evidence of the previous development where vegetation removal and grading took place. Several paved and dirt roads provide access throughout the RA, and power lines that served the previous development extend into the RA. An iron entry gate restricts access. Outside of the previously developed areas, the RA contains oak and pine woodlands. No new facilities would be installed at Monticello Shores RA under the no-action alternative, and it would remain closed to the public.

Berryessa Point RA

Berryessa Point RA is not currently open to the public for recreational uses. No recreation facilities are currently available at this RA.

Much of the southern portion of the RA was disturbed as a result of the previous development and contains unvegetated, flat areas. Most facilities associated with the previous development have been removed, and the launch ramp has been deconstructed. An iron entry gate restricts access. Outside of the previously developed areas, the RA contains oak woodlands. No new facilities would be installed at Berryessa Point RA under the no-action alternative, and it would remain closed to the public.

Spanish Flat RA

Access to Spanish Flat RA is from Spanish Flat Resort Road off Berryessa Knoxville Road. The main entrance contains a temporary entry station building to welcome visitors. Some areas of this RA were disturbed as a result of the previous development, while other areas, particularly in the northern portion, are less disturbed and contain pine and oak woodlands. The peninsula was

heavily occupied by trailers, which disturbed much of the understory, but most of the oak and pine trees were retained and are still present in that area. Current use of the RA is restricted to the previously disturbed areas to minimize impacts on native vegetation and other resources.

Spanish Flat Partners, LLC provides interim services at Spanish Flat RA under an interim concession contract with Reclamation that expires December 31, 2018, in compliance with the EA and FONSI for Interim Services at Lake Berryessa (Reclamation 2013a). Pleasure Cove Marina, LLC previously operated the RA under an interim contract, which identified the following required facilities: a boat launch ramp with associated amenities; buoys; day use sites with parking spaces, picnic tables, barbeques, trash receptacles, and restrooms; campsites for tents and RVs with associated amenities like those for the day use sites; and a retail sales area for water and firewood. The RA currently has a campground with about 45 standard campsites for tent or RV use and about 10 tent-only campsites, a day use area, two vault toilets, and parking areas (Figure 2-2).

Spanish Flat Water District (SFWD) supplies water to the RA via a distribution system that was used for the former development at the RA. The system was re-connected to SFWD's main pipeline during the summer of 2014. Two spigots are available at one location along the distribution pipeline. Hookups for RVs and a launch ramp are not currently available. A dump station and non-potable water are provided near a campground just west of the peninsula. Vault restrooms are also provided.

Reservation, security, and resource protection services are also provided to support the short-term uses. Authorized services that Reclamation may also approve under the interim contract include a fueling station, rental operations, wet slip rentals, additional day use and campsites, and additional retail sales. Installation of new facilities would be subject to additional environmental review under NEPA, separate from this EA.

Steele Canyon RA

Access to Steele Canyon RA is from Steele Canyon Road off Berryessa Knoxville Road. The main entrance contains a temporary entry station building to welcome visitors. Much of this RA was disturbed as a result of the previous development and is sparsely vegetated in some areas. Current use of the RA is restricted to the previously disturbed areas to minimize impacts on native vegetation and other resources.

Pleasure Cove Marina, LLC provides interim services at Steele Canyon RA under an interim concession contract with Reclamation that expires December 31, 2018, in compliance with the EA and FONSI for Interim Services at Lake Berryessa (Reclamation 2013a). The interim contract identifies the following required facilities: a boat launch ramp with associated amenities; buoys; day use sites with parking spaces, picnic tables, barbeques, trash receptacles, and restrooms; campsites for tents and RVs with associated amenities like those for the day use sites; and a retail sales area for water and firewood. The RA currently has three standard campgrounds with about 59 standard campsites for tent or RV use, an RV-only campground with six sites, two tent-only campgrounds with about 19 campsites, two day use areas, a multiple-lane launch ramp, two vault toilets, and parking and boat storage areas (Figure 2-3a and 2-3b). The launch ramp provides access to a cove off the west side of the RA.

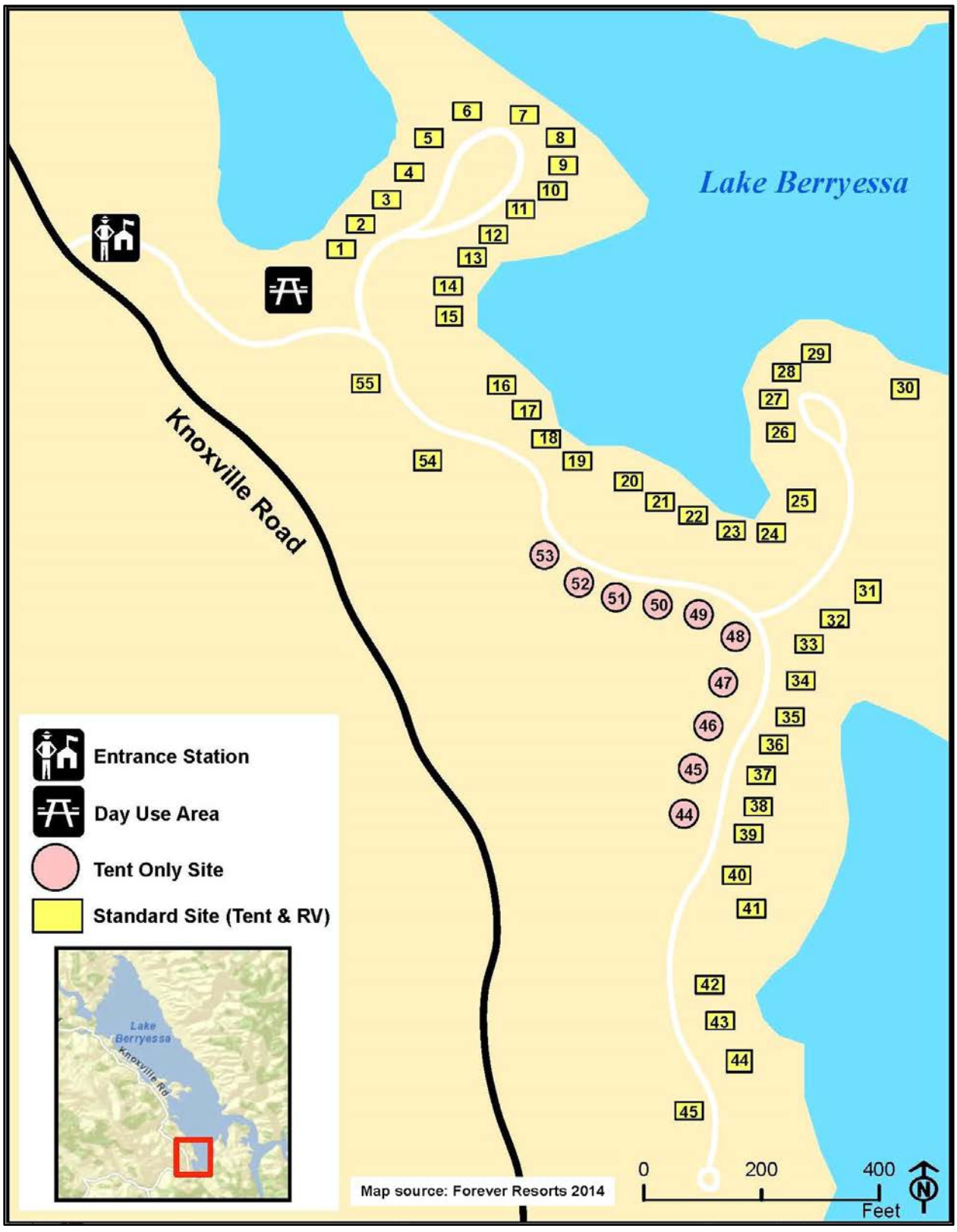

Figure 2-2. Spanish Flat RA Existing Facilities

Figure 2-3a. Steele Canyon RA Existing Facilities North

Figure 2-3b. Steele Canyon RA Existing Facilities South

Napa Berryessa Resort Improvement District (NBRID) supplies water to the RA via a distribution system that was used for the former development at the RA. The system was reconnected to NBRID's main pipeline during the summer of 2014. Two spigots are available at one location along the distribution pipeline. Hookups for RVs are not currently available. A dump station and non-potable water are provided near the campground off the main access road in the southern portion of the RA.

Reservation, security, and resource protection services are also provided to support the short-term uses. Authorized services that Reclamation may also approve under the interim contract include a fueling station, rental operations, wet slip rentals, additional day use and campsites, and additional retail sales. Installation of new facilities would be subject to additional environmental review under NEPA, separate from this EA.

Proposed Action

This section presents an overview of the proposed development at the five RAs and describes the conceptual site plans and infrastructure plans for each RA.

Overview of Proposed Development

Reclamation has identified a desired range of public use facilities and services to support short-term recreational uses at the five RAs at Lake Berryessa in accordance with the RAMP and VSP ROD. Development of the facilities and provision of the services would be phased over a 30-year period and distributed across the RAs in response to visitor and market demand. Each RA would support different levels of use and facilities to provide diverse opportunities, and some areas may be more developed than others at full build-out. Some RAs may be focused on camping and day use opportunities, whereas others may provide more expansive development with cabins, restaurants, and retail stores. Full build-out of the RAs is expected to attract an estimated 1.5 million visitors each year, based on a market assessment conducted as part of the planning phase (Reclamation 2014c), and would attract multiple types of users, such as boaters, hikers, campers, and nature photographers.

The total number of facilities allowed to be developed at the five RAs is based on the number of required and authorized facilities established by Reclamation; this represents the maximum amount of development allowed across the RAs. Required facilities must be constructed under the concession contract or MPA, whereas authorized facilities may be constructed at the discretion of the concessionaire and upon approval by Reclamation. Table 2-1 summarizes the total number of required and authorized facilities for all five RAs based on the latest design plans prepared by Reclamation, market research, and financial feasibility (Reclamation 2015). Distribution of these facilities across the RAs depends on a variety of factors (e.g., market demand and perception, environmental conditions, feasibility) and is described conceptually for each RA below. The conceptual site plans will be refined by the concessionaires to identify specific locations and designs for the facilities. All facilities will be located within the designated RA boundaries. The need for off-site facilities or improvements (e.g., road improvements, utility line connections) is not currently known, but will be evaluated as needed in subsequent environmental documentation.

Table 2-1. Total Facilities Across the Five Recreation Areas

Facility Type	Total Number of Required Facilities	Total Number of Additional Authorized Facilities	Total Number of Allowed Facilities
Tent Campsites	113	233[a]	346
Tent/RV Campsites (No Utilities)	14	36	50
RV or Tent/RV Campsites (Utilities)	37	111	148
Other Campsite Services	8[b]	10[c]	18
Lodging Units	32[d]	85[e]	117
Launch Lane Boat Ramps	12	16	28
Courtesy Docks	7	10	17
Wet Slips (Boat/Houseboat)	454/47	200/-	654/47
Dry Boat Storage (Spaces)	30	96	126
Other Boat Services	15[f]	21[g]	36
Lake Access (Boat Exclusion Zone)	4	1	5
Day Use Sites	38	53	91
Group Day Use Area	-	3	3
Special Use Areas	-	2	2
Retail Stores	-	5	5
Restaurants	-	5	5
Restrooms	16[h]	35[i]	51
Entry Stations	4	2	6
Trail Kiosks	-	5	5
Parking Spaces	462	169	631

Notes:
a Authorized campsites include tent sites (208) and hike-in/boat-in tent sites (25).
b Other required camping services include camp host sites (3), RV dump stations (3), and iron rangers (2).
c Other authorized camping services include overnight group use areas (2), camp host sites (2), dump stations (2), playgrounds (3), and an iron ranger (1).
d Required lodging includes park models (17) and cabins (15).
e Authorized lodging includes park models (29), cabins (9), yurts (9), rustic cabins (8), tent cabins (8), park models for employee housing (16), and floating campsites (6).
f Other required boat services include a kiosk at boat ramps (3 total), fuel or sanitary storage tanks (3), fuel dispensing or sanitary connections (3), marina services and buildings (3), and boat rental services (3).
g Other authorized boat services include kiosks at boat ramps (2), fuel or sanitary storage tanks (2), fuel dispensing or sanitary connections (2), fish cleaning stations (7), marina services and buildings (2), concessionaire buildings (3), maintenance and repair yards (2) , and a boat rental service (1).
h Required restrooms include entry station vault toilets (3), vault toilets (5), toilet-only comfort stations (5), toilet/family room comfort stations (2), and toilet/family room/shower comfort stations (1).
i Authorized restrooms include vault toilets (11), toilet-only comfort stations (7), toilet/family room comfort stations (8), toilet/family room/shower comfort stations (7), and comfort stations with laundry (2).

Conceptual Site Plans

Reclamation has prepared conceptual site plans for each RA depicting some of the possible sites for required facilities that are not located within the boundaries of detailed infrastructure plans. Conceptual site plans for each RA are presented in Appendix C, Figures C-1 through C-5.

Conceptual plans are the result of preliminary planning, public input, landscape-level design, and an evaluation of market trends and the financial feasibility of developing recreation facilities at the RAs. They are not intended to provide site-specific details or engineering-level designs for facilities that would be developed at each RA. These plans establish the understanding necessary for concessionaires to design structural facilities (e.g., marinas, retail stores, restrooms, lodging units) and are intended to present the general locations where required facilities would likely be developed. Some authorized facilities may be located in the same general areas as required facilities. The concessionaires selected for developing the RAs will prepare site-specific plans and construction schedules using the conceptual plans as guidance and obtain Reclamation approval before developing individual facilities. The specific numbers of facilities and services provided at each RA may be adjusted in response to additional market and financial analyses during development of the site-specific plans, but the total numbers of facilities and services across the RAs will not exceed those identified in Table 2-1.

The following key planning, design, and implementation commitments result from the management guidance provided in the VSP EIS and ROD, and are included as elements of the proposed action for the conceptual site plans:

- Prior to approving proposals from concessionaires for development of conceptual site plan elements, Reclamation shall ensure the areas of direct and indirect disturbance that would result from granting such approvals have been adequately surveyed for biological, cultural, and other resources and hazards, and that adequate documentation exists to support reasoned decision-making by Reclamation pursuant to NEPA and interconnected environmental statutes (e.g., NHPA Section 106, ESA Section 7, CWA Section 404).

- All recreation facilities must be day use, short-term, or annual occupancy only, in accordance with the VSP ROD.

- Proposed new facilities such as parking areas, campgrounds, access drives, boat ramps, utility corridors, and infrastructure will be in the same general locations as previous development to the degree practicable in order to minimize development costs and environmental disturbance.

- No permanent structures or dump stations will be located below elevation 455 feet above mean sea level (msl). Any restrooms, showers, laundry facilities, or fuel storage tanks below 455 feet msl are to be flood-proofed.

- A 100-foot buffer zone above the 455-foot contour will not contain wastewater treatment infrastructure.

- Marina buildings, restaurants, retail stores, maintenance and service buildings, multi-use centers, and other structures will have floor elevations at 456 feet msl or higher.

- Boats are presumed to have safe access to docks and slips with 9 feet of water depth at slips if lake level is down to 400 feet msl.

- Water access facilities will comply with *Recreation Facility Design Guidelines* (Reclamation 2013a) and the *Layout, Design and Construction Handbook for Small Boat Launching Facilities* (California Department of Boating and Waterways 1991).

- A minimum 200-foot "no wake" zone will be established beyond landing floats such as docks per the California Boating Law Section 655.2 (2)(C).

- Water supply tanks need to be on highest ground, but will not exceed the height of surrounding tree lines.

- Existing native trees and vegetation will be maintained wherever practicable. Shoreline vegetation will be protected wherever practicable and consideration will be given to replacing exotic non-native vegetation with more native species.

- To the degree practicable, direct disturbance of elderberry shrubs with stems greater than one inch diameter at ground level will be avoided and a 25-foot buffer will be established to protect the shrubs.

- Cut banks will be minimized wherever practicable.

- Cuts and fills below the 455-foot contour will be minimized. Due to the potential for reservoir flooding and based on the top elevation of the dam, the 455-foot contour is a benchmark for cuts and fills, whereby all finished earthwork below that elevation should be, at a minimum, balanced on a contour-by-contour basis.

- In areas where extensive grading is required, final slopes will have a gradient similar to that of adjacent slopes or slopes of nearby natural areas. The finished slopes will be stabilized with retaining soil cover and native vegetation and will blend in with the surrounding landscape.

- Two areas are excluded from development due to possible soil contamination and ongoing monitoring efforts: 1.72 acres at Putah Canyon RA on the southern end of the peninsula and 1.162 acres at Steele Canyon RA south of the existing launch ramp.

- The visual design of new facilities will be compatible with Reclamation guidelines that require all recreation facilities to be harmonious in form, line, color, and texture with the surrounding landscape. Facilities will be sited to minimize visual intrusions from the lake and will be designed to conform to thematic requirements that reflect a natural condition.

- Concurrent construction across multiple recreation areas will require documentation by Reclamation of compliance with the General Conformity Rule for air quality prior to initiating construction.

Infrastructure Plans

Plans for the core, essential infrastructure necessary to develop the five RAs in accordance with the RAMP and VSP ROD are presented in Appendix C. At build-out core, essential infrastructure would be provided for water supply, wastewater treatment and disposal, stormwater control, electricity, and access (e.g., roads, parking areas) to support the required and authorized recreation facilities and services at the RAs. Water supply facilities may include groundwater wells, water treatment facilities, pump stations, storage tanks, pipelines, and related facilities to provide potable water to campgrounds, lodging units, and other development. Wastewater facilities may include package treatment plants, spray/disposal fields, septic tanks, pipelines, and related facilities to collect, store, treat, and dispose wastewater generated by restrooms, lodging units, and other development. Stormwater control would be provided by detention basins or similar facilities to collect and store stormwater runoff until it can infiltrate into the ground. Electricity would be provided to the main recreation facilities via overhead or underground lines; existing electrical lines and poles would be incorporated into the electrical distribution system to the extent feasible. Roads and parking areas would be improved or established to provide access and parking needed to support the recreation facilities.

Minor infrastructure (e.g., improvements to campgrounds) and other facilities necessary to support required and authorized services will be designed by the concessionaires as they prepare site-specific designs for the recreation areas. Minor infrastructure and other facilities proposed by concessionaires would be concentrated outside the boundaries of the infrastructure plan elements shown in Appendix C.

As for the conceptual site plans, Reclamation applied the management guidance from the VSP EIS and ROD to develop the planning and initial design criteria that are the bases for the detailed infrastructure plans. The following key planning, design, and implementation commitments are included as elements of the proposed action for the infrastructure plans and are in addition to the commitments listed above for the conceptual plans:

- Prior to approving proposals from concessionaires for development of infrastructure site plan elements Reclamation shall ensure the areas of direct and indirect disturbance that would result from granting such approvals have been adequately surveyed for biological, cultural, and other resources and hazards, and that adequate documentation exists to support reasoned decision-making by Reclamation pursuant to NEPA and interconnected environmental statutes (e.g., NHPA Section 106, ESA Section 7, CWA Section 404).

- Designs for infrastructure and certain facilities will be consistent with Reclamation's *Recreation Facility Design Guidelines*.

- Designs for new facilities will follow the Guiding Principles Checklist for New Construction, which requires integrated design principles, optimization of energy efficiency, use of renewable energy, protection and conservation of water, enhancement of indoor environmental quality, and reduction of environmental impacts of materials.

- Facilities will be in compliance with the National Fire Protection Association Life Safety Code and accessibility requirements under the 2010 Americans with Disabilities Act.

- Access routes will incorporate design criteria from the *Design of Recreation Areas and Facilities, Access and Circulation Engineering and Design Manual EM 1110-2-410* dated December 31, 1982 prepared by the U.S. Army Corps of Engineers (USACE).

- Roadways will comply with Napa County Road and Street Standards and State Responsibility Area Fire Safe Regulations for pavement thickness and road width, respectively.

- Stormwater detention basins will comply with the National Pollutant Discharge Elimination System Waste Discharge Requirements for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems.

Putah Canyon RA

Overview of Development and Conceptual Site Plan

Table 2-2 presents the total number of required and authorized facilities at Putah Canyon RA. These numbers are subject to change as site-specific plans are prepared. Figure C-1 in Appendix C depicts the anticipated locations of required facilities at the RA based on the conceptual site plans prepared by Reclamation.

At build-out, Putah Canyon RA would contain a marina and campgrounds, as well as day use amenities, lodging units, and other supporting facilities. Two new entry stations (one required, one authorized) would provide access to facilities on the east and west sides of Berryessa Knoxville Road. An iron ranger would be required initially for visitors accessing the west side. The main land-based facilities would be on the east side of the road and would include tent and/or RV campgrounds, lodging units, day use sites on the southern peninsula near the existing boat ramp, and vehicle and trailer parking on the southern peninsula. Some of the campsites would have utilities or RV hookups. The existing six-lane boat launch ramp off the southern peninsula would likely be demolished and reconstructed and may become a four-lane (required) or six-lane (authorized) launch ramp. Recreation facilities on the west side of the road would include tent-only campgrounds and day use sites.

New recreation facilities would be located primarily in previously disturbed areas or at interim facility locations. At the discretion of the concessionaire and upon approval by Reclamation once site-specific designs are available, interim facilities may remain in place for use over the long term or they may be removed and relocated to another portion of the RA or to another RA. For facilities that remain in place, minor (or no) additional improvements would be expected (e.g., minor improvements might include installing RV hookups at an existing tent campsite or creating a tent pad for a campsite at an existing day use site).

Table 2-2. Facilities Allowed at Putah Canyon Recreation Area

Facility Type	Total Number of Required Facilities	Total Number of Additional Authorized Facilities	Total Number of Allowed Facilities
Tent Campsite	47	20	67

Facility Type	Total Number of Required Facilities	Total Number of Additional Authorized Facilities	Total Number of Allowed Facilities
Tent/RV Campsite (No Utilities)	14	-	14
Tent/RV Campsite (Utilities)	23	-	23
Other Campsite Service	3[a]	2[b]	5
Lodging Unit (Park Model)	5	7[c]	12
Launch Lane Boat Ramp	4	2	6
Courtesy Dock	2	3	5
Wet Slip (Boat/Houseboat)	201/15	-	201/15
Dry Boat Storage (Spaces)	30	-	30
Other Boat Service	5[d]	4[e]	9
Lake Access (Boat Exclusion Zone)	2	-	2
Day Use Site	18	20	38
Group Day Use Area	-	1	1
Retail Store	-	1	1
Restaurant	-	1	1
Restroom	6[f]	3[g]	9
Entry Station	1	1	2
Access Road Close Gate	2	1	3
Trail Kiosk	-	1	1
Vehicle Parking (at Marina)	126	-	126
Vehicle with Boat Trailer Parking	55	-	55

Notes:
a Other required camping services include a camp host site, an RV dump station, and an iron ranger.
b Other authorized camping services include a playground and an iron ranger.
c Authorized lodging includes (1) park model and six (6) park models for employee housing.
d Other required boat services include a kiosk at a boat ramp, a fuel or sanitary storage tank, a fuel dispensing or sanitary connection, a marina service and building, and a boat rental service.
e Other authorized boat services include fish cleaning stations (2), a concessionaire building, and a maintenance and repair yard.
f Required restrooms include a vault toilet at the entry station, toilet-only comfort stations (3), a toilet/family room comfort station, and a toilet/family room/shower comfort station with laundry.
g Authorized restrooms include a vault toilet, a toilet-only comfort station, and a comfort station with laundry.

The primary lake access would be provided on the west side of Berryessa Knoxville Road. A full-service marina with boat slips, a restaurant (authorized), a retail store (authorized), and watercraft rentals would be provided in the cove. The proposed marina would require the installation of facilities on the lake and shore to connect the marina to land. The existing boat ramp on the west side of the RA would remain or would be reconstructed and would be used for marina access only. Parking and dry boat storage would be provided near the marina. Other supporting facilities and services may also be available for maintenance and concessionaire operations, such as a boat repair facility and employee housing; for lake access; and for day use areas, such as a playground and group day use area. Supporting uses, such as a fish cleaning

station, a sanitary disposal site, a laundry facility, and vault toilets or flush restrooms conveniently located throughout the RA would also be provided. Trails through the RA would connect to the Shoreline Trail system.

Infrastructure Plan

Figure C-1 in Appendix C depicts the proposed infrastructure at Putah Canyon RA, based on the detailed infrastructure plans prepared by Reclamation. At build-out core, essential infrastructure would be provided for water supply, wastewater treatment and disposal, stormwater control, electricity, and access (e.g., roads, parking areas) to support the required and authorized recreation facilities and services at the RAs. Water supply facilities may include groundwater wells, water treatment facilities, pump stations, storage tanks, pipelines, and related facilities to provide potable water to campgrounds, lodging units, and other development. For additional details see *Lake Berryessa Concession Infrastructure Design – Draft Infrastructure Basis of Design Report, Napa County, CA* (Reclamation 2015a).

Monticello Shores RA

Overview of Development and Conceptual Site Plan

Table 2-3 presents the total number of required and authorized facilities at Monticello Shores RA. These numbers are subject to change as site-specific plans are prepared. Figure C-2 in Appendix C depicts the anticipated locations of required facilities at the RA based on the conceptual site plans prepared by Reclamation.

Table 2-3. Facilities Allowed at Monticello Shores Recreation Area

Facility Type	Total Number of Required Facilities	Total Number of Additional Authorized Facilities	Total Number of Allowed Facilities
Tent Campsite	-	150[a]	150
Tent/RV Campsite (No Utilities)	-	4	4
Tent/RV Campsite (Utilities)	-	29	29
Other Campsite Service	-	3[b]	3
Lodging Unit	-	55[c]	55
Launch Lane Boat Ramp	-	4	4
Courtesy Dock	-	2	2
Wet Slip (Boat/Houseboat)	-	50/-	50/-
Other Boat Service	-	6[d]	6
Lake Access (Boat Exclusion Zone)	-	1	1
Day Use Site	-	8	8
Group Day Use Area	-	1	1
Retail Store	-	1	1
Restaurant	-	1	1
Restroom	-	22[e]	22

Facility Type	Total Number of Required Facilities	Total Number of Additional Authorized Facilities	Total Number of Allowed Facilities
Entry Station	-	1	1
Access Road Close Gate	1	-	1
Trail Kiosk	-	1	1
Vehicle Parking (at Marina)	-	30	30
Vehicle with Boat Trailer Parking	-	49	49

Notes:
a Authorized campsites include tent sites (130) and hike-in/boat-in tent sites (20).
b Other authorized camping services include a group use area, a camp host site, and an RV dump station.
c Authorized lodging includes park models (28), cabins (9), yurts (6), rustic cabins (4), tent cabins (5), and floating campsites (3).
d Other authorized boat services include a kiosk at a boat ramp, a fuel or sanitary storage tank, a fuel dispensing or sanitary connection, a) fish cleaning station, a marina service and building, and a boat rental service.
e Authorized restrooms include vault toilets (10), a toilet-only comfort station (1), toilet/family room comfort stations (5), and toilet/family room/shower comfort stations (6).

At build-out, Monticello Shores RA would contain diverse overnight facilities, such as tent-only campsites, standard and RV campsites, and various types of lodging units, as well as day use and boat launching facilities. The only required facility is an access road gate, and all other authorized facilities would be designed by the concessionaire as part of the site-specific design process. No facilities currently exist at the RA.

Improvements for water supply, wastewater treatment, electricity, and communications to support the authorized recreation facilities may be located within the approximate boundaries of conceptual plan elements shown in Figure C-2. Roads and parking areas would be improved or established to provide access and parking in the RA once the RA is open to the public. Other supporting facilities may include an entry station, trails, a fish cleaning station, a sanitary disposal site, a fuel storage and dispensing station, a watercraft storage building, and vault toilets or flush restrooms conveniently located throughout the RA. Adequately detailed plans for essential services not already included in the conceptual site development plan (e.g., water, power, etc.) will be developed by the concessionaire and submitted for review and approval by Reclamation.

Infrastructure Plan

Figure C-2 in Appendix C depicts the proposed infrastructure at Monticello Shores RA, based on the detailed infrastructure plans prepared by Reclamation. Core infrastructure at Monticello Shores RA is limited to construction of a single access road close gate, located near the southern boundary of the RA, immediately north of the intersection of the two-way circulation road (a conceptual plan element) and Berryessa Knoxville Road. For additional details see *Lake Berryessa Concession Infrastructure Design – Draft Infrastructure Basis of Design Report, Napa County, CA* (Reclamation 2015a).

Berryessa Point RA

Overview of Development and Conceptual Site Plan

Table 2-4 presents the total number of required and authorized facilities at Berryessa Point RA. These numbers are subject to change as site-specific plans are prepared. Figure C-3 in Appendix C depicts the anticipated locations of required facilities at the RA based on the conceptual site plans prepared by Reclamation.

Berryessa Point RA would primarily contain tent-only campsites with options for expanding recreational facilities to include RV campsites, day use sites, marina facilities, and a boat launch. An iron ranger would serve as the entry station to the tent campground. Vault toilets may be installed at the campground. No facilities currently exist at the RA, and all new facilities would be located primarily in previously disturbed areas on or near the peninsula. No facilities would be installed in the rescinded area on the peninsula until Reclamation authorizes their construction (i.e., once the rescission is lifted).

Table 2-4. Facilities Allowed at Berryessa Point Recreation Area

Facility Type	Total Number of Required Facilities	Total Number of Additional Authorized Facilities	Total Number of Allowed Facilities
Tent Campsite	49	-	49
RV Campsite (Utilities)	-	41	41
Other Campsite Service	1[a]	2[a]	3
Launch Lane Boat Ramp	-	1	1
Courtesy Dock	-	1	1
Wet Slip (Boat/Houseboat)	-	50/-	50/-
Other Boat Service	-	5[b]	5
Day Use Site	8	9	17
Special Use Area	-	1	1
Retail Store	-	1	1
Restaurant	-	1	1
Restroom	2	-	2
Entry Station	-	1	1
Access Road Close Gate	-	-	-
Trail Kiosk	-	1	1
Vehicle Parking (at Marina)	-	30	30
Vehicle Parking	60	18	78

Notes:
a Other camping services include a required iron ranger, an authorized camp host site, and an authorized RV dump station.
b Other authorized boat services include a kiosk at the boat ramp, a fuel or sanitary storage tank, a fuel dispensing or sanitary connection, a fish cleaning station, and a marina service and building.

Infrastructure Plan

Figure C-3 in Appendix C depicts the proposed infrastructure at Berryessa Point RA, based on the detailed infrastructure plans prepared by Reclamation. At build-out core, essential infrastructure would be provided for water supply, wastewater treatment and disposal, stormwater control, electricity, and access (e.g., roads, parking areas) to support the required and authorized recreation facilities and services at the RAs. Water supply facilities may include groundwater wells, water treatment facilities, pump stations, storage tanks, pipelines, and related facilities to provide potable water to campgrounds, lodging units, and other development. For additional details see *Lake Berryessa Concession Infrastructure Design – Draft Infrastructure Basis of Design Report, Napa County, CA* (Reclamation 2015a).

Spanish Flat RA

Overview of Development and Conceptual Site Plan

Table 2-5 presents the total number of required and authorized facilities at Spanish Flat RA. These numbers are subject to change as site-specific plans are prepared. Figure C-4 in Appendix C depicts the anticipated locations of required facilities at the RA based on the conceptual site plans prepared by Reclamation.

At build-out, Spanish Flat RA would contain a floating marina, lodging units, campgrounds, day use amenities, and other supporting facilities. A new entry station would be provided at a location further into the RA than the current entrance. The main tent and/or RV campgrounds and lodging (e.g., yurts, rustic cabins) would likely be on the peninsula. The required tent campsites would not have utilities initially, but all of the standard and RV campsites would have utilities at build-out. Day use sites and tent campsites would be provided along the shore. A two-lane boat launch ramp and vehicle and trailer parking may be provided near the day use sites.

Table 2-5. Facilities Allowed at Spanish Flat Recreation Area

Facility Type	Total Number of Required Facilities	Total Number of Additional Authorized Facilities	Total Number of Allowed Facilities
Tent Campsite	17	39	56
Tent/RV Campsite (No Utilities)	-	10	10
Tent/RV Campsite (Utilities)	-	12	12
Other Campsite Service	2[a]	1[a]	3
Lodging Unit	-	10[b]	10
Launch Lane Boat Ramp	2	2	4
Courtesy Dock	1	1	2
Wet Slip (Boat/Houseboat)	75/-	-	75/-
Other Boat Service	5[c]	2[d]	7
Lake Access (Boat Exclusion Zone)	1	-	1
Day Use Site	10	8	18

Facility Type	Total Number of Required Facilities	Total Number of Additional Authorized Facilities	Total Number of Allowed Facilities
Retail Store	-	1	1
Restaurant	-	1	1
Restroom	3	4[e]	7
Entry Station	1	-	1
Access Road Close Gate	-	1	1
Trail Kiosk	-	1	1
Vehicle Parking (at Marina)	45	-	45
Vehicle with Boat Trailer Parking	33	-	33

Notes:
a Other camping services include a required camp host site, a required RV dump station, and an authorized playground.
b Authorized lodging includes yurts (3), rustic cabins (4), and tent cabins (3).
c Other required boat services include a kiosk at a boat ramp, a fuel or sanitary storage tank, a fuel dispensing or sanitary connection, a marina service and building, and a boat rental service.
d Other authorized boat services include a fish cleaning station and a concessionaire building.
e Authorized restrooms include a vault toilet, two (2) toilet-only comfort stations, and a toilet/family room comfort station.

New recreation facilities would be located primarily in previously disturbed areas or at the interim facility locations. At the discretion of the concessionaire and upon approval by Reclamation once site-specific designs are available, interim facilities may remain in place for use over the long term or they may be removed and relocated to another portion of the RA or to another RA. For facilities that remain in place, minor (or no) additional improvements would be expected.

The primary lake access would be provided in the cove north of the peninsula. A marina with boat slips and watercraft rentals would be provided in the cove. The proposed marina would require the installation of facilities on the lake and shore to connect the marina to land. A two-lane boat ramp may also be provided and may be in the location of a previous ramp or a new location. Parking and dry boat storage would be provided near the marina. Supporting facilities may include a fish cleaning station, a sanitary disposal site, a concessionaire operations building, and vault toilets or flush restrooms conveniently located throughout the RA. Trails through the RA would connect to the Shoreline Trail system.

Infrastructure Plan

Figure C-4 in Appendix C depicts the proposed infrastructure at Spanish Flat RA, based on the detailed infrastructure plans prepared by Reclamation. At build-out core, essential infrastructure would be provided for water supply, wastewater treatment and disposal, stormwater control, electricity, and access (e.g., roads, parking areas) to support the required and authorized recreation facilities and services at the RAs. Water supply facilities may include groundwater wells, water treatment facilities, pump stations, storage tanks, pipelines, and related facilities to provide potable water to campgrounds, lodging units, and other development. For additional details see *Lake Berryessa Concession Infrastructure Design – Draft Infrastructure Basis of Design Report, Napa County, CA* (Reclamation 2015a).

Steele Canyon RA

Conceptual Site Plan

Table 2-6 presents the total number of required and authorized facilities at Steele Canyon RA. These numbers are subject to change as site-specific plans are prepared. Figure C-5 in Appendix C depicts the anticipated locations of required facilities at the RA based on the conceptual site plans prepared by Reclamation.

At build-out, Steele Canyon RA would contain a marina and campgrounds, as well as day use amenities, lodging units, and other supporting facilities. A new entry station would provide access to facilities at the same location as the current entrance. The campgrounds, lodging units, and day use sites would be distributed throughout the RA. The required campsites would have utilities or RV hookups.

New recreation facilities would be located primarily in previously disturbed areas or at the interim facility locations. At the discretion of the concessionaire and upon approval by Reclamation once site-specific designs are available, interim facilities may remain in place for use over the long term or they may be removed and relocated to another portion of the RA or to another RA. For facilities that remain in place, minor (or no) additional improvements would be expected.

Lake access for boating would be provided in the cove off the western shore. A full-service marina with boat slips, a restaurant (authorized), a retail store (authorized), and watercraft rentals would be provided in the cove. The proposed marina would require the installation of facilities on the lake and shore to connect the marina to land. The existing boat ramp would likely be demolished and reconstructed and may become a six-lane (required) or 10-lane (authorized) boat ramp. Parking and dry boat storage would be provided near the marina and boat launch ramp. Other supporting facilities and services may also be available for maintenance and concessionaire operations, such as a boat repair facility and employee housing; for lake access; and for day use areas, such as a playground and group day use area. Supporting uses, such as a fish cleaning station, a sanitary disposal site, a laundry facility, and vault toilets or flush restrooms conveniently located throughout the RA may also be provided. Trails through the RA would connect to the Shoreline Trail system.

Table 2-6. Facilities Allowed at Steele Canyon Recreation Area

Facility Type	Total Number of Required Facilities	Total Number of Additional Authorized Facilities	Total Number of Allowed Facilities
Tent Campsite	-	24[a]	24
Tent/RV Campsite (No Utilities)	-	22	22
Tent/RV Campsite (Utilities)	14	29	43
Other Campsite Service	2[b]	2[c]	4
Lodging Unit	27[d]	13[e]	40

Facility Type	Total Number of Required Facilities	Total Number of Additional Authorized Facilities	Total Number of Allowed Facilities
Launch Lane Boat Ramp	6	4	10
Courtesy Dock	4	2	6
Wet Slip (Boat/Houseboat)	178/32	100/-	278/32
Dry Boat Storage (Spaces)	-	96	96
Other Boat Service	5[f]	4[g]	9
Lake Access (Boat Exclusion Zone)	1	-	1
Day Use Site	10	-	10
Group Day Use Area	-	1	1
Special Use Area	-	1	1
Retail Store	-	1	1
Restaurant	-	1	1
Restroom	4[h]	7[i]	11
Entry Station	1	-	1
Access Road Close Gate	1	-	1
Trail Kiosk	-	1	1
Vehicle Parking (at Marina)	128	60	188
Vehicle with Boat Trailer Parking	75	-	75

Notes:
a Authorized campsites include tent sites (19) and hike-in/boat-in tent sites (5).
b Other required camping services include a camp host site and an RV dump station.
c Other authorized camping services include a group use area and a playground.
d Required lodging includes park models (12) and cabins (15).
e Authorized lodging includes floating campsites (3) and park models for employees (10).
f Other required boat services include a kiosk at a boat ramp, a fuel or sanitary storage tank, a fuel dispensing or sanitary connection, a marina service and building, and a boat rental service.
g Other authorized boat services include fish cleaning stations (2), a concessionaire building, and a maintenance and repair yard.
h Required restrooms include a vault toilet at the entry station, toilet-only comfort stations (2), and a toilet/family room comfort station.
i Authorized restrooms include toilet-only comfort stations (3), toilet/family room comfort stations (2), a toilet/family room/shower comfort station, and a toilet/family room/shower comfort station with laundry.

Infrastructure Plan

Figure C-5 in Appendix C depicts the proposed infrastructure at Steele Canyon RA, based on the detailed infrastructure plans prepared by Reclamation. At build-out core, essential infrastructure would be provided for water supply, wastewater treatment and disposal, stormwater control, electricity, and access (e.g., roads, parking areas) to support the required and authorized recreation facilities and services at the RAs. Water supply facilities may include groundwater wells, water treatment facilities, pump stations, storage tanks, pipelines, and related facilities to provide potable water to campgrounds, lodging units, and other development. For additional details see *Lake Berryessa Concession Infrastructure Design – Draft Infrastructure Basis of Design Report, Napa County, CA* (Reclamation 2015a).

Construction Overview

Construction Schedule

The construction schedules for the recreation facilities would be determined by the concessionaire(s) in coordination with Reclamation. The timing of construction would be dependent on receipt of the necessary environmental approvals and permits as well as the demand for the facilities. Concurrent construction across multiple recreation areas will require documentation by Reclamation of compliance with the General Conformity Rule for air quality prior to initiating construction.

To the extent practicable, facility construction would be scheduled for the fall, winter, or early spring, after the Labor Day weekend and before the Memorial Day weekend, to avoid construction activities during the peak visitor season. Any construction that continues through the peak visitor season would be isolated to designated areas away from recreational use areas. Construction activities for facilities in Lake Berryessa (e.g., boat ramps, marinas) would be scheduled during low-water levels.

Construction Methods

Construction of the various facilities would entail various levels of ground disturbance and vegetation removal, installation of underground infrastructure, and placement or construction of new facilities. The depth of excavations for underground infrastructure would vary based on pipeline requirements and bedrock conditions, but most pipelines are expected to be installed about 4 feet below the ground surface. Groundwater wells would require deeper drilling, up to about 180 feet, to tap into the groundwater aquifer. Much of the initial site preparation work has already been completed at each RA during removal of the old facilities and debris and installation of interim facilities. Many areas were previously graded as part of the prior development, and most new facilities would be constructed in these disturbed areas, requiring minimal additional grading or vegetation removal in most areas. Roads that do not meet the required standard could require extensive ground disturbance to widen and level the roads. Specific construction methods and cut/fill quantities would be identified by the concessionaire(s) in coordination with its contractors.

Standard Construction Practices

During all phases of construction at the five RAs, standard construction practices and best management practices (BMPs) will be implemented to minimize impacts on water quality, soil, air quality, native vegetation, traffic, noise, and public safety. In addition, contractors will be required to adhere to site-specific geotechnical recommendations for construction activities, such as those described in the *Final 60% Design Geotechnical Engineering Report* (CDM Smith 2015) (Appendix D). Additional resource-specific measures are identified in the Environmental Consequences section of this EA (Chapter 3), if they were determined necessary to comply with applicable permits. All applicable resource-specific measures will be identified in the construction contracts.

Construction activities will comply with the State of California's Construction General Permit, which requires the implementation of a stormwater pollution prevention plan (SWPPP) for ground disturbance on more than 1 acre of land. Standard BMPs for stormwater runoff, erosion

control, and fugitive dust will be implemented during construction activities, including but not limited to the below-listed BMPs which are elements of the proposed action:

- Construction shall proceed in accordance with design and construction recommendations set forth in the *Final 60% Design Geotechnical Engineering Report* (CDM Smith 2015).

- Erosion control measures, such as sediment traps, barriers, covers, or other methods approved by the Central Valley Regional Water Quality Control Board (Regional Water Board), will be used.

- Mulching, seeding, or other suitable erosion stabilization measures as approved by the Regional Water Board will be used.

- Any soil stockpiles will be covered at the end of the construction season and during extended periods of rain.

- Construction equipment will be inspected daily and maintained to ensure that fuel or lubricants do not contaminate the lake or drainages. Maintenance and refueling of vehicles or equipment will take place away from drainages, wetlands, and Lake Berryessa.

- Vehicle and equipment washing will be performed in a manner that prevents the runoff of untreated water; oil and water will be separated before discharge.

- Oily or greasy substances originating from the RAs will not be allowed to enter, or be placed where they will later enter, Lake Berryessa or its tributaries.

- Educational material will be provided to the construction contractor about fuel efficiency and the benefits of using vehicles powered by alternative energy sources to enhance awareness of global warming issues.

- The construction contractor will be responsible for limiting dust by watering haul roads, stockpiled soils, and construction areas used by trucks and vehicles and by maintaining low vehicle speeds on dirt roads or areas to minimize dust.

- Pursuant to California Vehicle Code, all trucks hauling soil and other loose material to and from the construction site will be covered or should maintain at least 6 inches of freeboard (i.e., minimum vertical distance between top of load and the trailer).

Standard construction practices for disposal of hazardous and solid waste will be implemented during construction activities, including but not limited to the below-listed practices which are elements of the proposed action:

- All accumulated debris from construction activities will be removed and properly disposed in accordance with federal, state, and local laws.

- The construction contractors will provide recycling bins for on-site waste materials.

- Natural debris will be recycled and reused, if feasible, by means such as chipping woody materials for use as compost, dust control, and resource mitigation material.

- All construction workers will store, handle, and use hazardous materials in a manner that protects workers from harmful exposure, minimizes the potential for spills and releases, and reduces the use of these materials to diminish the subsequent generation of hazardous waste.

- The construction contractor will have a spill prevention and cleanup plan on-site during all construction activities; this plan will detail the appropriate measures to implement in the event of an accidental spill of hazardous or other materials that could contaminate soils or water or pose a hazard to people.

- Any fuel stored on-site will be stored in a double-walled contained vessel surrounded by a berm appropriately sized for the volume. Spill containment kits will be on-site at all times.

Appropriate traffic control measures will be implemented along the main access roads to the RAs and within the RAs, if they are open to the public during construction, including but not limited to the below-listed measures which are elements of the proposed action:

- Signs will be used along main roads to alert travelers to the construction activities and construction duration.

- Flagmen or signs will be used to alert travelers to locations where trucks and equipment may be exiting the main roads to access the RAs or where a travel lane needs to be closed on any main roads.

- Gates or fencing will be installed and maintained around closed areas at the RAs to prevent public access.

No main road closures or detour routes are expected to be necessary. To minimize construction noise near residential and other recreational uses, all construction activities will be scheduled between the hours of 7 a.m. and 7 p.m., unless specifically authorized by Reclamation.

To prevent wildfires, the construction contractor will follow applicable regulations of Public Resources Code Sections 4428–4442 during dry periods to minimize the potential for the initiation and spread of fires from the work area.

The concessionaire will develop and implement site restoration and landscaping plans to revegetate disturbed areas around facilities. In developing landscaping plans concessionaires shall consider planting with native species. This plan will be approved by Reclamation before implementation. Where possible, the re-planting of native vegetation and reuse of landscape materials disturbed during construction will be used. Hazardous trees will be removed in accordance with a removal permit from Reclamation. In addition, temporary disturbance to fish and wildlife resources will be minimized by limiting the amount of soil erosion, dust, and noise.

As part of the restoration and development of the RAs, construction measures will be implemented to prevent the spread or introduction of invasive plants and noxious weeds and minimize damage to native trees, including but not limited to the below-listed measures which are elements of the proposed action:

- Construction equipment must be weed free before entering the work area.
- Equipment staging will be done in areas that do not contain weeds.
- Straw bales and other vegetative materials used for erosion control must be certified weed free.
- All revegetation materials (e.g., mulches, seed mixtures, vegetative material) must also be certified weed free and should comprise locally adapted native plant materials to the extent practicable.
- To prevent damage to roots, no heavy equipment or underground construction will be allowed within the canopy zone of native trees unless specifically authorized by Reclamation.

Operations and Maintenance

Future operation of the RAs will be defined by the concession contract or MPA established between Reclamation and any concessionaire selected for developing and operating one or more of the five RAs. The concessionaire will be required to implement a maintenance plan for long-term operations and maintenance of the RAs. The maintenance plan delineates and specifies the maintenance responsibilities of the concessionaire and Reclamation with regard to the RA property, lands, and facilities that are assigned to, or otherwise used by, the concessionaire for the purposes authorized by the concession contract or MPA. Maintenance plans shall include the following measure to minimize the release of emissions of dust containing asbestos and other potentially harmful minerals during future operations of the RAs:

On unpaved roads located in areas in areas underlain by ultramafic rocks or soils formed in material weathered from serpentine, the concessionaire shall:

- Stabilize unpaved areas by wetting, chemical dust suppressant, or cover whenever emissions of fugitive dust are visible more than 25 feet from origin.
- Limit vehicle speeds in unpaved areas to less than 15 mph, or if vehicle speeds are permitted to exceed 15 mph, routinely stabilize unpaved areas to prevent emissions of fugitive dust that are visible more than 25 feet from origin.
- Stabilize storage piles and disturbed areas not subject to vehicle traffic stabilized by wetting, chemical dust suppressant, or cover.

The concessionaire will also be responsible for general preventive and recurring maintenance and emergency repair in a timely manner to ensure that all improvements at the RAs achieve the basic goals described by the concession contract or MPA and applicable codes and guidelines.

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Chapter 3 Affected Environment and Environmental Consequences

Introduction

This chapter describes the affected environment and discusses the environmental consequences of the no-action alternative and the proposed action. The description of the affected environment includes characterizations of the regional settings of Napa County or Lake Berryessa, depending on the resource topic, and of the local settings of the RAs, separated by RA if conditions vary between them. The setting, or baseline conditions, for the RAs is based on current conditions at the time fieldwork was conducted (2011–2014) or during the summer of 2015, as appropriate.

The analysis of the no-action alternative was considered in the context of the current setting (summer 2015) at the RAs and the previously prepared EAs for interim facilities and infrastructure (Reclamation 2013a, 2014a, 2014b). The analysis of the proposed action was considered in the context of the programmatic analysis provided in the VSP EIS. The VSP EIS evaluated multiple alternatives for developing the RAs and provided general discussions of the types of impacts anticipated with various levels of development. As discussed in the VSP EIS, the subsequent analysis provided in this EA is necessary to fully evaluate the environmental impacts of the proposed action before Reclamation can reach its decision on whether to implement it.

The analysis of environmental consequences focuses on resources that could be affected and on issues that need to be resolved before development of the RAs. Table 3-1 lists resource topics considered for analysis; bolded topics are described in detail in this chapter, and other topics are not analyzed further. For some resource topics (e.g., biological resources, soils), the analysis is discussed separately for each RA if the impacts would differ between the RAs. For other topics (e.g., land use), the impacts would be similar across the RAs and are not discussed separately.

Table 3-1. Summary of Resource Topics Considered in This EA

Resource Topic	Analyzed in the EA?	Comments
Agricultural Resources	No	The RAs do not support agricultural uses or contain important farmland.
Air Quality	Yes	Construction activities and operations at the RAs would generate emissions that could affect local and possibly regional air quality.
Biological Resources	Yes	Native habitats, wetlands, and various special-status species and migratory birds could be affected by construction activities and operations.
Cultural Resources	Yes	Ground-disturbing activities at the RAs may expose or damage cultural resources.

Resource Topic	Analyzed in the EA?	Comments
Environmental Justice	No	The RAs do not support permanent populations, and they would be open to all users for recreational purposes, without discrimination. No disproportionate adverse impacts on low-income or minority populations are expected.
Geology and Soils	Yes	Geologic and soil hazards could pose concerns for development at the RAs, and native topsoil could be disturbed during some activities.
Indian Trust Assets	No	No Indian trust assets are known to exist at the RAs. The nearest Indian Trust Asset is Rumsey Rancheria approximately 15 miles north-northeast of Putah Canyon.
Indian Sacred Sites	No	No Indian sacred sites are known to exist in or near the RAs.
Land Use	Yes	Increased recreational activities could create localized land use conflicts from increased traffic, noise, and similar activities. Compliance with applicable land use plans must also be evaluated.
Mineral Resources	No	The RAs do not contain important mineral resources.
Noise	Yes	Construction activities and operations at the RAs would generate noise, which could affect nearby sensitive receptors (e.g., residents in nearby communities).
Public Health and Safety	Yes	Increased use of the RAs could increase risks to public health and safety.
Recreation	Yes	The proposed action would improve recreational opportunities at Lake Berryessa and increase visitation to the area, although temporary disruptions to recreational uses may occur during construction.
Socioeconomics	Yes	The proposed action would generate revenue and provide jobs to benefit the local economy, but would require initial expenditures to implement the recreational developments.
Transportation and Circulation	Yes	Construction activities and operations at the RAs would increase traffic on highways and local roads.
Utilities	Yes	The proposed action would increase the demand for water and wastewater services, as well as other utility services.
Visual Resources	Yes	The proposed action would modify the visual setting of each RA.
Water Resources	Yes	Construction activities and operations at the RAs could discharge pollutants into the lake or its tributaries or modify drainage patterns.
RA = recreation area		

As previously mentioned, the analysis in this EA addresses both conceptual site plans and infrastructure plans, as these are described in Chapter 2 for the proposed action, at levels

commensurate with the degree of design detail conveyed in those plans. Because infrastructure planning was carried forward by Reclamation to approximately 60% completion, the infrastructure plan elements of the proposed action are adequately detailed to support the rigorous NEPA analysis needed to fully inform Reclamation's management decisions without the need for subsequent, additional NEPA evaluation. Conceptual site plans are more speculative; concessionaires would have opportunity to propose to Reclamation the designs, numbers, and precise locations of entry stations, marinas, boat launches, campgrounds, lodging units, RV campsites, day use amenities, and other conceptual elements of the proposed action. Thus additional evaluation of some conceptual plan elements of the proposed action, subsequent to the decision document issued pursuant to this EA, ultimately may be needed, depending upon the development proposals for conceptual elements that are put forth by concessionaires. This analytical approach is intended to enable implementation of the infrastructure plans upon completion of the decision document without the need for additional NEPA evaluation and upon receipt of any applicable permits, unless concessionaires request modifications to the infrastructure plans.

Chapter 2 describes various construction measures and standard practices that would be implemented during all phases of development to avoid or minimize adverse environmental impacts, such as from air emissions, water pollutants, and invasive plants. These measures were considered during the analysis to determine whether more specific mitigation measures would be needed to further reduce adverse impacts. Where necessary, two types of mitigation measures are identified: (1) design measures and (2) construction or operation measures. For activities requiring additional analysis, the mitigation measures identified in this EA should be reviewed and incorporated into subsequent NEPA documents, as applicable and appropriate. The concessionaires will be responsible for implementing all measures required by Reclamation.

The cumulative impacts of implementing the proposed action and other projects in the Lake Berryessa area are analyzed at the end of this chapter.

Air Quality

The following discussion of the affected environment for air quality is based on regional air quality information available from the Bay Area Air Quality Management District (BAAQMD) and California Air Resources Board websites. The discussion of environmental consequences and mitigation measures addresses the potential for construction- or operation-related activities to affect air quality in the vicinity of Lake Berryessa, focusing on the degree to which the no-action and proposed action alternatives would comply with the General Conformity Rule of the federal Clean Air Act.

Affected Environment

Regional Setting

Air quality is defined by the concentration of pollutants in relation to their impact on human health. Concentrations of air pollutants are determined by the rate and location of pollutant emissions released by pollution sources, and by the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, and

sunlight. Therefore, ambient air quality conditions in a given region are influenced by such natural factors as topography, meteorology, and climate, in addition to the amount of air pollutant emissions released by existing air pollutant sources.

Napa County is in the San Francisco Bay Air Basin (SFBAB). Air quality in the SFBAB is heavily influenced by weather conditions, particularly climate and wind patterns. Summers in the SFBAB are hot and dry in the inland areas, and winters are typically cool and wet. In summer, a northwest wind originates off the coastline and is drawn inland through the Golden Gate and over the lower portions of the San Francisco Peninsula, carrying pollutants from the San Francisco area. The mountains that surround Lake Berryessa are effective barriers to the prevailing northwesterly winds, but an up-valley wind that draws air from the San Pablo Bay frequently develops during warm summer afternoons. The wind patterns and topography contribute to the buildup of high concentrations of emitted pollutants in the Bay Area.

Local Setting

The Lake Berryessa area is rural with four residential communities that have been established around the lake: Berryessa Estates at the northwestern extent of the Putah Creek arm of the lake, Berryessa Pines and Pope Creek on the western shore just north of Monticello Shores RA, Spanish Flat on the western shore north of Spanish Flat RA, and Berryessa Highlands on the southern shore east of Steele Canyon RA. These residential areas represent the primary group of sensitive receptors around the lake. Recreationists are also considered sensitive receptors, but they are transient and their exposure is more limited.

Typical sources of emissions at the RAs that are currently open (i.e., Putah Canyon, Spanish Flat, and Steele Canyon RAs; Capell Cove Boat Launch; and Oak Shores and Smittle Creek Day Use Areas) include vehicle traffic, boating activities, barbeques, firepits, and maintenance activities. The main source of emissions at the closed RAs (Monticello Shores and Berryessa Point) is from vehicle traffic using Berryessa Knoxville Road. Recreationists are the only sensitive receptors at the open RAs. Sensitive receptors also exist within the four residential communities at the lake.

Criteria Air Pollutants

Concentrations of the following air pollutants are commonly measured and used as indicators of ambient air quality conditions: ozone (using as measurement surrogates oxides of nitrogen (NOX) and reactive organic gases (ROG)), carbon monoxide (CO), sulfur dioxide (SO2), respirable and fine particulate matter (PM10 and PM2.5), and lead. Because these are prevalent air pollutants known to be deleterious to human health, they serve as a basis for establishing air quality standards and monitoring air quality, and are commonly referred to as “criteria air pollutants.” Each criteria air pollutant is described briefly in following paragraphs.

Ozone Ozone is a photochemical oxidant and the primary component of smog. Ozone is not directly emitted into the air, but is formed through complex chemical reactions between precursor emissions of ROG and NOX in the presence of sunlight. ROG emissions result primarily from incomplete combustion, and from the evaporation of chemical solvents and fuels. NOX are a group of gaseous compounds of nitrogen and oxygen, namely nitric oxide (NO) and nitrogen dioxide (NO2) that results from the combustion of fuels such as hydrocarbons in the atmosphere.

Ozone located in the lower atmosphere is a major health and environmental concern. Meteorology and terrain play a major role in ozone formation. Low wind speeds or stagnant air coupled with warm temperatures and clear skies provide the optimum conditions for ozone formation. Therefore, summer is the peak ozone season. Ozone is a regional pollutant that often affects large areas. Ozone concentrations over or near urban and rural areas reflect an interplay of emissions of ozone precursors, transport, meteorology, and atmospheric chemistry.

Carbon Monoxide. Carbon monoxide (CO) is a colorless, odorless, and poisonous gas produced by incomplete burning of carbon in fuels, primarily from mobile (transportation) sources. Approximately 77 percent of the nation's CO emissions are from mobile sources. The other 23 percent consist of CO emissions from wood-burning stoves, incinerators, and industrial sources. The highest concentrations are generally associated with cold, stagnant weather conditions that occur during winter. In contrast to ozone, which is a regional pollutant, CO causes problems on a local scale.

Sulphur Dioxide. Sulphur dioxide (SO2) is produced by such stationary sources as coal and oil combustion, steel mills, refineries, and pulp and paper mills. SO2 is a respiratory irritant.

Particulate Matter. Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM10. PM10 consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources; construction operations; fires; and natural windblown dust and particulate matter formed in the atmosphere by condensation and transformation of SO2 and ROG.

PM2.5 comprises a subgroup of finer particles that have an aerodynamic diameter of 2.5 micrometers or less.

Lead. Lead is a metal found naturally in the environment and in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result of the phase-out of leaded gasoline, metal processing is currently the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Federal General Conformity Rule

The U.S. Environmental Protection Agency (EPA) and the State of California have designated national and California Ambient Air Quality Standards, respectively, to protect public health and welfare. The California standards are more stringent than the national standards. "Attainment" status for a pollutant means that the air quality for that pollutant within a given air quality management district (in this case the BAAQMD) meets the standard set by the EPA or by the state. The attainment status for each of the above-described criteria air pollutants under the national and the California standards are reported in Table 3-2, Attainment Status for Criteria Air Pollutants in Napa County.

Air quality is monitored at one location in Napa County, the Napa-Jefferson Avenue monitoring station, approximately 15 miles south of Lake Berryessa. This monitoring station records hourly measurements for ozone and $PM_{2.5}$ (PM_{10} is no longer monitored at the station as of early 2014). Occasionally during hot summer afternoons, ozone concentrations approach and sometimes

exceed the California standard. According to monitoring data for 2000–2013, Napa County had 8 days that exceeded the California 1-hour ozone standard, 20 days that exceeded the California 8-hour ozone standard, and 11 days that exceeded the national 8-hour ozone standard (California Air Resources Board 2015).

Table 3-2. Attainment Status for Criteria Air Pollutants in Napa County

Criteria Air Pollutant	National Designation	State Designation
Ozone (NOX)	Nonattainment	Nonattainment
Ozone (ROG)	Nonattainment	Nonattainment
PM10	Unclassified	Nonattainment
PM2.5	Nonattainment	Nonattainment
CO	Unclassifiable/Attainment	Attainment
NO2	Unclassifiable/Attainment	Attainment
SO2	Unclassifiable/Attainment	Attainment
Lead (Particulate)	Unclassifiable/Attainment	Attainment

Notes:
CO = carbon monoxide; NO_2 = nitrogen dioxide; $PM_{2.5}$ = fine particulate matter; PM_{10} = respirable particulate matter; SO_2 = sulfur dioxide

The highest PM concentrations occur in the winter, particularly during evening and nighttime hours. Napa County had an estimated 66 days that exceeded the California PM_{10} measured standard during 2000–2013; the federal standard was not exceeded. Because of the episodic buildups of these high concentrations of pollutants, as shown in Table 3-2 Napa County is designated as a nonattainment area for ozone and 24-hour $PM_{2.5}$ under the national standards, and is designated as a nonattainment area for ozone and respirable particulate matter (PM_{10} and $PM_{2.5}$) under the California standards.

The EPA implements national air quality programs. EPA's air quality mandates derive primarily from the federal Clean Air Act (CAA), which was enacted in 1970 and most recently amended in 1990. In addition to requiring EPA to establish the previously mentioned national ambient air quality standards, the CAA also required each state to prepare a state implementation plan (SIP) that describes how that state will attain or maintain the primary and secondary NAAQS set forth in the CAA and Code of Federal Regulations.

The 1990 amendments to the CAA require EPA to promulgate rules to ensure that federal actions conform to the appropriate SIP. These rules are known as the General Conformity Rule and are codified at Title 40 of the Code of Federal Regulations, Part 93 (40 CFR 93). Any federal agency responsible for an action in a nonattainment/maintenance area must determine whether that action conforms to the applicable SIP or is exempt from the requirements of the General Conformity Rule.

As previously mentioned Napa County is designated as a nonattainment area for ozone and 24-hour $PM_{2.5}$ under the national standards and is designated as a nonattainment area for ozone and respirable particulate matter (PM_{10} and $PM_{2.5}$) under the California standards. Therefore the General Conformity Rule is applicable to the project, and a conformity determination would be required for each criteria air pollutant or precursor where the total of direct and indirect emissions of the criteria pollutant or precursor caused by the federal action would equal or exceed any of the General Conformity *de minimis* emission levels, expressed in tons per year, presented in Table 3-3, Federal Conformity *De Minimis* Levels for Annual Production of Criteria Air Pollutants or Precursors in Napa County.

Table 3-3. Federal Conformity *De Minimis* Levels for Annual Production of Criteria Air Pollutants or Precursors in Napa County.

Pollutant	Emission Levels (tons per year)
Nonattainment Areas	
Ozone (VOC's or NO_X)	
Serious NAA's	50
Severe NAA's	25
Extreme NAA's	10
Other Ozone NAA's outside an ozone transport region	**100**
Other Ozone NAA's inside an ozone transport region	
VOC	50
NO_X	**100**
Carbon Monoxide: All NAA's	**100**
SO_2 and NO_2: All NAA's	**100**
PM_{10}	
Moderate NAA's	**100**
Serious NAA's	70
$PM_{2.5}$	
Direct Emissions	**100**
SO_2	**100**
NO_X (Unless determined not be significant precursors)	**100**
VOC or Ammonia (if determined to be significant precursors)	100
Pb: All NAA's	25
Maintenance Areas	
Ozone (NO_X), SO_2 or NO_2: All MA's	100
Ozone (VOC's):	
Maintenance areas inside an ozone transport region	50
Maintenance areas outside an ozone transport region	100

General Conformity Rule Applicability Analysis

The purpose of a General Conformity Rule applicability analysis is to ascertain whether and for which criteria pollutants a conformity determination is required pursuant to 40 CFR 93. If the federal action will cause emissions that equal or exceed the *de minimis* emission levels in any nonattainment or maintenance area and the action is not otherwise exempt, "presumed to conform," or included in the existing emissions budget of the applicable implementation plan for attaining or maintaining the NAAQS, the agency must conduct a conformity determination before implementation of the proposed Federal action. In Table 3-3, *de minimis* emission levels that are germane to the proposed action are shown in bold font.

To complete the applicability analysis for the proposed action, short-term construction emissions were simulated using the California Emissions Estimator Model (CalEEMod), version 2013.2.2, based on projections of work schedules, worker commutes, and off-road equipment usage anticipated during construction. Emissions were calculated for annual conditions on a tons-per-year basis.

Modeling assumptions and results are presented in Appendix E – General Conformity Rule Applicability Analysis Modeling Assumptions and Results. As more fully described in Appendix E, the modeling results are based on assumptions regarding construction of both the conceptual site plan elements and the infrastructure plan elements at the Putah Canyon RA. The Putah Canyon RA was selected for modeling because construction activities there would yield the most intensive environmental consequences for air quality due to its greater distance from major highways and the anticipated need for substantially greater excavation at the Putah Canyon RA than at any other individual recreation area.

Results of the Putah Canyon modeling were then scaled up by multiplying them by 500 percent to approximate a worst-case scenario, under which development at all five recreation areas would proceed concurrently. The results of the Putah Canyon modeling, and the approximation of conditions under concurrent construction at all five recreation areas, are presented in Table 3-4, Results of Criteria Air Pollutant Modeling at Putah Canyon RA. The projected emissions reported in Table 3-4 are for unmitigated construction.

Table 3-4. Results of Criteria Air Pollutant Modeling at Putah Canyon RA (tons per year)

	Ozone (ROG)	**Ozone (NO_X)**	**CO**	**SO_2**	**PM_{10} (Total)**	**$PM_{2.5}$ (Total)**
Putah Canyon Recreation Area						
Construction Year 1	0.5537	4.3420	7.7113	0.01	31.4597	3.5953
Construction Year 2	1.0474	9.4135	10.4500	0.0227	28.1492	3.3589
Concurrent Construction at Five Recreation Areas						
Construction Year 1	2.7685	21.71	38.5565	0.05	157.2985	17.9765
Construction Year 2	5.237	47.0675	52.25	0.1135	140.746	16.7945

As shown in Table 3-4 projections of the annual production of criteria pollutants or precursors for the Putah Canyon RA – and by extension the other recreation sites individually - do not

exceed the federal conformity *de minimis* levels presented in Table 3-3. However federal *de minimis* levels for PM 10 could be exceeded if construction activities for multiple recreation areas were to be undertaken concurrently. Per the description of the proposed action in Chapter 2, concurrent construction of multiple recreation areas would require supplemental documentation by Reclamation of compliance with the General Conformity Rule prior to initiating construction. Absent concurrent construction a conformity determination before implementation of the proposed Federal action at a single RA is not required.

Regional Air Quality Standards

The portion of the SFBAB that includes Lake Berryessa falls under the regulatory jurisdiction of the Bay Area Air Quality Management District (BAAQMD). The BAAQMD is the primary agency responsible for assuring that the National and California Ambient Air Quality Standards (NAAQS and CAAQS, respectively) are attained and maintained in Napa County. Included among the BAAQMD's responsibilities and activities are preparing plans for attaining and maintaining air quality standards, and adopting and enforcing rules and regulations to protect air quality.

In 2011 the BAAQMD updated its California Environmental Quality Act Air Quality Guidelines (Guidelines). The Guidelines include project-level construction and operational significance thresholds for ROG, NOX, and particulate matter (PM10 and PM2.5) which the BAAQMD applies to determine the significance of the effects on air quality of proposed actions for the purposes of the California Environmental Quality Act (CEQA). In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a proposed action's individual emissions would be cumulatively considerable. If a proposed action would exceed the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. The BAAQMD Criteria Pollutant Emission Thresholds are presented in Table 3-5.

Table 3-5. Bay Area Air Quality Management District Criteria Pollutant Thresholds

Pollutant	Construction
ROG	54 lbs/day
NO_X	54 lbs/day
CO	No standard
PM10	82 lbs/day (exhaust)
PM2.5	54 lbs/day (exhaust)
PM10/ PM2.5 (fugitive dust)	Best management practices (BMPs)
TACs (Project-level)	Increased cancer risk of 10 in 1 million; increased non-cancer risk of greater than 1.0 (hazard index [HI]); PM2.5 increase of greater than 0.3 micrograms per cubic meter
TACs (cumulative)	Increased cancer risk of 100 in 1 million; increased non-cancer risk of greater than 10.0; PM2.5 increase of greater than 0.8 microgram per cubic meter at receptors within 1,000 feet
Odors	–

Results of the above-described General Conformity Rule applicability analysis (presented in Table 3-4 and Appendix E) are summarized in Table 3-6 using the same units of measurements used to define pollutant thresholds in Table 3-5.

Table 3-6. Summary of Maximum Modeled Emissions of Criteria Air Pollutants and Precursors Associated with Lake Berryessa Concessions Development Activities (lb/day)

Maximum Daily Emissions[1]	ROG	NOX	PM_{10} Exhaust	PM_{10} Dust	$PM_{2.5}$ Exhaust	$PM_{2.5}$ Dust
2019 emissions	3.03	23.79	0.699	171.71	0.62	19.08
2020 emissions	5.74	51.58	2.17	152.07	2.02	16.38
BAAQMD Thresholds of Significance	54	54	82	BMPs/AAQS	54	BMBs/AAQS

1 Maximum daily emissions of criteria air pollutants were calculated based on total work hours per month and therefore the maximum daily emissions would occur on each day of the month during any given month of the entire construction period

AAQS = Ambient Air Quality Standards
BAAQMD = Bay Area Air Quality Management District
BMPs = Best Management Practices
lb/day = pounds per day
NO_X = oxides of nitrogen
PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less
$PM_{2.5}$ = respirable particulate matter with an aerodynamic diameter of 2.5 micrometers or less
ROG = reactive organic gases

Modeled values represent maximum daily emissions that would occur over the duration of the construction period. See Appendix E for detail on model inputs, assumptions, and project specific modeling parameters.

As shown in Table 3-6 projections of the annual production of criteria pollutants or precursors for the Putah Canyon RA – and by extension the other recreation sites individually - do not exceed the thresholds of significance established by the BAAQMD. However thresholds of significance for NOX could be exceeded if construction activities for multiple recreation areas were to be undertaken concurrently. Per the description of the proposed action in Chapter 2, concurrent construction of multiple recreation areas would require supplemental documentation by Reclamation of compliance with the General Conformity Rule prior to initiating construction.

Environmental Consequences and Mitigation Measures

No-Action Alternative

Under the no-action alternative, no new facilities would be installed at the RAs without prior approval from Reclamation and further environmental review under NEPA. Installation of previously approved facilities would generate minimal air quality impacts. No other construction activities would take place. Routine maintenance and upkeep of interim facilities, similar to that under current conditions, would also generate minimal emissions. Use of the RAs would continue to be limited to previously disturbed areas, as it is under current conditions.

Proposed Action

Overall Development and Conceptual Site Plan Impacts Construction emissions would be the primary contributor to air quality impacts from the proposed development. Construction

activities associated with development of the RAs would result in varying levels of temporary emissions of air pollutants, particulate matter, and greenhouse gases (GHGs). Construction equipment (such as graders, backhoes, compactors, and dump trucks) and worker vehicles would emit ozone precursors (e.g., ROG, NOX), particulate matter, and GHGs. Soil disturbance would produce fugitive dust.

The general levels of impacts on air quality for the different types of recreation facilities are presented below:

- **Day Use Site:** Minimal fugitive dust and construction equipment emissions would occur during barbeque and fire ring installation and picnic table placement.

- **Tent-Only or Tent/RV Campsite without Utilities:** Fugitive dust and construction equipment emissions (more than for a day use site) would occur during installation of a tent pad and establishment of a parking spot.

- **Standard or Tent/RV Campsite with Utilities:** Fugitive dust and construction equipment emissions (more than for a tent-only campsite) would occur during installation of underground utilities and hookups for RVs.

- **Lodging Units:** Fugitive dust and construction equipment emissions (similar to those for a standard campsite) would occur, but over a larger area to accommodate a building.

- **Administrative or Retail Buildings:** Fugitive dust and construction equipment emissions (similar to those for the lodging units) would occur.

- **Entry Stations:** Fugitive dust and construction equipment emissions (similar to those for the lodging units) would occur but likely over a smaller area.

- **Parking Areas and Roads:** Grading and cut/fill activities to level the areas for access would result in varying levels of fugitive dust and construction equipment emissions.

- **Trails:** Minor fugitive dust and construction equipment emissions would occur during establishment of dirt roads or resurfacing of paths along a narrow trail corridor.

Construction emissions would be primarily localized around the construction areas, and they would be temporary, limited to the construction phase of individual facilities, and periodic over the 30-year development period. As discussed in Chapter 2, standard construction practices would be implemented during construction activities to reduce the release of fugitive dust, control erosion, and cover stockpiles. However, construction-related emissions associated with large facilities or multiple facilities being constructed at one time could reduce air quality around the lake and expose sensitive receptors (e.g., recreationists near the construction area, residents in nearby homes) to pollutants that could cause health impacts. Concurrent construction of multiple recreation areas would require supplemental documentation by Reclamation of compliance with the General Conformity Rule prior to initiating construction.

As previously mentioned the projected emissions reported in Table 3-4 are for unmitigated construction. The implementation of BAAQMD-recommended measures, as described in Mitigation Measure AIR-1, would further reduce emissions and fugitive dust during construction activities and ensure construction emissions comply with applicable national air quality standards.

As discussed in the Recreation section of this chapter, development of the RAs is expected to result in increased visitation to the RAs. Visitation levels would be comparable to past levels when all of the RAs were open. Vehicle and motorized watercraft emissions generated by increased visitation to the RAs could degrade air quality in the Lake Berryessa region by releasing increased levels of ozone precursors and particulate matter. In addition, increased visitation to the RAs would increase the amount of dust generated by human use. Increased visitation would also result in more particulate matter emissions from the use of barbeques and firepits. Ongoing routine maintenance, management activities, and repairs of facilities at the RAs would continue to involve the use of motorized vehicles and various types of equipment. Increased visitation could increase the amount of facility maintenance required, which would generate additional dust and vehicle emissions, including particulate matter and ozone precursors. Although increased visitation to the RAs would increase the overall volume of air pollutants generated, overall emission levels would likely be similar to past levels when visitation levels were higher. Past levels of emissions were not considered substantial and did not cause violations of national or California air quality standards. Implementation of standard BMPs and Mitigation Measure AIR-1, as appropriate, during routine maintenance activities would minimize air quality impacts during these activities. Paving or installing surface material on roads and trails within the RAs would also help minimize fugitive dust during vehicle access and trail use.

Infrastructure Plan Impacts A discussion of emissions anticipated to result from implementation of the infrastructure elements of the proposed action at the Putah Canyon, Monticello Shores, Berryessa Point, Spanish Flat, and Steele Canyon RAs is presented below.

Construction activities associated with infrastructure installation at would generate temporary emissions of fugitive dust and other pollutants, as described above for the overall development and conceptual site plan elements. The combined effects of construction activities at multiple RAs at one time could increase air quality impacts across the lake, although standard construction practices and Mitigation Measure AIR-1 would help alleviate air quality impacts associated with individual construction activities

Putah Canyon RA The infrastructure plan for Putah Canyon RA would involve the installation of new water and wastewater pipelines, construction of a wastewater treatment facility and supporting facilities, establishment of stormwater control areas, installation of electrical lines and transformers, and establishment of parking areas and roads. These facilities would involve varying levels of soil disturbance and equipment use, which would emit ozone precursors, fugitive dust, and other emissions into the air around the work area.

Emissions would be temporary, but substantial amounts of ground-disturbing activities or equipment use at one time at the RA could generate impacts that affect local or regional air quality. Most emissions would be expected to dissipate in the immediate vicinity of the work

area, although they could affect sensitive receptors using nearby recreation facilities at the RA if construction is scheduled when the RA is open to the public. If infrastructure is installed on different construction schedules, air quality impacts would be spread out over time and be less likely to substantially affect regional or local air quality.

Standard construction practices described in Chapter 2 for erosion and dust control and covering stockpiles in combination with Mitigation Measure AIR-1 would help reduce dust and other pollutant emissions at the RA. With these measures, infrastructure installation at Putah Canyon RA would not contribute to the existing nonattainment status for particulate matter or ozone in the county or adversely affect air quality at Lake Berryessa, and construction emissions would not exceed federal General Conformity Rule *de minimis* thresholds for the region.

Monticello Shores RA As shown in Appendix C, Figure C-2, infrastructure plan elements at Monticello Shores RA are limited to installation of a single access road close gate, located near the southern boundary of the RA, immediately north of the intersection of the two-way circulation road (a conceptual plan element) and Berryessa Knoxville Road. With incorporation of the environmental commitments and standard construction practices set forth in Chapter 2 for the proposed action, and Mitigation Measure AIR-1, implementing infrastructure plan elements at Monticello Shores RA will not have a significant impact on air quality.

Berryessa Point RA The infrastructure plan for Berryessa Point RA would involve the establishment of stormwater control areas, installation of electrical lines and transformers, and establishment of parking areas and roads. These facilities would involve some soil disturbance and equipment use, but construction-related emissions would be minor based on the small area of impact and few facilities being constructed.

Standard construction practices described in Chapter 2 for erosion and dust control and covering stockpiles in combination with Mitigation Measure AIR-1 would help reduce dust emissions and other pollutants at the RA. With these measures, infrastructure installation at Berryessa Point RA would not contribute to the existing nonattainment status for particulate matter or ozone in the county or adversely affect air quality at Lake Berryessa, and construction emissions would not exceed federal General Conformity Rule *de minimis* thresholds for the region.

Spanish Flat RA The infrastructure plan for Spanish Flat RA would involve the installation of new water pipelines, possible improvements to an existing storage tank, establishment of stormwater control areas, installation of electrical lines and transformers, and establishment of parking areas and roads. These facilities would involve varying levels of soil disturbance and equipment use, which would emit ozone precursors, fugitive dust, and other emissions into the air around the work area.

Emissions would be temporary, but substantial amounts of ground-disturbing activities or equipment use at one time at the RA could generate impacts that affect local or regional air quality. Most emissions would be expected to dissipate in the immediate vicinity of the work area, although they could affect sensitive receptors using nearby recreation facilities at the RA if construction is scheduled when the RA is open to the public, or at nearby residences. If infrastructure is installed on different construction schedules, air quality impacts would be spread out over time and be less likely to substantially affect regional or local air quality.

Standard construction practices described in Chapter 2 for erosion and dust control and covering stockpiles in combination with Mitigation Measure AIR-1 would help reduce dust and other pollutant emissions at the RA. With these measures, infrastructure installation at Spanish Flat RA would not contribute to the existing nonattainment status for particulate matter or ozone in the county or adversely affect air quality at Lake Berryessa, and construction emissions would not exceed federal General Conformity Rule *de minimis* thresholds for the region.

Steele Canyon RA The infrastructure plan for Steele Canyon RA would involve the installation of new water and wastewater pipelines, possible installation of a storage tank, establishment of stormwater control areas, installation of electrical lines and transformers, and establishment of parking areas and roads. These facilities would involve varying levels of soil disturbance and equipment use, which would emit ozone precursors, fugitive dust, and other emissions into the air around the work area.

Emissions would be temporary, but substantial amounts of ground-disturbing activities or equipment use at one time at the RA could generate impacts that affect local or regional air quality. Most emissions would be expected to dissipate in the immediate vicinity of the work area, although they could affect sensitive receptors using nearby recreation facilities at the RA if construction is scheduled when the RA is open to the public, or at nearby residences. If infrastructure is installed on different construction schedules, air quality impacts would be spread out over time and be less likely to substantially affect regional or local air quality.

Standard construction practices described in Chapter 2 for erosion and dust control and covering stockpiles in combination with Mitigation Measure AIR-1 would help reduce dust and other pollutant emissions at the RA. With these measures, infrastructure installation at Steele Canyon RA would not contribute to the existing nonattainment status for particulate matter or ozone in the county or adversely affect air quality at Lake Berryessa, and construction emissions would not exceed federal General Conformity Rule *de minimis* thresholds for the region.

Minimal operational emissions are anticipated after the infrastructure is in place. Pipelines and other facilities would require periodic maintenance, which would involve the use of construction equipment and possible ground-disturbing activities similar to the construction activities.

Aboveground facilities, like pump stations and wastewater treatment facilities, would generate emissions from operations and energy use. In addition, wastewater facilities at Putah Canyon RA may generate unpleasant odors that are noticeable by recreationists using the RA. These facilities have been located away from recreation facilities, but wind patterns could blow occasional odors toward facilities. Because these operational impacts on air quality would not substantially affect air quality around the lake or contribute to violations of national or California standards for air pollutants beyond current emission levels, mitigation measures were determined to be unnecessary for operation-related air quality impacts associated with the infrastructure plans.

Mitigation Measures

Reclamation will require its concessionaire(s) to comply with applicable laws and policies relating to protection of air quality. During construction activities, any contractor(s) will be required to implement standard BMPs to reduce the release of fugitive dust. The following

mitigation measure would also be implemented to address potential impacts associated with air quality.

Mitigation Measure AIR-1. Fugitive Dust and Emissions Control Measures Reclamation or its concessionaire(s) will comply with the required BAAQMD rules and regulations to mitigate for short-term construction emissions involving earthmoving activities. To the extent feasible, multiple facilities will not be constructed at the same time at one RA, and construction activities will be scheduled when the RA is closed to the public or when visitation is lowest.

The following mitigation measures are recommended by BAAQMD:

- Water all active construction sites at least twice daily.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 2 feet of freeboard.
- Apply water three times daily or apply nontoxic soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
- Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at construction sites.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.
- Hydroseed or apply nontoxic soil stabilizers to inactive construction areas (previously disturbed areas inactive for 10 days or more).
- Enclose, cover, and water twice daily, or apply nontoxic soil binders to exposed stockpiles (dirt, sand, etc.).
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.
- Suspend excavation and grading activity when winds (instantaneous gusts) exceed 20 mph.
- Minimize idling time to 5 minutes or less.
- Maintain properly tuned equipment.

Biological Resources

The following discussion of the project setting for biological resources is based on field surveys of the RAs, previous environmental documentation for activities at Lake Berryessa, and reviews of special-status species databases and applicable literature. The technical studies prepared to support the EA and subsequent permitting are summarized in Appendix F, in the section titled

Field Review and Investigation, and include California red-legged frog habitat assessments for portions all five RAs (North State Resources 2014a); and delineations of waters of the United States for each RA (North State Resources 2014b-f), which were limited to portions where infrastructure plan elements—or, in the case of Monticello Shores RA, conceptual plan elements—would be concentrated. Appendix F, Biological Resources Information, provides additional supporting information for the affected environment for biological resources, including an assessment of special-status species. The analysis discusses the potential for impacts on native habitats; special-status species; and waters of the United States, including wetlands.

Affected Environment

Regional Setting

Habitat Communities Habitat communities around Lake Berryessa include blue oak, foothill pine, interior live oak, chamise, fresh emergent wetland, and urban. Lake Berryessa provides aquatic habitat (lacustrine). Seasonal wetlands and swales and ephemeral and intermittent drainages occur in the upland habitats, and they support wetland and riparian vegetation and associated wildlife species. Descriptions of the plant and wildlife species commonly found in these habitats are provided below and are based on vegetation classifications from *A Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995), habitat classifications provided in the California Wildlife Habitat Relationship system (Mayer and Laudenslayer 1988), and observations made during fieldwork. Appendix F includes habitat maps for each RA.

Blue Oak The blue oak community ranges from open-canopied, savannah-like stands of oaks to dense, closed-canopy stands. The dominant overstory species is blue oak (*Quercus douglasii*); foothill pine (*Pinus sabiniana*) is also present. The understory is dominated by annual and perennial herbaceous plants; understory shrubs are primarily buckbrush (*Ceanothus cuneatus*). Native herbaceous understory species include needlegrass (*Nassella* spp.), brodiaea (*Brodiaea* sp.), soaproot (*Chlorogalum pomeridianum*), clarkia (*Clarkia purpurea*), larkspur (*Delphinium* spp.), blue dicks (*Dichelostemma capitatum*), Chinese caps (*Euphorbia crenulata*), goose grass (*Galium aparine*), spokepod (*Thysanocarpus radians*), whiskerbrush (*Linanthus ciliatus*), western buttercup (*Ranunculus occidentalis*), sanicle (*Sanicula* spp.), Ithuriel's spear (*Triteleia laxa*), and sixweeks fescue (*Vulpia octoflora*).

Non-native understory species include European hairgrass (*Aira caryophyllea*), bur-chervil (*Anthriscus caucalis*), slender wild oat (*Avena barbata*), rip-gut brome (*Bromus diandrus*), soft brome (*Bromus hordeaceus*), yellow star-thistle (*Centaurea solstitialis*), hedgehog dogtail grass (*Cynosurus echinatus*), turkey mullein (*Eremocarpus setigerus*), dove-foot geranium (*Geranium molle*), Italian ryegrass (*Festuca multiflorum*), bird-foot trefoil (*Lotus corniculatus*), medusa-head grass (*Elymus caput-medusae*), winter vetch (*Vicia villosa*), and rat-tail fescue (*Vulpia myuros*).

Blue oak woodlands support a diversity of wildlife species due to rich food resources such as acorns and pine nuts. Bird species common to blue oak woodland habitats include western scrub jay (*Aphelocoma californica*), California quail (*Callipepla californica*), Anna's hummingbird (*Calypte anna*), house finch (*Carpodacus mexicanus*), yellow-rumped warbler (*Dendroica coronata*), horned lark (*Eremophila alpestris*), wild turkey (*Meleagris gallopavo*), song sparrow

(*Melospiza melodia*), western bluebird (*Sialia mexicana*), white-crowned sparrow (*Zonotrichia leucophrys*), and a variety of woodpeckers. Raptor species that may use the habitat include Cooper's hawk (*Accipiter cooperi*), red-tailed hawk (*Buteo jamaicensis*), and peregrine falcon (*Falco peregrinus*).

Common mammal species include coyote (*Canis latrans*), mountain lion (*Felis concolor*), black-tailed jackrabbit (*Lepus californicus*), striped skunk (*Mephitis mephitis*), California vole (*Microtus californicus*), long-tailed weasel (*Mustela frenata*), mule deer (*Odocoileus hemionus*), deer mouse (*Peromyscus* sp.), raccoon (*Procyon lotor*), western gray squirrel (*Sciurus griseus*), and gray fox (*Urocyon cinereoargenteus*). A variety of bats also occur in these habitats including big brown bat (*Eptesicus fuscus*), western mastiff bat (*Eumops perotis*), western long-eared bat (*Myotis evotis*), long-legged bat (*Myotis volans*), Yuma bat (*Myotis yumanensis*), western pipistrelle (*Pipistrellus hesperus*), and Brazilian free-tailed bat (*Tadarida brasiliensis*).

Foothill Pine The foothill pine community supports many plant species common to the blue oak community. Its understory consists of moderately dense to very dense stands of shrubs. Dominant overstory species include foothill pine, blue oak, and interior live oak (*Quercus wislizenii*). Common shrubs include manzanita (*Arctostaphylos* spp.), coyote bush (*Baccharis pilularis*), buckbrush, western redbud (*Cercis occidentalis*), birch-leaf mountain mahogany (*Cercocarpus betuloides*), yerba santa (*Eriodictyon californica*), toyon (*Heteromeles arbutifolia*), and poison-oak (*Toxicodendron diversilobum*).

Native herbaceous understory plants include many of the species found in the blue oak community, as well as yarrow (*Achillea millefolium*), blow-wives (*Achyrachaena mollis*), peninsular onion (*Allium peninsulare*), fiddleneck (*Amsinckia menziesii*), Douglas iris (*Iris douglasii*), lupine (*Lupinus latifolia*), man-root (*Marah* sp.), California melic (*Melica californica*), and erect plantain (*Plantago erecta*).

Non-native understory species in the foothill pine community include scarlet pimpernel (*Anagallis arvensis*), slender wild oat, rip-gut brome, soft brome, yellow star-thistle, Italian ryegrass, bird-foot trefoil, and winter vetch.

Wildlife species that use foothill pine habitat are similar to those found in blue oak woodlands because of the similar plant species composition. Species that prefer this habitat to blue oak woodland include eastern fox squirrel (*Sciurus niger*) and black bear (*Ursus americana*), among others.

Interior Live Oak. The interior live oak community supports a greater diversity of overstory species than either the blue oak or foothill pine communities. Overstory species include big-leaf maple (*Acer macrophyllum*), madrone (*Arbutus menziesii*), blue oak, black oak (*Quercus kelloggii*), California bay (*Umbellularia californica*), interior live oak, and foothill pine. The understory is less dense than the foothill pine community is, but it supports similar shrub species. Less common herbaceous plants in this community include Idaho fescue (*Festuca idahoensis*) and California melic.

Wildlife species that use interior live oak habitat are similar to those found in blue oak woodlands and foothill pine habitat.

Chamise The chamise habitat community is characterized by a dense stand of chamise (*Adenostoma fasciculatum*) with a sparse herbaceous understory only where openings among shrubs occur. Other shrub species found in this community include manzanita, buckbrush, toyon, and scrub oak (*Quercus berberidifolia*). Patches of chamise and scrub oak communities are interspersed with the blue oak, foothill pine, and interior live oak communities.

Wildlife species that use the chamise habitat community are similar to those found in blue oak and foothill pine habitats because of the proximity of the habitats to one another. The absence of trees in this community does, however, preclude tree-nesting raptors and some migratory songbirds from using it as breeding habitat. The dense shrub layer provides excellent cover and resting habitat as well as rich foraging habitat for ground- and foliage-gleaning birds and nesting habitat for many songbirds.

Fresh Emergent Wetland Fresh emergent wetlands occurring around Lake Berryessa are typically a function of constructed impoundments that are inundated for a sufficient length of time and are shallow enough to support fresh emergent vegetation. Dense clumps of common reed (*Phragmites australis*) are typical in fresh emergent wetlands. Willows (*Salix* spp.), California bay, blue oaks, and coyote brush may overhang the banks.

Fresh emergent wetlands are among the most productive wildlife habitats. They provide abundant breeding, foraging, and roosting habitat for a diverse array of animals. Emergent plants and quiet water within the wetlands provide safe harbors for breeding amphibians such as California toad (*Anaxyrus boreas*), bullfrog (*Rana catesbiana*), and Pacific chorus frog (*Psuedacris regilla*). The western pond turtle (*Actinemys marmorata*) and western aquatic garter snake (*Thamnophis couchii*) also require wetlands to forage and breed. Many bird and mammal species use or require fresh emergent wetlands for foraging and nesting. Birds using this wetland type include great blue heron (*Ardea herodias*), green heron (*Butorides virescens*), black-crowned night heron (*Nycticorax nycticorax*), common yellowthroat (*Geothlypis trichas*), song sparrow, common snipe (*Gallinago gallinago*), mallard (*Anas platyrhynchos*), northern pintail (*Anas acuta*), red-winged blackbird (*Agelaius phoeniceus*), and American bittern (*Botaurus lentiginosus*), among many others.

Lacustrine Lake Berryessa provides lacustrine (lake) habitat; this habitat is typically considered the area beyond where the shoreline zone transitions into the deepwater zone. Open water occurs at depths that preclude the establishment of emergent vegetation. Some emergent vegetation persists along the shorelines of Lake Berryessa, primarily consisting of non-native Eurasian watermilfoil (*Myriophyllum spicatum*). More diverse or extensive aquatic plant communities are not likely to develop along the shallow shores of the lake as a result of annually fluctuating water levels. The maximum elevation of the lake at full pool, based on the dam and spillway elevations, is 440 feet above msl.

Typical wildlife that can be found on Lake Berryessa includes waterfowl and shorebirds, such as wood duck (*Aix sponsa*), northern pintail, American wigeon (*Anas americana*), green-winged teal (*Anas crecca*), Eurasian wigeon (*Anas penelope*), mallard, great egret (*Ardea alba*), great blue heron, Canada goose (*Branta canadensis*), American coot (*Fulica americana*), common moorhen (*Gallinula chloropus*), and hooded merganser (*Lophodytes cucullatus*). Other bird species that use upland habitats, but may forage at the lake, include belted kingfisher (*Ceryle*

alcyon), bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), gulls (*Larus* spp.), osprey (*Pandion haliaetus*), double-crested cormorant (*Phalacrocorax auritus*), and swallows (*Hirundo* sp. and *Tachycineta* sp.).

Lake Berryessa supports both warmwater and coldwater fish species. The warmwater fish are found in the shallower and warmer upper level and littoral zones, whereas the coldwater fish use the deeper, cooler, and well-oxygenated lower level. The Lake Berryessa warmwater fishery is self-sustained, meaning that it does not require supplementation (i.e., stocking). Although some natural recruitment may occur, the coldwater fishery is predominantly supported by annual or periodic supplementation. The California Department of Fish and Wildlife (CDFW) stocks rainbow trout (*Oncorhynchus mykiss*), Chinook salmon (*O. tshawytscha*), kokanee salmon (*O. nerka*), and brown trout (*Salmo trutta*) (Reclamation 1992).

Native fish species present in the lake include Sacramento sucker (*Catostomus occidentalis*), California roach (*Hesperoleucus symmetricus*), hitch (*Lavinia exilicauda*), hardhead (*Mylopharadon conocephalus*), Sacramento blackfish (*Orthodon microlepidotus*), and Sacramento pikeminnow (*Ptychocheilus grandis*). Warmwater fishes include white catfish (*Amereiurus catus*), bullhead (*Amereiurus* spp.), common carp (*Cyprinus carpio*), channel catfish (*Ictalurus punctatus*), sunfish (*Lepomis* spp.), bass (*Micropterus* spp.), and crappie (*Promixis* spp.), all of which are non-native fish species. The coldwater fish species include rainbow trout, kokanee salmon, Chinook salmon, brown trout, and brook trout (*Salvelinus fontinalis*). The Monticello Dam forms a fish barrier to Lake Berryessa, which prevents natural populations of special-status fish species from entering the lake from downstream rivers and streams.

Urban Disturbed areas associated with development that support primarily non-native weedy or horticultural species are classified as urban. Urban habitat includes campgrounds, parking areas, and other recreation development around the lake. Trees and shrubs are common to the urban habitat, but because of frequent recreational use, the understory grasses are often denuded during the course of the recreation season. Native plants are less common, but include manzanita, coyote bush, California brome (*Bromus carinatus*), star tulip (*Calochortus* sp.), Oregon ash (*Fraxinus latifolia*), black walnut (*Juglans nigra*), keckiella (*Keckiella* spp.), Fremont cottonwood (*Populus fremontii*), blue oak, black oak, valley oak (*Quercus lobata*), interior live oak, blue elderberry (*Sambucus mexicana*), redwood (*Sequoia sempervirens*), and Ithuriel's spear. Non-native weedy or horticultural species in urban areas include agave (*Agave* sp.), rip-gut brome, soft brome, Italian cypress (*Cupressus sempervirens*), Scotch broom (*Cytisus scoparius*), Russian olive (*Elaeagnus angustifolia*), iris (*Iris* sp.), western juniper (*Juniperus occidentalis*), white mulberry (*Morus alba*), bamboo (*Nandina* sp.), oleander (*Nerium oleander*), penstemon (*Penstemon* sp.), date palm (*Phoenix* sp.), Monterey pine (*Pinus radiate*), Chinese pistachio (*Pistacia chinensis*), poplar (*Populus* sp.), rose (*Rosa* sp.), rosemary (*Rosmarinus officinalis*), weeping willow (*Salix babylonica*), and Aleppo pine (*Pinus halepensis*).

In general, urban habitats support far fewer wildlife species than natural habitats such as mixed chaparral and blue oak woodland. Wildlife species found in urban habitats tend to be tolerant of human activities and have adapted to the modified environment. Bird species commonly associated with urban habitats include house finch, northern flicker (*Colaptes auratus*), rock dove (*Columba livia*), American crow (*Corvus brachyrhynchos*), dark-eyed junco (*Junco*

hyemalis), house sparrow (*Passer domesticus*), bushtit (*Psaltriparus minimus*), European starling (*Sturnus vulgaris*), and mourning dove. Mammal species include Virginia opossum (*Didelphis virginiana*), big brown bat, raccoon, eastern fox squirrel, and Brazilian free-tailed bat.

Seasonal Wetlands and Swales Seasonal wetlands are variously shaped depressions that collect and hold water as a result of an impermeable subsurface layer. They are frequently ponded during the growing season and support plant species adapted to saturated soil conditions. Typical plant species in seasonal wetlands at Lake Berryessa include winter cress (*Barbarea orthoceras*), nutsedge (*Cyperus* sp.), California pearly everlasting (*Gnaphalium californica*), toad rush (*Juncus bufonius*), iris-leaved rush (*Juncus xiphioides*), common monkeyflower (*Mimulus guttatus*), common reed (*Phragmites australis*), rabbitsfoot grass (*Polypogon monspeliensis*), red willow (*Salix laevigata*), and cockle-bur (*Xanthium strumarium*).

Intermittent swales often provide a hydrologic connection between wetlands that pond (i.e., hold water) and other water features. Plant species associated with swales around Lake Berryessa include sedge (*Carex* spp.), spike rush (*Eleocharis macrostachya*), white sweetclover (*Melilotus alba*), curly dock (*Rumex crispus*), and vetch (*Vicia* spp.).

Intermittent and Ephemeral Drainages Creek and stream habitat is formed by naturally occurring water courses draining into Lake Berryessa. The intermittent and ephemeral drainages are characterized by discernable beds and banks that formed from surface flows or groundwater discharge. The drainages may support riparian or wetland vegetation and may be used as corridors for wildlife movement or for foraging, cover, or nesting, depending on the density of overstory vegetation. Wildlife found in other habitats may also be found in or near drainages.

Sensitive Biological Resources The ecological settings around Lake Berryessa provide habitat for special-status plant and wildlife species protected under the federal ESA and California Fish and Game Code. Serpentine parent soils on the west side of the lake provide suitable habitat for two special-status plant species: Clara Hunt's milk-vetch (*Astragalus claranus*), state and federally listed as endangered, and Keck's checker-mallow (*Sidalcea keckii*), federally listed as endangered. Additionally, potential breeding habitat for the California red-legged frog (*Rana draytonii*), federally listed as threatened, occurs in some of the RAs. Special-status fish, or special-status vernal pool plant and wildlife species, are not expected to occur in or around Lake Berryessa because habitats to support these species absent or because barriers to their movement prevent the species from entering the lake (i.e., Monticello Dam).

Blue elderberry (*Sambucus mexicana*) shrubs with stems greater than 1 inch in diameter at ground level can provide habitat for the federally threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (VELB). Although blue elderberry has been observed to occur at four of the five RAs, the likelihood that the shrubs are occupied by the protected beetle is remote because Lake Berryessa is located outside the beetle's historic and current range.

Habitat communities in the RAs provide nesting and foraging habitat for a variety of migratory birds and raptors, which are protected under the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code. Ospreys, protected under the MBTA, are known to utilize telephone and power poles for nesting around Lake Berryessa. Bald and golden eagles, also

protected under the MBTA and under the Bald and Golden Eagle Protection Act, are known and assumed, respectively, to breed and forage in the northern portion of Lake Berryessa.

The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). This prohibition includes direct and indirect acts, although harassment and habitat modifications are not included unless they result in direct loss of birds, nests, or eggs. The current list of species protected by the MBTA can be found in 78 FR 65844 and includes several hundred species; essentially all native birds. Loss of nonnative species, such as house sparrows (*Passer domesticus*), European starlings (*Sturnus vulgaris*), and rock pigeons (*Columba livia*) is not covered by this statute.

The Bald and Golden Eagle Protection Act (16 USC 668-668c) makes it unlawful to take, possess, sell, purchase, barter, offer to sell or purchase or barter, transport, export, or import a bald or golden eagle, alive or dead, or any part, nest, or egg of these eagles unless authorized by the Secretary of the Interior. Violators are subject to fines and/or imprisonment for up to one year. Active eagle nest sites are also protected from disturbance during the breeding season.

"Waters of the United States" are subject to regulation by USACE under Section 404 of the CWA. Lake Berryessa, including its tributaries and adjacent wetlands, are waters of the United States. As defined for CWA regulatory purposes by the USACE, "wetlands" are a subset of waters of the United States that are transitional between uplands and deep water habitats, and that are identified on the basis of hydrology, soils, and the assemblage of plants they support. Wetlands include seasonally wet features (i.e., "seasonal wetlands"), intermittent swales, constructed impoundments, seep-spring wetlands, fresh emergent wetlands, and riparian wetlands. "Other waters of the United States", also subject to USACE regulation under CWA Section 404, include ephemeral, intermittent, and perennial streams that are tributary to the lake, and the lake itself.

Local Setting

The biological setting at each RA is based on the technical studies prepared to support the EA and surveys that have been conducted since about 2008 to characterize habitats, record observations of special-status species, and delineate wetlands and other waters. Appendix F and the supporting technical studies (North State Resources 2014a-f) provide detailed information for each RA.

Putah Canyon RA Putah Canyon RA encompasses approximately 808 acres and consists of blue oak, foothill pine, chamise, urban, and lacustrine habitat types. Much of Putah Canyon RA is disturbed as a result of the previous development and is sparsely vegetated in the areas where interim facilities currently exist. Current use of the RA is restricted to the previously disturbed areas. Putah Canyon RA is bordered to the north and south by arms of Lake Berryessa, to the east by the main body of the lake, and to the west by open space.

The habitats at the RA could support special-status species, such as Clara Hunt's milk vetch, Keck's checker mallow, valley elderberry longhorn beetle, bald eagle, California red-legged frog, and nesting migratory birds. The two plants were not observed during focused surveys within a 78-acre portion of the RA where infrastructure plan elements would be concentrated,

which were conducted in April–May 2014. The RA contains a constructed impoundment of sufficient depth to potentially provide suitable breeding habitat for the California red-legged frog; however, the impoundment lacks emergent and overhanging vegetation necessary for deposition of eggs. Four osprey nests were documented at the RA during surveys.

Elderberry shrubs were found to occur at 11 locations. Three of the elderberry shrubs contained exit holes that may indicate the presence of the VELB. Information recently compiled by the U.S. Fish and Wildlife Service indicates that the Putah Canyon RA is located outside the historic range of occurrence for the VELB, and the likelihood of occurrence is remote. However, due to the patchiness of the VELB distribution, and the difficulty in detecting occupied habitat, protections for unoccupied habitat are important to ensure habitat connectivity is maintained. (USFWS, 2017). See Appendix F, Biological Resources Information for detailed locations of elderberry shrubs.

A detailed delineation of wetlands and other waters of the United States within an approximately 78-acre portion of the RA where infrastructure plan elements would be concentrated was performed in 2014 (North State Resources 2014d). The delineation documented a seep-spring and five ephemeral streams. The seep-spring is in the western portion of the RA along an ephemeral stream and encompasses about 0.001 acre. The five streams are west of Berryessa Knoxville Road, and they convey seasonal flow into the Putah Creek arm of the lake or the main body of the lake.

As reported in Table 3-7 the area of likely waters of the United States within the approximately 78-acre portion of the Putah Canyon RA where infrastructure plan elements would be concentrated totals 0.044 acre, about 0.06 percent of the gross area delineated.

Table 3-7. Putah Canyon RA Waters of the United States Summary

Waters of the United States	Total Acreage*	Total Linear Feet*
Seep-spring wetland	0.001	N/A
Ephemeral streams	0.043	1,424
Total Waters of the United States	**0.044**	**1,424**

*Note: The total acreage and linear feet estimates are for a portion of the RA subjected to formal delineation (see North State Resources 2014d for a description of the study area).

Monticello Shores RA Monticello Shores RA encompasses approximately 503 acres and consists of blue oak, foothill pine, urban, and lacustrine habitat types. Most facilities associated with the previous development have been removed, and some areas show evidence of the previous development where vegetation removal and grading took place. Several dirt roads provide access throughout the RA, and power lines that served the development extend into the RA. The RA is bordered to the south by Berryessa Point RA, to the east by the main body of the lake, to the north by a private community, and to the west by open space.

The habitats at the RA could support special-status species, such as Clara Hunt's milk vetch, Keck's checker mallow, valley elderberry longhorn beetle, bald eagle, California red-legged

frog, and nesting migratory birds. The two plants were not observed during focused surveys within a 103-acre portion of the RA where conceptual plan elements would be concentrated, which were conducted in April–May 2014. The RA does not provide suitable breeding habitat for the California red-legged frog, due to the lack of shallow water features with suitable vegetation. One osprey nest was documented at the RA during surveys.

Seven elderberry shrubs were documented at the RA during surveys. Five of the elderberry shrubs contained exit holes that may indicate the presence of the VELB. Information recently compiled by the U.S. Fish and Wildlife Service indicates that the Monticello Shores RA is located outside the historic range of the VELB, and the likelihood of occurrence is remote. However, due to the patchiness of the VELB distribution, and the difficulty in detecting occupied habitat, protections for unoccupied habitat are important to ensure habitat connectivity is maintained. (USFWS, 2017). See Appendix F, Biological Resources Information for detailed locations of elderberry shrubs.

A detailed delineation of wetlands and other waters of the United States within the approximately 103-acre portion of the Monticello Shores RA where a single infrastructure plan element (i.e., access gate) and several conceptual plan elements would be concentrated was performed in 2014 (North State Resources 2014c). The delineation documented a seasonal wetland, nine ephemeral streams, and three intermittent streams. The seasonal wetland is near the southern end of the RA and encompasses approximately 0.069 acre. It appears to be isolated from the lake and streams. The 12 streams are scattered across the area delineated and convey seasonal or periodic flow into the main body of the lake.

As reported in Table 3-8 the area of likely waters of the United States within the approximately 103-acre portion of the Monticello Shores RA where conceptual plan elements would be concentrated totals 0.228 acre, about 0.22 percent of the gross area delineated.

Table 3-8. Monticello Shores RA Waters of the United States Summary

Waters of the United States	Total Acreage	Total Linear Feet
Seasonal Wetland	0.069	N/A
Ephemeral Streams	0.072	1,679
Intermittent Streams	0.087	964
Total Waters of the United States	**0.228**	**2,643**

*Note: The total acreage and linear feet estimates are for a portion of the RA subjected to formal delineation (see North State Resources 2014c for a description of the study area).

Berryessa Point RA Berryessa Point RA encompasses approximately 199 acres and consists of blue oak, foothill pine, urban, and lacustrine habitat types. Much of the southern portion of the RA was disturbed as a result of the previous development and contains unvegetated flat areas. Berryessa Point RA is bordered to the north by Monticello Shores RA, to the east by the main body of the lake, and to the south and west by open space.

The habitats at the RA could support special-status species, such as Clara Hunt's milk vetch, Keck's checker mallow, valley elderberry longhorn beetle, bald eagle, California red-legged frog, and nesting migratory birds. The two plants were not observed during focused surveys within a 31-acre portion of the RA where infrastructure plan elements would be concentrated, which were conducted in April–May 2014. The RA contains a constructed impoundment that holds water, but it does not provide suitable breeding habitat for the California red-legged frog due to the shallow depth of the water and the lack of suitable vegetation. Two osprey nests were documented at the RA during surveys.

Three elderberry shrubs were documented at the RA during surveys. None of the elderberry shrubs contained exit holes that may indicate the presence of the valley elderberry longhorn beetle. Information recently compiled by the U.S. Fish and Wildlife Service indicates that the Berryessa Point RA is located outside the historic range of the VELB, and the likelihood of occurrence is remote. However, due to the patchiness of the VELB distribution, and the difficulty in detecting occupied habitat, protections for unoccupied habitat are important to ensure habitat connectivity is maintained. (USFWS, 2017). See Appendix F, Biological Resources Information for detailed locations of elderberry shrubs.

A detailed delineation of wetlands and other waters of the United States within the approximately 31-acre portion of the Berryessa Point RA where infrastructure plan elements would be concentrated was performed in 2014 (North State Resources 2014b). The delineation documented three ephemeral streams and an intermittent stream. No wetlands were delineated. The four streams are in the northern and central portions of the RA, and they convey seasonal and periodic flow into the main body of the lake.

As reported in Table 3-9 the area of likely waters of the United States within the approximately 31-acre portion of the Berryessa Point RA where infrastructure plan elements would be concentrated totals 0.029 acre, about 0.09 percent of the gross area delineated.

Table 3-9. Berryessa Point RA Waters of the United States Summary

Waters of the United States	Total Acreage	Total Linear Feet
Ephemeral Streams	0.024	479
Intermittent Stream	0.005	149
Total Waters of the United States	**0.029**	**628**

*Note: The total acreage and linear feet estimates are for a portion of the RA subject to formal delineation (see North State Resources 2014b for a description of the study area).

Spanish Flat RA Spanish Flat RA encompasses approximately 339 acres and consists of blue oak, foothill pine, urban, and lacustrine habitat types. Much of the area in the RA is disturbed as a result of the previous development and is sparsely vegetated in the areas where facilities currently exist. The RA is bordered to the east by the main body of the lake, to the south and north by arms of the lake, and to the west by open space.

The habitats at the RA could support special-status species, such as Clara Hunt's milk vetch, Keck's checker mallow, bald eagle, California red-legged frog, and nesting migratory birds. The two plants were not observed during focused surveys within a 57-acre portion of the RA where infrastructure plan elements would be concentrated, which were conducted in April–May 2014. The RA does not provide suitable breeding habitat for the California red-legged frog due to a lack of water features with sufficient water depth and emergent vegetation. One osprey nest was documented at the RA during surveys; no elderberry shrubs were observed.

A detailed delineation of wetlands and other waters of the United States within the approximately 57-acre portion of the Spanish Flat RA where infrastructure plan elements would be concentrated was performed in 2014 (North State Resources 2014e). The delineation documented a seep-spring wetland, a vegetated ditch, four ephemeral streams, two intermittent streams, and a perennial stream. The seep-spring is adjacent to a vegetated ditch in the central portion of the RA and encompasses approximately 0.001 acre. The perennial stream conveys flow from the west side of Berryessa Knoxville Road into a small cove off the main body of the lake north of the peninsula. Two ephemeral streams convey flow off the peninsula into the main body of the lake. The other streams convey seasonal or periodic flow into the coves of the lake on the north and south sides of the peninsula.

As reported in Table 3-10 the area of likely waters of the United States within the approximately 57-acre portion of the Spanish Flat RA where infrastructure plan elements would be concentrated totals 0.041 acre, about 0.07 percent of the gross area delineated.

Table 3-10. Spanish Flat RA Waters of the United States Summary

Waters of the United States	Total Acreage	Total Linear Feet
Seep-spring Wetland	0.001	N/A
Vegetated Ditch	0.015	332
Ephemeral Streams	0.010	377
Intermittent Streams	0.003	63
Perennial Stream	0.012	201
Total Waters of the United States	**0.041**	**973**

*Note: The total acreage and linear feet estimates are for a portion of the RA subject to formal delineation (see North State Resources 2014e for a description of the study area).

Steele Canyon RA Steele Canyon RA encompasses approximately 321 acres and consists of blue oak, foothill pine, interior live oak, urban, and lacustrine habitat types. Much of the area in the RA is disturbed as a result of the previous development and is sparsely vegetated in the areas where interim facilities currently exist. Steele Canyon RA is bordered to the north by the main body of the lake, to the west by an arm of the lake, to the east by a residential development, and to the south by open space.

The habitats at the RA could support special-status species, such as valley elderberry longhorn beetle, bald eagle, California red-legged frog, and nesting migratory birds. The RA contains a constructed impoundment of sufficient depth to potentially provide suitable breeding habitat for the California red-legged frog; however, the impoundment lacks emergent and overhanging vegetation necessary for deposition of eggs, and the presence of predators such as bullfrogs and crayfish reduces the suitability of the feature for the frog. Three osprey nests were documented at the RA during surveys within a 78-acre portion of the RA where infrastructure plan elements would be concentrated, conducted in April–May 2014.

One elderberry shrub was documented during the April-May 2014 surveys. The elderberry shrub did not contain any potential exit holes that may indicate presence of the VELB. Information recently compiled by the U.S. Fish and Wildlife Service indicates that the Steele Canyon RA is located outside the historic range of the VELB, and the likelihood of occurrence is remote. However, due to the patchiness of the VELB distribution, and the difficulty in detecting occupied habitat, protections for unoccupied habitat are important to ensure habitat connectivity is maintained. (USFWS, 2017). See Appendix F, Biological Resources Information for detailed locations of elderberry shrubs.

A detailed delineation of wetlands and other waters of the United States within the approximately 78-acre portion of the Steele Canyon RA where infrastructure plan elements would be concentrated was performed in 2014 (North State Resources 2014f). The delineation documented a constructed impoundment, six ephemeral streams, and two intermittent streams. The constructed impoundment is in the central portion of the RA, and it captures flow from an intermittent stream before conveying it into a cove west of the RA. Four of the streams convey seasonal or periodic flow into the cove, and the other four streams convey seasonal flow into the main body of the lake.

As reported in Table 3-11 the area of likely waters of the United States within the approximately 78-acre portion of the Steele Canyon RA where infrastructure plan elements would be concentrated totals 0.941 acre, about 1.2 percent of the gross area delineated.

Table 3-11. Steele Canyon RA Waters of the United States Summary

Waters of the United States	Total Acreage	Total Linear Feet
Constructed Impoundment	0.866	N/A
Ephemeral Streams	0.036	1,051
Intermittent Streams	0.039	828

Waters of the United States	Total Acreage	Total Linear Feet
Total Waters of the United States	**0.941**	**1,879**

*Note: The total acreage and linear feet estimates are for a portion of the RA subject to formal delineation (see North State Resources 2014f for a description of the study area).

Environmental Consequences and Mitigation Measures

No-Action Alternative

Under the no-action alternative, no new facilities would be installed at the RAs without prior approval from Reclamation and further environmental review under NEPA. Installation of previously approved facilities would primarily take place in previously disturbed areas (e.g., along roads) with minimal vegetation removal. Vegetation disturbance associated with routine maintenance and upkeep of interim facilities and use of the RAs would also be limited to previously disturbed areas, as they are under current conditions. Temporary disturbance to wildlife could occur during facility installation and routine maintenance activities. Ongoing use of the RAs would result in periodic disturbance to wildlife in the area, but the wildlife would likely become (or has already become) acclimated to human presence and could avoid areas with greater human use. The recreational fishery at the lake would also be similar to the fishery under current conditions, and the CDFW would be expected to continue stocking fish as needed.

Proposed Action

Overall Development and Conceptual Site Plan Impacts Development of the RAs would result in varying levels of ground disturbance and construction activities over a period of about 30 years and increased human activity and presence at each of the RAs indefinitely. Most new facilities are expected to be constructed in previously disturbed areas, which would require minimal removal of overstory and herbaceous understory vegetation. Invasive or non-native vegetation would be removed, to the extent feasible, from developed areas within the RAs. Some facilities would be constructed in less disturbed areas and may require more extensive vegetation removal, which could result in the removal of native vegetation. Implementing the siting and design measures incorporated into the proposed action would retain native vegetation, remove non-native and invasive plants, restore native vegetation in disturbed areas as part of the landscaping plan and, to the degree practicable, avoid disturbance within a 25 foot distance of elderberry shrubs greater than one inch diameter at ground level. Staging would be in previously disturbed areas or in a designated construction area once it is cleared of vegetation. Access would be on existing roads or designated roads in construction areas.

Construction activities would result in disturbances (e.g., noise, human activity, construction equipment use, ground-borne vibrations) that could affect wildlife near the activity and that could deter wildlife from using the habitats at the RAs during the construction period. The habitats in the areas where most facilities would be located are previously disturbed and less desirable than the surrounding native environment. Common wildlife and their habitats are abundant in the region. The abundance of available suitable habitats in the surrounding region would provide an opportunity for wildlife to relocate and maintain healthy populations. Nesting birds, such as osprey, bald eagle, and other MBTA species would be susceptible to adverse impacts from construction disturbance because the birds may abandon their nests and young.

Scheduling construction activities outside the nesting period or implementing precautionary measures before and during construction can reduce these impacts (see Mitigation Measure BIO-1 below).

Increased recreational use at the RAs and on the water could disturb wildlife using habitats near the RAs and could affect the fishery in the lake; however, because of previous disturbance and use at the RAs and continued use at some of the RAs, wildlife in the area and fish in the lake have become used to human presence to some extent. The recreational fishery at the lake could be affected through a reduction in fish populations by increased fishing and boating activities, but the CDFW would be expected to restock the coldwater fishery if needed to maintain healthy populations, and the warmwater fishery is considered self-sustaining. The Monticello Dam forms a fish barrier to the lake and prevents access by special-status fish. No special-status fish would be affected by the development.

Most of the plant and wildlife species found at the RAs are common to the area, but some special-status species could be affected by construction activities or by increased human use over the long term. Clara Hunt's milk-vetch and Keck's checker-mallow could be affected by activities at Putah Canyon, Monticello Shores, Berryessa Point, and Spanish Flat RAs; and California red-legged frog (dispersing, not likely breeding) could be affected by activities at any of the RAs. The five RAs are outside of the historic range of the VELB. However, due to the patchiness of the VELB distribution, and the difficulty in detecting occupied habitat, protections for unoccupied habitat are important to ensure habitat connectivity is maintained. (USFWS 2017).

Although suitable habitat for Clara Hunt's milk-vetch and Keck's checker-mallow is present at Putah Canyon, Monticello Shores, Berryessa Point, and Spanish Flat RAs, neither plant was observed during focused surveys in 2014. Clara Hunt's milk-vetch is known only from four occurrences in Napa and Sonoma counties, with the nearest occurrence more than 9 miles west of Spanish Flat RA; it has a relatively low likelihood of being found at the RAs. Keck's checker-mallow is known from about six occurrences in Napa and Yolo counties, with the nearest occurrence less than 3 miles south of Steele Canyon RA; it also has a low likelihood of being found at the RAs. Due to the lack of observations of the plants at the RAs and low potential for the plants to be present, no impacts on Clara Hunt's milk-vetch or Keck's checker-mallow are anticipated.

Blue elderberry shrubs with stems greater than 1 inch in diameter at ground level may provide suitable habitat for the valley elderberry longhorn beetle when the shrubs are located within the beetle's geographic range of occurrence. Elderberry shrubs were observed to occur at Putah Canyon, Monticello Shores, Berryessa Point, and Steele Canyon RAs. Direct impacts on valley elderberry longhorn beetle could occur if elderberry shrubs that contain beetles are removed or if ground disturbance takes place within 25 feet of the shrub. Indirect impacts could result from construction activities within 100 feet of the drip line of an occupied elderberry shrub if the activities result in changes that could affect the long-term viability of the elderberry shrubs, such as alteration of drainage patterns, sedimentation, erosion, and hazardous material spills.

Federal agencies contemplating actions that may affect some species listed under the federal ESA consult with the U.S. Fish and Wildlife Service (USFWS) to determine whether the species

would be adversely affected. Reclamation informally consulted with the USFWS on the potential effects of the proposed action on VELB, in a request for concurrence with its determination that the proposed action may affect, but is not likely to adversely affect the species, dated April 13, 2016. In a memorandum dated June 2, 2016, USFWS concurred with Reclamation's determination and clarified a minimum avoidance buffer of 25 feet for direct impacts. In subsequent informal communications culminating with an email from Mr. Leif Goude, USFWS, dated July 5, 2017, the USFWS informed Reclamation of a new *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (USFWS, 2017). This Framework indicates the unlikely occurrence of VELB in the areas proposed for development (western shores of Lake Berryessa). However, due to the presence of exit holes on elderberry shrubs which are documented in survey findings within the development footprint (surveys from 2011 and 2014), and their potential overlap with project features being proposed under the Lake Berryessa development plans (January 2015 infrastructure designs), Reclamation will review development plans prior to approving them, and will consider modifications to achieve the 25-foot avoidance buffer for potential direct impacts to VELB where practicable (see Mitigation Measure BIO-2 below).

Potential breeding habitat for California red-legged frogs is present in two constructed impoundments at Putah Canyon and Steele Canyon RAs; however, the potential for breeding is considered low due to the lack of emergent vegetation and presence of predators at the impoundments. Red-legged frogs may disperse across the RAs along streams and wet areas if they are present in the vicinity, although the potential for them to be present at the RAs is also considered low based on the California red-legged frog habitat assessment (North State Resources 2014a). Direct loss of individuals could occur during any phase of construction if red-legged frogs are present and activities occur in streams or other wet areas that could support frog dispersal. Indirect impacts could result from degradation of water quality of suitable breeding habitat if sediment or hazardous materials are carried in runoff to the respective features. Direct or indirect impacts on the species would require consultation with the USFWS. If the California red-legged frog is present, implementation of precautionary measures described in Mitigation Measure BIO-3 during construction can reduce the potential for impacts on this species.

Discharge of fill into Lake Berryessa or its tributaries during installation of facilities, such as culverts, marinas, launch ramps, and docks, could affect water quality in the lake, as discussed under Water Resources, and could affect navigability of the lake, particularly for recreational users. Discharge of fill and other activities that disturb wetlands and other waters of the United States could result in a loss of wetlands. Discharge of fill into waters of the United States is regulated under Section 404 of the CWA and is subject to permit authorization from USACE. Implementation of a SWPPP and standard water quality BMPs identified in Chapter 2 would minimize water quality impacts, but additional mitigation measures may be required to offset the discharge of fill material into waters of the United States, as described in Mitigation Measure BIO-4.

Infrastructure Plan Impacts Special-status species with reasonable potential to be affected by infrastructure plans are limited to raptors and migratory birds protected under the MBTA, and the California red-legged frog. Most of the infrastructure would be installed in previously disturbed areas, requiring little vegetation removal. Construction activities could disturb wildlife using habitats in or near the work areas, particularly nesting birds if present within several

hundred feet of the work areas. No other special-status species have reasonable potential to occur at the RAs.

Wetlands and streams under the jurisdiction of USACE could be affected by installation of pipelines, roads, or aboveground infrastructure. A description of the anticipated construction impacts for the four RAs with infrastructure plans is presented below. No infrastructure-related impacts at Monticello Shores RA would occur initially, although implementing elements of conceptual plans could affect waters of the United States depending on the specific plans proposed by concessionaires. Operational impacts associated with the infrastructure plans would be minimal and limited to disturbance associated with periodic maintenance.

Based on the analyses presented below, implementing the proposed action in conformance with Mitigation Measures BIO-1, BIO-2, BIO-3, and BIO-4 is not likely to adversely affect special-status species or have a significant impact on waters of the United States.

Putah Canyon RA Based on the infrastructure plans for Putah Canyon RA, installation of infrastructure would disturb an estimated 6 acres of native habitats (blue oak and foothill pine), most of which is already disturbed in the understory, and some aboveground infrastructure (e.g., wastewater treatment facility) would require removal of native trees. The minimal loss of habitat for special-status and other plant and wildlife species would not affect overall habitat availability around Lake Berryessa.

Most of the infrastructure would be installed in previously disturbed areas and non-native habitats; however, ground disturbance in these areas could facilitate establishment of invasive plants. Standard construction practices to prevent invasive plant or weed establishment would be implemented during construction activities, as described in Chapter 2. Construction activities during the nesting season could disturb active bird nests near work areas, including several osprey nests documented at the RA. Implementation of Mitigation Measure BIO-1 would avoid or minimize disturbance to nesting birds such as osprey, bald eagle, and other MBTA species if present.

Based on the previously mentioned focused surveys within a 78-acre portion of the RA where infrastructure plan elements would be concentrated, which were conducted in April–May 2014, the infrastructure elements of the proposed action at Putah Canyon RA would encroach to within 25 feet of the driplines of four shrubs; two of these four shrubs would be destroyed. Implementation of Mitigation Measure BIO-2 would avoid the potential for direct or indirect effects to VELB. See Appendix F for detailed maps of elderberry locations.

Although unlikely to be present, California red-legged frogs could disperse through the RA to or from breeding sites in the vicinity. No infrastructure is proposed at or near the constructed impoundment on the west side of Berryessa Knoxville Road near the southern portion of the RA. Potential impacts during construction would include those described above for the development, and implementation of Mitigation Measure BIO-3 would avoid the potential for direct or indirect effects on the frog.

Based on the previously mentioned detailed delineation of wetlands and other waters of the United States within the approximately 78-acre portion of the Putah Canyon RA where

infrastructure plan elements would be concentrated, performed in 2014, most of the infrastructure would be located away from delineated waters of the United States, and no facilities would affect wetlands at Putah Canyon RA. A proposed road on the west side of Berryessa Knoxville Road, just north of the proposed wastewater treatment facility, could result in permanent discharge of dredged or fill material into two ephemeral streams. In addition, an electrical line would cross one of the streams upstream of the road, and construction activities associated with the line could result in disturbance of or placement of fill (e.g., if it is underground) into the stream. These impacts would, however, be temporary. Specific design of the road and electrical line should consider Mitigation Measure BIO-4, and permits may be required before filling the streams.

Demolition and installation of a launch ramp would affect Lake Berryessa and require implementation of Mitigation Measure BIO-4. The existing launch ramp contains an estimated 23,000 square feet of concrete, some of which is below the ordinary high water mark of the lake. The proposed launch ramp would affect about 0.6 acre of the lake below the ordinary high water mark, including placement of concrete, installation of riprap, and installation of offshore anchors and associated ramp facilities. Installation of infrastructure for the proposed marina would be further evaluated once the marina design details are available.

Monticello Shores RA As shown in Appendix C, Figure C-2, infrastructure plan elements at Monticello Shores RA are limited to installation of a single access road close gate, located near the southern boundary of the RA, immediately north of the intersection of the two-way circulation road (a conceptual plan element) and Berryessa Knoxville Road. With incorporation of the environmental commitments and standard construction practices set forth in Chapter 2 for the proposed action, and Mitigation Measures Mitigation BIO-1 and BIO-3, implementing infrastructure plan elements at Monticello Shores RA will not have a significant impact on biological resources.

With implementation of installation of the access road close gate is not likely to adversely affect special-status species or have a significant impact on waters of the United States.

Berryessa Point RA Based on the infrastructure plans for Berryessa Point RA, none of the proposed infrastructure would disturb native habitats (e.g., blue oak or foothill pine). All of the infrastructure would be installed in previously disturbed areas and non-native habitats; however, ground disturbance in these areas could facilitate establishment of invasive plants. Standard construction practices to prevent invasive plant or weed establishment would be implemented during construction activities, as described in Chapter 2. Construction activities during the nesting season could disturb active bird nests near work areas, including an osprey nest documented on the peninsula at the RA. Implementation of Mitigation Measure BIO-1 would avoid or minimize disturbance to nesting birds such as osprey, bald eagle, and other MBTA species if present.

Based on the previously mentioned focused surveys within a 31-acre portion of the RA where infrastructure plan elements would be concentrated, which were conducted in April–May 2014, infrastructure elements of the proposed action at Berryessa Point RA (i.e., proposed main road) would encroach to within 25 feet of the dripline of a single elderberry shrub. Implementation of

Mitigation Measure BIO-2 would avoid potential direct effects to VELB. See Appendix F for detailed maps of elderberry locations.

Although unlikely to be present, California red-legged frogs could disperse through the RA to or from breeding sites in the vicinity. Potential impacts during construction would include those described above for the development, and implementation of Mitigation Measure BIO-3 would avoid the potential for direct or indirect effects on the frog.

Based on the previously mentioned detailed delineation of wetlands and other waters of the United States within the approximately 31-acre portion of the Berryessa Point RA where infrastructure plan elements would be concentrated, performed in 2014, most of the infrastructure would be located away from delineated waters of the United States, and no facilities would affect wetlands or other waters of the United States at the RA.

Spanish Flat RA Based on the infrastructure plans for Spanish Flat RA, installation of infrastructure would disturb an estimated 3 acres of native habitats (blue oak and foothill pine), most of which is already disturbed in the understory, and some aboveground infrastructure (e.g., detention basins) could require removal of native trees. The minimal loss of habitat for special-status and other plant and wildlife species would not affect overall habitat availability around Lake Berryessa.

Most of the infrastructure would be installed in previously disturbed areas and non-native habitats; however, ground disturbance in these areas could facilitate establishment of invasive plants. Standard construction practices to prevent invasive plant or weed establishment would be implemented during construction activities, as described in Chapter 2. Construction activities during the nesting season could disturb active bird nests near work areas, including several osprey nests documented at the RA. Implementation of Mitigation Measure BIO-1 would avoid or minimize disturbance to nesting birds such as osprey, bald eagle, and other MBTA species if present.

Based on the previously mentioned focused surveys within a 57-acre portion of the RA where infrastructure plan elements would be concentrated, which were conducted in April–May 2014, none of the infrastructure elements of the proposed action at Spanish Flat RA would be located within 25 feet of mapped elderberry shrubs (none were documented at the RA). See Appendix F for detailed maps of elderberry locations.

Although unlikely to be present, California red-legged frogs could disperse through the RA to or from breeding sites in the vicinity. Potential impacts during construction would include those described above for the overall development and conceptual site plan impacts, and implementation of Mitigation Measure BIO-3 would avoid the potential for direct or indirect effects on the frog.

Based on the previously mentioned detailed delineation of wetlands and other waters of the United States within the approximately 57-acre portion of the Spanish Flat RA where infrastructure plan elements would be concentrated, performed in 2014, the proposed main road would cross a perennial stream and vegetated ditch over existing culverts, and replacement of those culverts could result in permanent discharge of dredged or fill material into the streams,

depending on the sizes of the replacement culverts. The road may also affect a small seep-spring near the vegetated ditch. Specific design of the road should consider Mitigation Measure BIO-4, and permits may be required before filling the streams or wetland.

Demolition and installation of a launch ramp would affect Lake Berryessa and require implementation of Mitigation Measure BIO-4. The existing launch ramp contains an estimated 30,000 square feet of concrete and asphalt, some of which is below the ordinary high water mark of the lake. The proposed launch ramp would affect about 0.4 acre of the lake below the ordinary high water mark, including placement of concrete, installation of riprap, and installation of offshore anchors and associated ramp facilities. Installation of infrastructure for the proposed marina would be done when the marina is installed and would be further evaluated once the marina design details are available.

Steele Canyon RA Based on the infrastructure plans for Steele Canyon RA, installation of infrastructure would disturb less than 1 acre of native habitats (blue oak, interior live oak, and foothill pine), most of which is already disturbed in the understory, and some water infrastructure may require removal of native trees. The minimal loss of habitat for special-status and other plant and wildlife species would not affect overall habitat availability around Lake Berryessa.

Most of the infrastructure would be installed in previously disturbed areas and non-native habitats; however, ground disturbance in these areas could facilitate establishment of invasive plants. Standard construction practices to prevent invasive plant or weed establishment would be implemented during construction activities, as described in Chapter 2. Construction activities during the nesting season could disturb active bird nests near work areas, including three osprey nests documented at the RA. Implementation of Mitigation Measure BIO-1 would avoid or minimize disturbance to nesting birds such as bald eagle, osprey, and other MBTA species if present.

Based on the previously mentioned focused surveys within a 78-acre portion of the RA where infrastructure plan elements would be concentrated, which were conducted in April–May 2014, the infrastructure elements of the proposed action at Steele Canyon RA (i.e., proposed main road) would encroach to within 25 feet of the dripline of a single elderberry shrub, and the shrub would be destroyed. Implementation of Mitigation Measure BIO-2 would avoid the potential for direct or indirect effects to VELB See Appendix F for detailed maps of elderberry locations.

Although unlikely to be present, California red-legged frogs could disperse through the RA to or from breeding sites in the vicinity. A detention basin is proposed at the location of the constructed impoundment on the west side of the main access road near the central portion of the RA. The basin would serve a similar function as the existing impoundment and is not expected to provide suitable breeding habitat for the frog. Potential impacts during construction would include those described above for the development, and implementation of Mitigation Measure BIO-3 would avoid the potential for direct or indirect effects on the frog.

Based on the previously mentioned detailed delineation of wetlands and other waters of the United States within the approximately 78-acre portion of the Steele Canyon RA where infrastructure plan elements would be concentrated, performed in 2014, most of the infrastructure would be located away from delineated waters of the United States, and no

facilities would affect wetlands. The proposed main road would cross two intermittent and two ephemeral streams over existing culverts, and replacement of those culverts could result in permanent discharge of dredged or fill material into the streams, depending on the sizes of the replacement culverts. Specific design of the road should consider Mitigation Measure BIO-4, and permits may be required before filling the streams or wetland. Three detention basins would be located where three streams were delineated and may detain seasonal flow from the streams. One detention basin would be located in the location of a constructed impoundment. Depending on the nature of ground disturbing activities to establish the basins, the basins could result in the discharge of dredged or fill material into waters of the United States, and implementation of Mitigation Measure BIO-4 would be necessary.

Demolition and installation of a launch ramp would affect Lake Berryessa and require implementation of Mitigation Measure BIO-4. The existing launch ramp contains an estimated 30,000 square feet of concrete and asphalt, some of which is below the ordinary high water mark of the lake. The proposed launch ramp would affect about 0.6 acre of the lake below the ordinary high water mark, including placement of concrete, installation of riprap, and installation of offshore anchors and associated ramp facilities. Installation of infrastructure for the proposed marina would be done when the marina is installed and would be further evaluated once the marina design details are available.

Mitigation Measures

Reclamation will require its concessionaire(s) to comply with applicable laws, regulations, and policies for protecting sensitive biological resources. During construction activities, any contractor(s) will be required to implement standard BMPs and comply with a site-specific SWPPP. Following construction activities, the concessionaire(s) will be required to implement a site restoration and landscaping plan. The following mitigation measures would also be implemented to reduce potential impacts on nesting birds, special-status plants and wildlife, and waters of the United States. Reclamation will review the limits of the lands under their purview prior to the implementation of any mitigation measure.

Mitigation Measure BIO-1. Nesting Bird Impact Avoidance and Minimization Reclamation or its concessionaire(s) will be required to schedule construction activities and vegetation removal outside the nesting season (March 1 through August 31 for most migratory birds (January 1 through August 31 for bald and golden eagles) or implement the measures listed below to avoid disturbance to nesting birds. Nesting birds and raptors could occur at any of the RAs during the breeding and nesting season. Removal of vegetation and potential nesting substrate (e.g., bushes, trees, grass, buildings, and burrows), in particular, should be scheduled before the onset of the nesting season (generally March 1, but January 1 if bald eagles are present in the area) to help preclude nesting. If activities cannot be scheduled during the non-nesting period, the following measures are recommended to protect nesting migratory birds and raptors:

- Vegetation removal, trimming, grading of vegetated areas, and construction activities associated with a proposed action should be conducted outside of the nesting season (between September 1 and February 28) to the maximum extent practicable. If not possible, the following measures are required to avoid impacts to active nest sites protected by the MBTA:

- If vegetation removal, vegetation trimming, or construction activities are initiated during the nesting season (typically between March 1 to August 31), a pre-construction nesting survey shall be conducted by a qualified biologist[1] no more than five days prior to the scheduled activity.

- If no birds are observed nesting within 500 feet of project activities, the biologist would document the results of the pre-construction survey in a report and send it to the address below within 30 days following the survey. No further monitoring will be required.

  Bureau of Reclamation
  Central California Area Office
  Attn: CC-400 7794
  Folsom Dam Road Folsom, CA
  95630-1799

- If an active nest or breeding behavior (e.g., courtship, nest building, territorial defense, etc.) is detected during surveys, no project activities should be conducted until nestlings have fledged, the nest fails, or breeding behaviors are no longer observed. The biologist shall contact Reclamation by phone or email within one day following the survey. If the activity must occur, an appropriate buffer based on the needs of the species observed, the proposed activity, and habitat type shall be established around the nest (generally no less than a 50 foot buffer zone). The biologist would delineate the buffer zone with construction tape or pin flags to identify the buffer zone of the active nest. The biologist would submit a report documenting the pre-construction survey results, buffer determinations, and actions taken to the above address within 30 days following the survey.

- In the event that project activities cause a nesting bird to vocalize, make defensive flights at intruders, get up from a brooding position, or fly off the nest, the buffer zone will be increased such that activities are far enough from the nest to stop the agitated behavior. The buffer zone will remain in place until the chicks have fledged and left the area or as otherwise determined by a qualified biologist. The biologist would submit a report documenting the new buffer determination and actions taken to the above address within 30 days following the establishment of the new buffer.

- Guidance from the USFWS would be requested by CCAO for a reduced buffer zone if establishing a 50-foot buffer zone is impractical.

- If the project site is inactive at any time for more than 7 days or if a new breeding season has begun during construction inactivity, another nesting survey shall be conducted prior to re-initiation of work onsite. Exclusionary netting, or another type of exclusionary

[1] A person is considered a qualified biologist for the purposes of conducting pre-construction nesting bird surveys if they fulfill the following requirements: completion of a 4-year degree from an accredited university in wildlife biology or natural resources; demonstrated field identification capabilities; and knowledge of the basic life history of western bird species.

material, can be installed over standing equipment and materials to prevent nesting from being initiated during construction inactivity. The installation of exclusionary materials shall be monitored by a qualified biologist and inspected daily for the duration of the exclusion period to minimize potential harm or injury to birds[2].

Mitigation Measure BIO-2. Elderberry Shrub Direct Impact Avoidance If construction and other activities are proposed in areas that have not been subjected to protocol-level surveys for elderberry shrubs, a field survey shall be conducted in accordance with the *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus)* (USFWS 2017) before they are approved for implementation by Reclamation.

For ground disturbing activities proposed within 25 feet of elderberry stems greater than one inch diameter at ground level, including ground disturbing activities described for infrastructure and conceptual plan elements described in this EA, documentation shall be provided by the concessionaire to Reclamation setting forth the reason(s) avoiding direct impacts (i.e., providing the minimum 25-foot buffer around the dripline) is not practicable. Reclamation shall review and either concur that avoidance is not practicable or shall direct the concessionaire to revise development proposals to achieve the 25-foot buffer prior to authorizing the activities.

Mitigation Measure BIO-3. California Red-Legged Frog Impact Avoidance and Minimization If construction and other activities are proposed by concessionaires in areas that have not been subjected to assessments of their potential suitability as habitat for California red-legged frog, a habitat suitability site assessment shall be conducted by a qualified biologist retained by the concessionaire in accordance with *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog* (U.S. Fish and Wildlife Service 2005). Prior to authorizing construction Reclamation will submit the habitat assessment to the USFWS for concurrence.

Following USFWS concurrence with habitat site suitability assessments, if proposed construction and other activities may affect California red-legged frog or its suitable habitat, Reclamation will consult with the USFWS under the ESA. The concessionaire will be required to implement avoidance and minimization measures identified in any decisions issued from the USFWS (e.g., Biological Opinion). These measures may include the following:

- An environmental awareness training for construction personnel will be conducted before onset of construction to brief them on how to recognize California red-legged frogs. Construction personnel will also be informed that if a California red-legged frog is encountered in the work area, construction will stop, and USFWS will be contacted for guidance.

- Ground-disturbing activities in or near water features will be conducted during the dry season, generally between April 15 and the first rain event greater than 1/2 inch on or after October 15, to the extent practicable.

[2] In the event that a bird requires extraction from exclusionary material, the qualified biologist is required to be in possession of a federal migratory bird permit to allow for handling activities.

- For activities proposed in or near features determined by the USFWS as suitable habitat, including the two constructed impoundments at Putah Canyon and Steele Canyon RAs, a USFWS-approved biologist will direct the installation of California red-legged frog exclusion fencing within 10 to 20 feet (depending on amount of vegetation cover) of the impoundments. The name and credentials of the project biologist(s) will be submitted to USFWS 15 days before the start of construction. The fencing will be buried a minimum of 6 inches into the ground. The fenced area will be flagged and/or signed to prevent the encroachment of construction personnel and equipment into suitable habitat during construction. Exclusion fencing will be checked once per week by construction personnel, who will be trained by the USFWS-approved biologist to identify weaknesses, and all compromised portions will be repaired and/or replaced immediately. Exclusionary fencing will be removed once nearby construction is completed or by October 15 of the construction year, whichever comes first.

- If vegetation is to be removed within 20 feet of the constructed impoundments, the vegetation will be manually removed by hand. A USFWS-approved biologist will monitor the removal of vegetation.

- Staging areas, as well as fueling and maintenance activities, will be a minimum of 100 feet from riparian or aquatic habitats. A spill prevention and cleanup plan will be prepared and implemented.

- Plastic mono-filament netting (erosion control matting) or similar material containing netting will not be used at the RAs because the California red-legged frog may become entangled or trapped in it. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds.

Mitigation Measure BIO-4. Waters of the United States/Waters of the State of California Impact Avoidance and Minimization If construction and other activities are proposed in areas that have not been subjected to a delineation of the likely boundaries of waters of the United States, a delineation shall be conducted by a qualified delineator in accordance with the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West* (U.S. Army Corps of Engineers 2008) before they are approved for implementation by Reclamation.

To the degree practicable, Reclamation or its concessionaire(s) will site facilities to avoid or minimize the discharge of dredged or fill material into waters of the United States and waters of the state of California. Features such as bridges or open-bottomed, arched culverts that span streams or wetlands will be incorporated into infrastructure designs whenever to practicable to avoid or minimize the discharge of fill into receiving waters.

If construction or other activities would result in discharge of fill into waters of the United States or waters of the state of California, the concessionaire(s) shall obtain all applicable permits and authorizations before construction of the facility(s). These may include but are not limited to permits or authorizations pursuant to Sections 401 and 404 of the CWA, and pursuant to Section 1602 of the California Fish and Game Code.

According to the terms and conditions contained in the Section 401 and 404 permits or authorizations, the concessionaire(s) will be required to implement avoidance and minimization measures during construction activities. These measures may include, but are not limited to, the following:

- To the extent practicable, all construction activities in or near streams and wetlands will be conducted during the dry season (i.e., periods of low to no stream flow) to minimize the potential for water quality impacts.

- Compensatory mitigation for the discharge of fill into Lake Berryessa will be achieved through the implementation of habitat improvement measures for fisheries. The measures to be implemented will be determined in consultation with USACE and may include, but are not limited to, the construction of manzanita brush structures, planting of willow and buttonbush (*Cephalanthus occidentalis*), and planting of annual cereal grains to improve the quality of fish habitat in the lake. Mitigation may occur at a ratio of not less than 1:1 (mitigation to impact, acreage basis).

- Compensatory mitigation for permanent losses of wetlands will be achieved through payment into a mitigation bank or other appropriate venue in consultation with USACE, or via on-site mitigation.

- If on-site mitigation is implemented, a Mitigation and Monitoring Plan will be prepared and provided to USACE and CDFW, as necessary, for review and approval. The Mitigation and Monitoring Plan will identify the monitoring parameters and performance criteria for each parameter. All waters of the United States temporarily affected by construction activities will be restored, as close as practicable, to pre-construction contours and conditions.

- The permittee(s) will be responsible for implementing any monitoring, maintenance, and reporting required by the regulatory agencies (e.g., USACE, Regional Water Quality Control Board, CDFW), and Reclamation will be responsible for ensuring overall compliance.

Cultural Resources

Cultural resources is a term used to describe both “archaeological sites” depicting evidence of past human use of the landscape through material culture, and the “built environment”, which is represented in structures such as dams, roadways, and buildings. The term ‘cultural resources’ also applies to traditional cultural properties, sites of religious or cultural significance, and sacred sites. Those resources that are on or eligible for inclusion in the National Register of Historic Places are referred to as historic properties.

The National Historic Preservation Act (NHPA) of 1966 is the primary federal legislation that outlines the federal government’s responsibility regarding historic properties. Title 54 United States Code, Section 306108, commonly known as Section 106 of the NHPA, requires the federal government to take into consideration the effects of its action on historic properties.

Section 106 is implemented through federal regulation at 36 CFR Part 800. Although the Section 106 and NEPA processes are independent statutes, Reclamation uses the Section 106 process as its primary effort to identify impacts to cultural resources as they apply to NEPA. Reclamation initiated consultation under these regulations with the California State Historic Preservation Officer (SHPO), Native American tribes, and other interested parties.

Affected Environment

This description of the affected environment for cultural resources is based on a historic context prepared for Lake Berryessa lands managed by Reclamation (Holm et al. 2012) and cultural resources investigations conducted in support of previous undertakings (Nickels 2007, Burns ND) and this EA (Burns ND, Holson and Ledebuhr 2013, Holm et al. 2015). The cultural resources investigations comprised records and archival research, outreach to Native American tribes, and a field surveys of the entire RAs except small portions within each deemed by Reclamation to be too steep for development. Portions of the RAs not subjected to field surveys for cultural resources are shown on Figures 2a, 2b, and 2c of *Final Report – Cultural Resources Inventory for the Monticello Shores, Berryessa Point, Spanish Flat, and Steele Canyon Concession Sites, Lake Berryessa, Napa County, CA* (Holm et al. 2015). The analysis discusses the potential for cultural resources to be disturbed during development of the RAs. As part of the analysis, Reclamation established an area of potential effects (APE) at each RA that corresponds to the area of disturbance associated with the infrastructure plans, as described in Chapter 2 and depicted on maps in Appendix C.

Regional Setting

Evidence of prehistoric uses in the northern Coast Ranges dates to the Early (3500 to 500 B.C.) and Middle (500 B.C. to A.D. 1050) periods (Milliken et al. 2007). During the Early Period, people had a localized forager lifestyle and began to use new ground stone technology. The Middle Period people moved toward a more sedentary lifestyle with acorn processing and storage and use of the mortar and pestle, bone tools and ornaments, and basketry awls. During the Late Period (A.D. 1050 to 1800), which is generally before Native American contact with Euro-Americans and Mexicans, central villages were being established with evidence of rock art, stone tools, midden soils, dietary bone and shell, and a diversity of artifacts in a single location.

Lake Berryessa is in the former Patwin territory, which encompassed a portion of the Sacramento River, surrounding grassland plains, and lower hills of the eastern Coast Ranges (Johnson 1978). The Patwin lived in large seasonal villages concentrated along the river and along Putah and Cache creeks and were predominantly a fishing and hunting-gathering society. The main village of the To-pai'di-sel Band of Southern Hill Patwin was in Berryessa Valley on the western bank of Putah Creek (Powers 1976, Barrett 1908). The village would have contained earth-covered or semi-subterranean structures, such as family dwellings, dance houses, menstrual houses, sudatory houses, and granaries (McKern 1923). The Patwin traded for various commodities and subsistence resources using clamshell disk beads as a medium of exchange (Johnson 1978).

The earliest recorded European expedition into Napa County occurred in 1823 to expand the Franciscan mission from Alta California (Altamira 1860, Hoover et al. 1990). The first land grant in Berryessa Valley occurred with the 1843 granting of the Rancho Las Putas to Jose and Sisto Berryessa (UC Davis 2005). This nearly 36,000-acre rancho covered most of Berryessa

Valley. As with most ranchos in California, stock ranching with cattle, sheep, and horses was the main economic activity of the rancho. American and Mexican settlers increased in the area between the 1840s and 1860s with the gold rush, suitability of lands for agriculture, and completion of the transcontinental railroad. Early agriculture in Berryessa Valley was primarily dry farming of grains, but improvements in irrigation allowed for planting of orchards further away from water channels, and pears, plums, prunes and other tree crops became prominent (Markham 1893). Many miners settled in the area when mining attempts failed and turned to the rich agricultural land as a means to make a living.

With the increase of settlers to the area, the nearby town of Monticello was founded in 1866 (Reclamation 2011a). The town provided commercial services for people in the area. A four-horse stage line that ran from Knoxville to Napa passed through the town. Monticello Dam at Devil's Gate on Putah Creek was completed in 1957 to create Lake Berryessa. The lake was created as part of the Solano Project to supply water for agricultural uses in the area and to supply local communities with a source of water. The lake likely inundated prehistoric and historic resources that were present along the former Putah Creek alignment and in the Berryessa Valley; the Putah Creek Bridge is one known resource submerged under the lake. An estimated 50 archaeological sites, such as prehistoric mounds, lithic scatters, and bedrock mortars, had been documented in the valley before creation of the lake (Pacific Coast Area River Basin Surveys 1948). In 1958, Reclamation and Napa County agreed to terms for development and management of recreation areas by Napa County, and soon after recreation and other facilities were installed around the lake. These facilities include camping, lodging, marinas, docks, launch ramps, retail stores, trailer homes, and associated infrastructure.

Local Setting

The RAs and surrounding lands have been subject to varying levels of cultural resource studies and surveying (Holm et al. 2015). Because of the past uses of the Berryessa Valley, particularly before Lake Berryessa was formed, cultural resources may be present in sensitive areas, such as along wave slopes along the lake, unmodified landscapes with gentle slopes, and lands above the Putah Creek channel. A study by True and Baumhoff (1982) identified a high sensitivity for cultural resources in the wave slopes and unmodified landscapes within the RA boundaries. Sensitivity of the RAs was assessed based on the level of past disturbance (human modifications associated with previous uses), soil characteristics, degree of slopes (gentler slopes have higher sensitivity, particularly in unmodified landscapes), proximity to the former Putah Creek channel, and documentation of previously recorded sites or resources nearby. More recently, Holm et al. (2012) completed a geoarchaeological study to assess the potential for buried prehistoric archaeological deposits around the lake. The study concluded that the RAs have low to no sensitivity for buried cultural materials due to prior landscape modifications, such as areas of imported gravel, concrete pads, and other infrastructural elements. These modifications, however, obscure the underlying ground surface, and cultural resources may be encountered at greater depths, particularly in sensitive areas identified by True and Baumhoff (1982).

Cultural resources surveys conducted by Pacific Legacy in 2012 (Holson and Ledebuhr 2013) identified one cultural resources site and six isolated finds within the RA boundaries; no cultural resources were discovered during surveys in 2014 (Holm et al. 2015). One previously recorded cultural resource site was also discovered during archival research (recorded in 1947). A

discussion of the sensitivity of each of the RAs is provided below based on Holm et al. (2015) and previous studies conducted at Lake Berryessa.

Putah Canyon RA Much of the Putah Canyon RA has been paved, graded, or covered with imported gravel. Some areas between existing recreation facilities are less disturbed but have been subject to past disturbances from vehicle or equipment access or grading activities. Land outside the developed area is less disturbed and has relatively gentle slopes.

No cultural resources have been documented in the RA, but three sites have been previously recorded within a 1-mile radius. The entire APE at the Putah Canyon RA was included in the pedestrian survey, with good ground surface visibility. No historic properties have been identified at the Putah Canyon RA. The entire APE is in the geologic formation of the Bressa-Dibble Complex, which dates to the late Pleistocene and has a very low potential for buried deposits. The APE at the Putah Canyon RA is not considered sensitive for cultural resources.

Monticello Shores RA Much of the Monticello Shores RA has been paved, graded, or covered with imported gravel. The northern portion of the RA is less modified than other areas, but has still been subject to some past disturbances.

One cultural resources site has been recorded in the inundated portion of the RA, beneath the lake, and outside the APE. The inundated site is not expected to be exposed during periods of low water based on its depth beneath the lake. The entire APE at the Monticello Shores RA was included in the pedestrian survey, with good ground surface visibility. No historic properties have been identified at the Monticello Shores RA. Monticello Shores RA is in the geologic formation of the Bressa-Dibble Complex, which dates to the late Pleistocene and has a very low potential for buried deposits. The APE at the Monticello Shores RA is not considered sensitive for cultural resources. No development in the vicinity of identified archaeological sites will occur without NEPA and NHPA review and consultation.

Berryessa Point RA The majority of the Berryessa Point RA has been paved, graded, or covered with imported gravel. The northern portion of the RA is mostly undisturbed.

One cultural resources site has been recorded just outside the RA beneath the lake, but no cultural resources have been documented in the RA. The inundated site is not expected to be exposed during periods of low water based on its depth beneath the lake. The entire APE at the Berryessa Point RA was included in the pedestrian survey, with good ground surface visibility. No historic properties have been identified at the Berryessa Point RA. The entire APE is in the geologic formation of the Bressa-Dibble Complex, which dates to the late Pleistocene and has a very low potential for buried deposits. The APE at the Berryessa Point RA is not considered sensitive for cultural resources.

Spanish Flat RA The southern portion of the Spanish Flat RA has been paved, graded, or covered with imported gravel. Some areas between existing recreation facilities are less disturbed but have been subject to past disturbances from vehicle or equipment access or grading activities. Land outside the developed area is less disturbed.

One cultural resources site was previously recorded just outside the RA beneath the lake. The inundated site is not expected to be exposed during periods of low water based on its depth

beneath the lake. The entire APE at the Spanish Flat RA was included in the pedestrian survey, with good ground surface visibility. No historic properties have been identified at the Spanish Flat RA. The entire APE is in the geologic formation of the Bressa-Dibble Complex, which dates to the late Pleistocene and has a very low potential for buried deposits. The APE at the Spanish Flat RA is not considered sensitive for cultural resources.

Steele Canyon RA Much of the Steele Canyon RA has been paved, graded, or covered with imported gravel. Some areas between existing recreation facilities are less disturbed but have been subject to past disturbances from vehicle or equipment access or grading activities. The tip of a peninsula in the northwest portion of the RA is relatively unmodified and has level terrain. Most of the land outside the developed area is also relatively unmodified.

One cultural resources site was previously recorded just outside the RA beneath the lake, but no cultural resources have been documented in the RA. The entire APE at the Steele Canyon RA was included in the pedestrian survey, with good ground surface visibility. No historic properties have been identified at the Steele Canyon RA. The entire APE is in the geologic formation of the Bressa-Dibble Complex, which dates to the late Pleistocene and has a very low potential for buried deposits. The APE at the Steele Canyon RA is not considered sensitive for cultural resources.

Environmental Consequences and Mitigation Measures

No-Action Alternative

Under the no-action alternative, no new facilities would be installed at the RAs without prior approval from Reclamation and further environmental review under NEPA. Installation of previously approved facilities would primarily take place in previously disturbed areas with minimal native soil disturbance. As they are under current conditions, routine maintenance and upkeep of interim facilities and use of the RAs would be limited to previously disturbed areas. No known cultural resources would be affected. Reclamation would not have any obligations under Section 106 of the NHPA because this alternative does not have the potential to affect historic properties, pursuant to 36 CFR 800.3(a)(1).

Proposed Action

Overall Development and Conceptual Site Plan Impacts Development of the RAs over the next 30 years would involve varying levels of ground disturbance, which could disturb buried cultural resources if present. The amount and location of ground disturbance from construction activities would vary based on the type of facility being constructed and the site-specific designs for development at each RA. The general level of soil disturbance for proposed recreation facilities is presented in the Geology and Soils section. The potential for the construction activities to affect unidentified historic properties is very low.

Excavation activities in portions of the RAs that are outside the APE (i.e., outside the area of disturbance associated with the conceptual plan elements for Monticello Shores RA, and outside the areas of disturbance associated with infrastructure plan elements for the other four RAs) could expose or damage buried cultural resources. Examples of the kinds of cultural resources that occur in settings similar to Lake Berryessa include concentrations of rock, ash, animal bone, and/or shell; dark, almost black or very dark brown soils, often containing charcoal; structural

remains or remnant foundations; isolated clusters of manufactured artifacts (e.g., glass bottles, metal cans, manufactured wood items); and human remains. These items are generally, but not always, indicators that a prehistoric or historic period cultural resource is present.

The above-described examples notwithstanding, except for a single inundated site within the Monticello Shores RA, no known cultural resources have been documented in the RAs, and the RAs are not considered sensitive for cultural resources. If a proposal is made to develop in or around the location of the known, inundated site at the Monticello Shores RA, Reclamation may conclude the impacts to the site require evaluation and subsequent documentation under NEPA before reaching a decision whether to authorize them.

If a potential cultural resource is discovered during any construction activities, Reclamation and the concessionaire(s) will be required to follow specific protocols described in Mitigation Measures CULT-1 and CULT-2 (if necessary) to protect or minimize disturbance to the resource. If buried human remains are encountered during construction activities, Reclamation and its concessionaire(s) will be required to follow specific protocols to protect the remains, as described in Mitigation Measure CULT-3. All Native American human remains identified on lands owned by the federal government are subject to the Native American Graves Protection and Repatriation Act (43 CFR 10).

As under current conditions, recreational use of the RAs would be concentrated in disturbed areas where facilities are located. New trails and defined limits of recreation facilities (e.g., signs, fencing) would help discourage visitors from traveling across native landscapes. Reclamation would continue to manage cultural resources as it currently does to protect the resources.

Infrastructure Plan Impacts Construction activities associated with infrastructure installation at Putah Canyon, Monticello Shores, Berryessa Point, Spanish Flat, and Steele Canyon RAs would involve varying levels of ground disturbance, as described above for the conceptual site plan elements. No known cultural resources would be affected by implementing the infrastructure plans. Except for the single known, inundated cultural resource site at the Monticello Shores RA, the potential for disturbance to buried cultural resources would be similar across the RAs, and would be as described above for implementing the conceptual site plan elements. Reclamation and its concessionaire(s) will be required to implement Mitigation Measures CULT-1, CULT-2 (if necessary), and CULT-3 in the event of a discovery of cultural resources or human remains during infrastructure installation. No historic properties would be affected by the proposed action infrastructure plans.

Mitigation Measures

Reclamation will require its concessionaire(s) to comply with applicable laws and guidelines for the protection of cultural resources and human remains. The following mitigation measures would be implemented to address potential impacts on cultural resources and human remains discovered during ground-disturbing activities. Adverse effects on historic properties under Section 106 of the NHPA will be resolved through consultation between Reclamation and the State Historic Preservation Officer (SHPO).

Mitigation Measure CULT-1. Standard Contract Provisions for Inadvertent Cultural Resource Discovery Reclamation will require the concessionaire(s) or their contractors to implement precautionary measures during ground-disturbing activities in the unlikely event of the discovery of cultural resources. The concession contract specifications will provide direction on the appropriate response to a discovery and include requirements for the training of construction employees on cultural resources that could potentially be encountered in the areas of disturbance, requirements for stoppage of construction work in the area immediately surrounding any identified resource, and the notification of Reclamation's cultural resource specialists of the discovery. Reclamation will also exclude any ground disturbing activities in areas were archaeological sites have been identified. Reclamation will develop a resource-specific response reaction to minimize any damage to the resource and proceed with the evaluation of, consultation on, and possible treatment of the resource in accordance with 36 CFR 800.13, as described in Mitigation Measure CULT-2.

Mitigation Measure CULT-2. Identification, Evaluation, and Mitigation (Treatment) of Impacts on Historic Properties If cultural resources are discovered during ground-disturbing activities, Reclamation will evaluate the resources for inclusion in the National Register of Historic Places using criteria found at 36 CFR 800.4. If the cultural resources are determined to meet the criteria for historic properties, Reclamation will develop a memorandum of agreement or a programmatic agreement in consultation with the SHPO and consulting parties to avoid, minimize, and possibly mitigate impacts on the historic properties. The implementation of the agreement will reduce impacts on historic properties by requiring specific measures to avoid, document, and in certain instances relocate the historic properties as determined through consultation. Cultural resources that are determined not to be eligible for inclusion in the National Register require no further management.

Mitigation Measure CULT-3: Treatment of Impacts on Human Remains In the unlikely event that human remains are encountered, all activities in the vicinity of the discovery will cease immediately and a Reclamation official will be contacted immediately. The Reclamation official will ensure the appropriate officials are contacted, including contacting Reclamation's Regional Law Enforcement Officer. If the remains are skeletal, the Reclamation official will immediately notify Reclamation's Regional Archaeologist. Information regarding the discovery, including contents and location, will be kept confidential and relayed only to responsible officials. Human remains will be treated with respect, will not be disturbed, and must be protected as necessary to lessen further exposure or impacts. Photographs will not be taken, and no postings on social media are permitted. Ongoing activities in the vicinity of the discovery will not proceed until Reclamation provides authorization to proceed.

Reclamation will be responsible for identification of skeletal human remains as Native American. Inadvertent and unpermitted discoveries of Native American human remains and Native American funerary objects, sacred objects, and objects of cultural patrimony discovered on federal land are subject to the Native American Graves Protection and Repatriation Act (25 United States Code 3001 et seq.) and the implementing regulations at 43 CFR Part 10. Reclamation is responsible for compliance with this Act and for conducting tribal consultations. Under the Act, the discovery and location of human remains is confidential and will not be shared with anyone, especially the press or social media, who is not a designated official.

Geology and Soils

The geology and soils setting is based on previous environmental documentation for activities at Lake Berryessa and a review of applicable literature and studies of the area. Appendix G presents additional details on the soil types at each RA. The analysis discusses the potential for geologic and soil hazards to affect development and the anticipated level of disturbance to soils. Analysis of the increased health and safety risks that would result from development and operation of the RAs due to the occurrence of soils derived from ultramafic rocks is presented in the following section titled Public Health and Safety.

Affected Environment

Regional Setting

Lake Berryessa is in the Coast Ranges Geomorphic Province, which is bounded on the west by the Pacific Ocean and on the east by the Great Valley Geomorphic Province. The Coast Ranges are characterized by northwest-trending ranges and valleys that generally parallel the San Andreas Fault (California Geological Survey 2002). Lake Berryessa is in the Berryessa Valley, through which Putah Creek flowed before it was dammed by Monticello Dam to create the lake. Elevations range from 182 feet above msl at the base of Monticello Dam to about 1,500 feet above msl at the northern end of the lake. Surrounding mountains reach more than 4,000 feet above msl.

The geologic features in the Lake Berryessa region are predominantly made up of sandstone and shale of the Great Valley Complex (Graymer et al. 2002, 2007). Sandstone and shale features consist of gray shale with concretions and contain beds of massive sandstone or conglomerate. The Great Valley Complex geologic unit may contain fossils from the Early Cretaceous and Late Jurassic periods, such as fossils of marine fauna. Ultramafic rocks occur along the western shore of the lake (California Department of Conservation, 2000). These features contain sheared serpentinite matrix with blocks of pyroxenite, gabbro, basalt, and high-grade metamorphic rocks up to several kilometers in length.

The proximity of Lake Berryessa to the San Andreas Fault system and several active faults makes it a seismically active region. The fault nearest to the RAs is the Berryessa Fault, which generally follows the western shore of the lake (CDM Smith 2015). This fault is part of the larger Green Valley Fault and is considered active during the Holocene (within the past 10,000 years). The Lake Berryessa area has a moderate potential for ground shaking as a result of nearby seismic activity (California Geological Survey 2003). Structural damage from seismic activity has not been reported at any of the RAs (Reclamation 2005). In areas of steep slopes, the potential for seismically induced collapse is considered moderate across the RAs (CDM Smith 2015).

Soils around Lake Berryessa formed in material weathered from sandstone, shale, serpentine, or igneous rock, depending on the underlying geologic feature. The soils tend to be moderate to highly susceptible to erosion and occur on steep to very steep slopes. Most soils are well drained. The shoreline of Lake Berryessa is susceptible to erosion from natural wind and wave action and waves created by boaters. The steep slopes around Lake Berryessa also pose a moderate potential for landslides, which can result from combined slump-earthflows or very

rapid failures such as debris flows, mud flows, rock falls, and toppling. Incidents of subsidence or unstable soil conditions have not been reported at the RAs in the past (Reclamation 2005).

Local Setting

Putah Canyon RA The geologic units underlying Putah Canyon are Serpentinite-Matrix Mélange, Sobrante Sandstone (early Miocene), and Sandstone and Shale (Early Cretaceous and Late Jurassic) (Graymer et al. 2007). The Serpentinite-Matrix Mélange unit is a serpentine feature from the Coast Range Ophiolite. Sobrante Sandstone is a quartz sandstone from the Early Quaternary and Tertiary Strata. The Sandstone and Shale unit consists of mudstone, shale, sandstone, and conglomerate from the Great Valley Complex. The Berryessa Fault extends along the western border of the RA (CDM Smith 2015). Because of the proximity to the fault, the potential for hazards associated with ground rupture is considered moderate.

Soils include Bressa-Dibble complex (30 to 50 percent slopes), Henneke gravelly loam, Los Gatos loam (5 to 30 percent slopes), and Montara clay loam (5 to 30 percent slopes) (Lambert et al., 1978). The erosion hazard of these soils ranges from slight to high. Henneke and Montara soils formed in material weathered from serpentine. Dibble soils tend to have higher clay content, resulting in low strength and a risk of shrink-swell. Concerns with the other soils include steep slopes and depth to bedrock. All of the soils have relatively slow percolation. Most of the soils in the previously developed areas have been disturbed (estimated at about 40 percent of the total land area within the RA boundary), and native topsoil has been removed or graded. Outlying areas within the RA boundary still contain native soils. See Appendix G for additional details on the soil types.

Topography of the RA is fairly hilly with slopes ranging from 10 to about 45 percent. The elevation range is from 400 feet above msl at the lake to more than 600 feet above msl in the uplands.

Monticello Shores RA The geologic units underlying Monticello Shores are Sandstone and Shale (Early Cretaceous and Late Jurassic), Serpentinite-Matrix Mélange, and Mélange (Graymer et al. 2007). The Sandstone and Shale unit consists of pebbly grit stone with green shale chips and glauconite from the Great Valley Complex. The Serpentinite-Matrix Mélange unit is a serpentine feature from the Coast Range Ophiolite. Mélange is similar to Sandstone and Shale with quartz and calcite veins. The Berryessa Fault is within 1 mile of the western border of the RA (CDM Smith 2015). The potential for hazards associated with ground rupture due to the fault is considered low. The steep rock bluff at the RA poses a hazard associated with seismically induced collapse.

Soils include Montara clay loam (30 to 50 percent slopes), Los Gatos loam (5 to 50 percent slopes), and Henneke gravelly loam (Lambert et al., 1978). The erosion hazard of these soils ranges from slight to high. Henneke and Montara soils formed in material weathered from serpentine. Concerns with these soils include steep slopes and depth to bedrock. The soils have relatively slow percolation. Some of the soils in the previously developed areas have been disturbed (estimated at about 20 percent of the total land area within the RA boundary), and native topsoil has been removed or graded. Outlying areas within the RA boundary still contain native soils. See Appendix G for additional details on the soil types.

Topography of the RA is gently sloping away from the lake with slopes ranging from 0 to about 30 percent, with a small canyon sloping up to about 60 percent. The elevation range is from 400 feet above msl at the lake to about 600 feet above msl in the uplands.

Berryessa Point RA The geologic unit underlying Berryessa Point is Sandstone and Shale (Early Cretaceous and Late Jurassic) (Graymer et al. 2002, 2007). The Sandstone and Shale unit consists of pebbly gritstone with green shale chips and glauconite or mudstone, shale, sandstone, and conglomerate from the Great Valley Complex. The Berryessa Fault is within 1 mile of the western border of the RA (CDM Smith 2015). The potential for hazards associated with ground rupture due to the fault is considered low.

Soils include Montara clay loam (30 to 50 percent slopes) and Los Gatos loam (30 to 50 percent slopes) (Lambert et al., 1978). The erosion hazard of these soils ranges from moderate to high. Montara soils formed in material weathered from serpentine. Concerns with these soils include steep slopes and depth to bedrock. The soils have relatively slow percolation. Most of the soils in the previously developed areas have been disturbed (estimated at about 50 percent of the total land area within the RA boundary), and native topsoil has been removed or graded. Outlying areas within the RA boundary still contain native soils, particularly in the northern portion. See Appendix G for additional details on the soil types.

Topography of the RA is fairly flat and gently sloping away from the lake with slopes ranging from 0 to about 30 percent. The elevation range is from 400 feet above msl at the lake to about 440 feet above msl in the uplands.

Spanish Flat RA The geologic unit underlying Spanish Flat is Sandstone and Shale (Early Cretaceous and Late Jurassic) (Graymer et al. 2002). The Sandstone and Shale unit consists of pebbly gritstone with green shale chips and glauconite from the Great Valley Complex.

Soils include Bressa-Dibble complex (30 to 50 percent slopes) and Montara clay loam (30 to 50 percent slopes) (Lambert et al., 1978). The erosion hazard of these soils ranges from moderate to severe. Montara soils formed in material weathered from serpentine. Dibble soils tend to have higher clay content, resulting in low strength and a risk of shrink-swell. Concerns with the other soils include steep slopes and depth to bedrock. The soils have relatively slow percolation. Some of the soils in the previously developed areas have been disturbed (estimated at about 40 percent of the total land area within the RA boundary), and native topsoil has been removed or graded. Outlying areas within the RA boundary still contain native soils, particularly in the northern portion and on the peninsula. See Appendix G for additional details on the soil types.

Topography of the RA is hilly on the peninsula and gently sloping away from the lake on the west side with slopes ranging from 0 to about 45 percent. The elevation range is from 400 feet above msl at the lake to 550 feet above msl in the uplands on the west side and from 400 feet msl to a high of 630 feet above msl on the peninsula.

Steele Canyon RA The geologic unit underlying Steele Canyon is Sandstone and Shale (Early Cretaceous and Late Jurassic) (Graymer et al. 2002). The Sandstone and Shale unit consists of pebbly gritstone with green shale chips and glauconite from the Great Valley Complex.

Soils include Bressa-Dibble complex (15 to 50 percent slopes) (Lambert et al., 1978). The erosion hazard of the soil ranges from slight to severe. In portions of the RA, particularly on slopes that are steeper than 30%, the Bressa-Dibble complex may include small areas of Montara soils formed in material weathered from serpentine. Dibble soils tend to have higher clay content, resulting in low strength and a risk of shrink-swell. Concerns with Bressa soils include steep slopes and depth to bedrock. The soils have relatively slow percolation. Most of the soils in the previously developed areas have been disturbed (estimated at about 60 percent of the total land area within the RA boundary), and native topsoil has been removed or graded. Outlying areas within the RA boundary still contain native soils, particularly on the two peninsulas. See Appendix G for additional details on the soil types.

Topography of the RA is gently sloping away from the lake with slopes ranging from 0 to about 45 percent. The elevation range is from 400 feet above msl at the lake to 600 feet above msl in the uplands.

Environmental Consequences and Mitigation Measures

No-Action Alternative

Under the no-action alternative, no new facilities would be installed at the RAs without prior approval from Reclamation and further environmental review under NEPA. Installation of previously approved facilities would primarily take place in previously disturbed areas with minimal native soil disturbance. As it is under current conditions, routine maintenance and upkeep of interim facilities and use of the RAs would be limited to previously disturbed areas. No activities would take place that could exacerbate existing soil-related or geologic hazards (e.g., landslides, rockfall) or disturb buried fossils.

People and facilities at the RAs would continue to be exposed to geologic and soil hazards, such as ground shaking from earthquakes, steep slopes, and rockfalls, with a low to moderate potential for major hazards depending on location. Visitors would continue to be discouraged from using areas known to be susceptible to hazards. Interim facilities would have a low potential of sustaining damage from an earthquake or other hazard based on the lack of any reported structural damage at the RAs from such hazards in the past.

Proposed Action

Overall Development and Conceptual Site Plan Impacts Development of the RAs would involve varying levels of soil disturbance during periodic construction activities over the next 30 years. The amount and location of soil disturbance from construction activities would vary based on the type of facility being constructed and the site-specific designs for development at each RA. The general level of soil disturbance for proposed recreation facilities is presented below. Additional analysis will be necessary once specific details about the facilities, their locations, and construction activities are known.

- **Day Use Site:** Minimal ground disturbance would occur during barbeque and fire ring installation and picnic table placement.

- **Tent-Only or Tent/RV Campsite without Utilities:** Ground disturbance (more than for a day use site) would occur during installation of a tent pad and establishment of a parking spot.

- **Standard or Tent/RV Campsite with Utilities:** Ground disturbance (more than for a tent-only campsite) would occur during installation of underground utilities and hookups for RVs.

- **Lodging Units:** Ground disturbance (similar to the disturbance for a standard campsite) would occur, but over a larger area to accommodate a building.

- **Administrative or Retail Buildings:** Ground disturbance (similar to the disturbance for the lodging units) would occur.

- **Entry Stations:** Ground disturbance (similar to the disturbance for the lodging units) would occur, but likely over a smaller area.

- **Parking Areas and Roads:** Grading and cut/fill activities to level the areas for access and resurfacing to protect soils over long term would occur; most utilities would be installed under parking areas and roads, requiring trenching.

- **Trails:** Minor ground disturbance would occur during establishment of dirt roads or resurfacing of paths along a narrow trail corridor.

Construction activities associated with establishing new campsites and day use sites, installing lodging units and other buildings, and constructing supporting facilities would temporarily expose bare soil to wind and water erosion and could increase the potential for localized landslides or other soil hazards if they occur on steep slopes or near the shoreline. These effects can have indirect consequences on the environment from windblown dust or increased sediment in the lake or streams.

Compliance with a SWPPP and implementation of BMPs during all ground-disturbing activities, as described in Chapter 2, would reduce the potential for erosion and indirect impacts on air or water quality at each RA. Native topsoil may be affected by construction activities in previously undisturbed areas, but most activities would take place in previously disturbed areas, preserving the native topsoil. A site restoration and landscaping plan, as described in Chapter 2, would help restore disturbed areas and stabilize exposed soils after construction activities. Adherence to geotechnical recommendations (CDM Smith 2015), as noted in Chapter 2, would also help protect soils, stabilize slopes, and ensure that proper backfill is used for fills and foundations. In addition, resurfacing of parking areas and roads would help stabilize soils and protect them from erosion over the long term.

Excavation activities in native soils, such as for utility installation, could expose or damage buried fossils, but the potential for a discovery is considered low due to the lack of past discoveries and extent of ground disturbance already present at the RAs. If a potential fossil is discovered during any construction activities, Reclamation will comply with applicable laws and

guidelines for protecting paleontological resources (e.g., the Paleontological Resources Protection Act).

Lodging units and other buildings at the RAs may be constructed on unstable soils that could result in damage over the long term (e.g., from shrink-swell in soils with high clay content). To ensure facilities do not sustain damage and are located on suitable soils, Mitigation Measure GEO-1 will be implemented when preparing site-specific designs for buildings.

The increased use of the RAs would result in soil disturbance over the long term, but this ongoing impact would result in conditions similar to current conditions and would be concentrated in disturbed areas where facilities are located. With increased use and development, the number of visitors and structures that could be exposed to geologic or soil hazards would also increase, but the potential for hazards would continue to be low to moderate, as it is under current conditions. Facility designs would comply with applicable California Building Code requirements for the region and Reclamation's *Recreation Facility Design Guidelines*. The increased use of the lake by boaters would also increase the potential for wave action to accelerate shoreline erosion. Reclamation would ensure compliance with State law, which requires boaters to maintain speeds of less than 5 mph within 200 feet of boat docks, launch ramps, and marinas.

Infrastructure Plan Impacts Construction activities associated with infrastructure installation at Putah Canyon, Monticello Shores, Berryessa Point, Spanish Flat, and Steele Canyon RAs would involve varying levels of soil disturbance, as described above for the conceptual site plan elements. A discussion of construction-related soil impacts at the four RAs is presented below. Soil-related impacts would be localized at each RA, although greater indirect impacts, such as on water quality, could result from multiple activities being conducted at one time across the RAs. As described in Chapter 2, standard construction practices and BMPs would be implemented during all construction activities to minimize soil erosion and properly stabilize soils during and after construction.

Putah Canyon RA The infrastructure plan for Putah Canyon RA would involve the installation of new water and wastewater pipelines, construction of a wastewater treatment facility and supporting facilities, establishment of stormwater control areas, installation of electrical lines and transformers, and establishment of parking areas and roads. Construction of these facilities would result in soil disturbance and varying levels of cuts and fills on approximately 3.7 acres of the RA.

Most of the infrastructure would be installed in previously disturbed areas, such as under existing roads or parking areas and at current or previously used recreation sites. Installation of underground infrastructure would involve soil excavation in trenches at depths up to about 4 feet and widths up to about 10 feet. Most aboveground infrastructure in previously disturbed areas would require minimal soil disturbance to establish a level area for the facility. Road widening would disturb soils and could involve extensive cuts and backsloping to ensure that the road meets current standards. Infrastructure installation and road establishment in the northernmost portion of the RA could disturb soils mapped as Montara clay loam, which are more sensitive to disturbance and could contain naturally occurring asbestos (see Public Health and Safety section).

Construction of the wastewater treatment facility at Putah Canyon RA, particularly the treatment ponds and associated access road, would require soil excavation to establish the proper depth for the effluent treatment and disposal. These types of soil disturbance could facilitate soil erosion and cause indirect impacts on water quality of streams or Lake Berryessa if sediment is carried in runoff from the work area. With implementation of standard construction practices and BMPs described in Chapter 2, mitigation measures were not determined to be necessary for construction-related impacts on soil.

Monticello Shores RA As shown in Appendix C, Figure C-2, infrastructure plan elements at Monticello Shores RA are limited to installation of a single access road close gate, located near the southern boundary of the RA, immediately north of the intersection of the two-way circulation road (a conceptual plan element) and Berryessa Knoxville Road. With incorporation of the environmental commitments and standard construction practices set forth in Chapter 2 for the proposed action, and Mitigation Measures Mitigation GEO-1, implementing infrastructure plan elements at Monticello Shores RA will not have a significant impact on geology and soils.

Berryessa Point RA The infrastructure plan for Berryessa Point RA would involve the establishment of stormwater control areas, installation of electrical lines and transformers, and establishment of parking areas and roads. Construction of these facilities would result in soil disturbance and varying levels of cuts and fills on approximately 5.1 acres of the RA. All of the infrastructure would be installed in previously disturbed areas. Road widening would disturb soils and could involve extensive cuts and backsloping to ensure that the road meets current standards. No underground infrastructure is proposed to support the required recreation facilities. None of the infrastructure proposed at Berryessa Point RA would affect the Montara series soil (a serpentine soil) mapped in the northern portion of the RA. Most of the excavation would be required for the stormwater control areas. With implementation of standard construction practices and BMPs described in Chapter 2, mitigation measures were not determined to be necessary for construction-related impacts on soil.

Spanish Flat RA The infrastructure plan for Spanish Flat RA would involve the installation of new water pipelines, possible improvements to an existing storage tank, establishment of stormwater control areas, installation of electrical lines and transformers, and establishment of parking areas and roads. Construction of these facilities would result in soil disturbance and varying levels of cuts and fills on approximately 1.5 acres of the RA.

Most of the infrastructure would be installed in previously disturbed areas, such as under existing roads or parking areas and at current or previously used recreation sites. In steep areas, such as on the peninsula at Spanish Flat RA, extensive cuts are anticipated to create suitable level areas for the infrastructure. Installation of underground infrastructure would involve soil excavation in trenches at depths up to about 4 feet and widths up to about 10 feet.

Most of the aboveground infrastructure in previously disturbed areas would require minimal soil disturbance to establish a level area for the facility. Road widening would disturb soils and could involve extensive cuts and backsloping to ensure that the road meets current standards. Improvements to the access road just off Berryessa Knoxville Road could disturb soils mapped as Montara clay loam, which are more sensitive to disturbance and could contain naturally occurring asbestos (see Public Health and Safety section and Mitigation Measure HEALTH-2).

These types of soil disturbance could facilitate soil erosion and cause indirect impacts on water quality of streams or Lake Berryessa if sediment is carried in runoff from the work area. With implementation of standard construction practices and BMPs described in Chapter 2, mitigation measures were not determined to be necessary for construction-related impacts on soil.

Steele Canyon RA The infrastructure plan for Steele Canyon RA would involve the installation of new water and wastewater pipelines, possible installation of a storage tank, establishment of stormwater control areas, installation of electrical lines and transformers, and establishment of parking areas and roads. Construction of these facilities would result in soil disturbance and varying levels of cuts and fills on approximately 3 acres of the RA.

Most of the infrastructure would be installed in previously disturbed areas, such as under existing roads or parking areas and at current or previously used recreation sites. In steep areas, such as on the peninsula in the northern portion of the RA, extensive cuts are anticipated to create suitable level areas for the infrastructure. Installation of underground infrastructure would involve soil excavation in trenches at depths up to about 4 feet and widths up to about 10 feet.

Most of the aboveground infrastructure in previously disturbed areas would require minimal soil disturbance to establish a level area for the facility. Road widening would disturb soils and could involve extensive cuts and backsloping to ensure that the road meets current standards. These types of soil disturbance could facilitate soil erosion and cause indirect impacts on water quality of streams or Lake Berryessa if sediment is carried in runoff from the work area. With implementation of standard construction practices and BMPs described in Chapter 2, mitigation measures were not determined to be necessary for construction-related impacts on soil.

Minimal soil disturbance is anticipated after the infrastructure is in place. Pipelines and other facilities would require periodic maintenance, which could involve ground-disturbing activities similar to the construction activities. Standard construction practices to minimize soil erosion would be implemented during these activities. Paving or surfacing roads and parking areas would reduce the potential for soil erosion over the long term by stabilizing the soils. Mitigation measures were not determined to be necessary for operation-related soil impacts associated with the infrastructure plans.

Mitigation Measures

Reclamation will require its concessionaire(s) to comply with applicable laws and guidelines for facility design in seismically active regions and with applicable laws for discovery of paleontological resources. During construction activities, any contractor(s) will be required to implement standard BMPs and comply with a site-specific SWPPP. Following construction activities, the concessionaire(s) will be required to implement a site restoration and landscaping plan. The following mitigation measures would also be implemented to address potential impacts associated with soil hazards and shoreline erosion.

Mitigation Measure GEO-1. Soil Hazard Design and Siting Considerations Prior to approving proposals from concessionaires for implementing ground disturbing activities, including ground disturbing activities for infrastructure and conceptual plan elements described in this EA, Reclamation will determine whether evaluations of site-specific soil and geologic conditions and/or geotechnical testing are necessary to confirm suitability of the soils, landscape

stability, and underlying geology to support the proposed construction. Examples of areas and activities that may require evaluation and testing include areas where lodging units, other buildings, or wastewater systems (e.g., spray field, septic tank) are proposed. This testing will be conducted by the concessionaire, and the concessionaire will submit the results for review by Reclamation before or at the time the concessionaire submits site-specific designs for Reclamation's approval. Results of the testing will be incorporated into the facility designs, as appropriate. If soils with potential for shrink-swell or other unstable geologic conditions are identified, the facility will be designed with consideration for these conditions or relocated to a suitable location. Wastewater systems will be designed and located in soils suitable for these types of facilities to ensure proper infiltration and stability.

Land Use

The land use setting is based on land use plans for the Lake Berryessa area and a review of applicable literature and studies of the area. The analysis discusses the potential for land use conflicts to result from development of the RAs.

Affected Environment

Regional Setting

Lake Berryessa is in a predominately rural, natural open space area surrounded by mountains. Land uses around the lake include agriculture (grazing), recreation, residential, open space, and some commercial uses. A predominant use of undeveloped private lands around the lake is grazing, and some federal lands outside the RA boundaries are used for grazing under agreements with Reclamation. The Lake Berryessa Wildlife Area encompasses 2,000 acres of federal land on the east side of the lake and is currently managed by the Blue Ridge Berryessa Partnership under an agreement with Reclamation. Reclamation and the Partnership are developing a new management plan for the area. Several small residential communities are situated around the southern and western sides of the lake along Berryessa Knoxville Road and State Route (SR) 128; these communities are discussed in more detail under the Socioeconomics section. Limited commercial uses are provided near the intersection of SR 128 and SR 121 and at some of the residential communities.

Federal lands around Lake Berryessa total approximately 28,916 acres, including 19,250 acres of open water and 9,666 acres of the lakeshore and adjacent upland areas. Reclamation manages and operates the lake in coordination with other federal, state, and county agencies and private entities. The Lake Berryessa RAMP and VSP provide management direction for Reclamation lands. The Napa County General Plan guides development and management of private lands around the lake. The Berryessa Snow Mountain National Monument, created in July 2015, comprises 330,780 acres of public lands administered by the U.S. Forest Service and the Bureau of Land Management, extending from the Cedar Roughs Wilderness west of Lake Berryessa, to the north approximately 100 miles.

The RAMP designated five land use classifications at Lake Berryessa to balance the different types of uses and levels of development (Reclamation 1992):

- **Class I - High-Density RAs** are intensely developed and managed areas intended for mass public use, such as resorts with restaurants, marinas, launch ramps, RV hookups, paved parking and roadways, moorage, mobile home parks, campgrounds, restrooms, and day use and maintenance areas.

- **Class II - General Outdoor RAs** are substantially developed areas intended for specific recreational uses, such as camping, picnicking, boat launching, developed parking, paved roads, launch ramps, restrooms, showers, designated campsites, and (potable) water, but of lower density than Class I.

- **Class III - Dispersed RAs** are minimally developed areas intended for less intensive use with no major improvements. These areas may include road access, minimal sanitation facilities, road pullouts, and trails.

- **Class IV - Semi-Primitive Areas** are undeveloped natural areas with limited or constrained access intended for limited recreational use. These areas may contain minimal improvements, such as fencing, trails, and low density boat-in camping.

- **Class V - Restricted and Easement Areas** are areas that have restricted recreation potential due to their use for project administration and operation or where flood easements are involved.

Additional details on the policies and management objectives of Lake Berryessa are available in the VSP EIS (Reclamation 2005) and RAMP EIS (Reclamation 1992).

Local Setting

All of the RA sites are classified as High-Density RAs (Class I) (Figure 3-1). Recreation is currently the primary use of the RAs. Portions of the sites were developed in the past with mobile home and trailer parks and commercial uses typical of a rural community.

Land use issues associated with the former development included traffic, congestion, competition for services, conflicts with management plan objectives and allowed uses, and concerns with compatibility of the development with nearby recreational uses. With the removal of the facilities associated with the former development, land use conflicts have been reduced or eliminated, and interim, short-term use recreation facilities have replaced the former development at some RAs. During high-use periods, such as holiday weekends in the summer, congestion and traffic can still be an issue at the RAs that are open, although the intensity of uses and visitation is currently less than it was with the former development.

Putah Canyon RA Current uses at Putah Canyon RA include interim recreation facilities that provide overnight and day use opportunities. Passive and active recreational opportunities are available at the RA, as discussed in more detail in the Recreation section.

Nearby lands are primarily open space with several trails and day use areas in the vicinity. Camp Berryessa, a former Boy Scout camp that is being developed with recreation facilities, is 0.5 mile northwest of Putah Canyon RA on a small peninsula in the Putah Creek arm of the lake. The North End Trail, a part of the regional Lake Berryessa Trail, begins 0.25 mile north of the RA

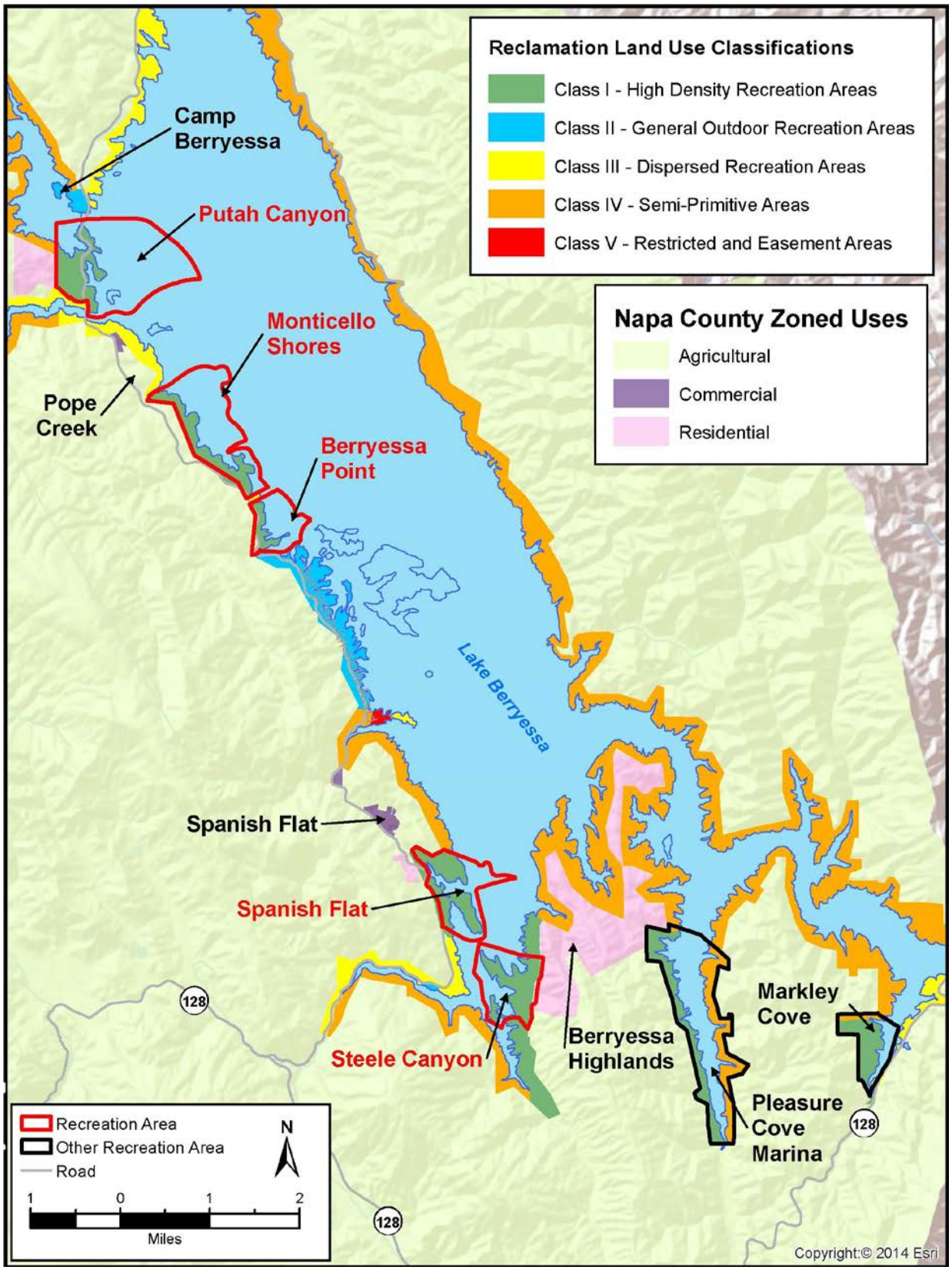

Figure 3-1. Land Use Classifications at Lake Berryessa

across the Putah Creek Bridge. Private land adjacent to the western boundary of the RA is zoned for rural residential uses as part of the Pope Creek community, which extends south from the RA along the shore of Lake Berryessa (Napa County 2013). No residential development currently exists on the adjacent lands.

Monticello Shores RA Monticello Shores RA is not currently open to the public and does not contain any recreation facilities. Nearby lands are a mixture of open space and residential uses with rural residential development less than 0.25 mile north in the Berryessa Pines community. A small commercial development is in that community along Berryessa Knoxville Road. Land in the vicinity is zoned for commercial, residential, open space, or agricultural uses, and some of the land is used for grazing.

Berryessa Point RA Berryessa Point RA is not currently open to the public and does not contain any recreation facilities. Nearby lands are primarily open space with some recreational uses to the south. No residential or commercial development exists near this RA. The Smittle Creek and Oak Shores day use areas, managed by Reclamation, are 0.4 and 1.4 miles, respectively, to the south of the RA along the shore of Lake Berryessa, and Reclamation's Lake Berryessa office is approximately 2 miles south. Land in the vicinity is zoned for open space or agricultural uses, and some of the land is used for grazing.

Spanish Flat RA Current uses at Spanish Flat RA include interim recreation facilities that provide overnight and day use opportunities. Passive and active recreational opportunities are available at the RA, as discussed in more detail in the Recreation section.

Nearby lands are a mixture of open space and rural residential with the community of Spanish Flat less than 0.5 mile northwest of the RA (Napa County 2013). Private land to the northwest is zoned for residential and commercial development and is currently developed with single-family homes, a mobile home park, and some commercial uses. Land to the west and southwest is primarily open space, and segments of the regional Lake Berryessa Trail are in the vicinity.

Steele Canyon RA Current uses at Steele Canyon RA include interim recreation facilities that provide overnight and day use opportunities. Passive and active recreational opportunities are available at the RA, as discussed in more detail under Recreation.

Nearby lands are a mixture of open space and rural residential development with the community of Berryessa Highlands less than 0.25 mile northeast of the RA (Napa County 2013). Private land to the northeast is zoned for residential development, although only a portion of the land is currently developed with single-family homes. Land to the south and west of the RA is primarily open space, and segments of the regional Lake Berryessa Trail are in the vicinity.

Environmental Consequences and Mitigation Measures

No-Action Alternative

Under the no-action alternative, no new facilities would be installed at the RAs without prior approval from Reclamation and further environmental review under NEPA. The interim recreation facilities at each of the RAs would continue to be available. The current uses at the RAs provide limited recreational opportunities, and they do not meet the management intent of Class I High-Density RAs. Reclamation has intended for the RAs to be developed with a variety

of recreation facilities to sustain mass public use. The interim facilities sustain low visitor numbers and do not provide the diverse opportunities anticipated in the VSP or RAMP ROD. This alternative would conflict with the RAMP and VSP RODs.

Proposed Action

Overall Development and Conceptual Site Plan Impacts The proposed action includes development of new short-term use facilities at the five Lake Berryessa RAs; these facilities would provide diverse recreational opportunities consistent with Reclamation policies and management direction. The level of development at the RAs would be compatible with the uses allowed and anticipated in Class I High-Density RAs, and the proposed action would be consistent with the RAMP and VSP RODs. Construction activities associated with the development of the RAs could result in temporary impacts on existing land uses, as summarized below.

- **Air Quality:** Construction activities would increase air emissions in the vicinity of the work area and could temporarily expose residents outside the RAs and recreationists at the RAs to elevated air pollutants.

- **Noise:** Construction activities would increase noise levels in the vicinity of the work area and could expose residents outside the RAs and recreationists at the RAs to periodic high noise levels.

- **Traffic and Circulation:** Minor impacts on local traffic would be expected during construction activities.

- **Parking:** Construction staging could cause reductions in available visitor parking in certain areas.

- **Visual Resources:** Construction-related activities, such as grading, trenching, and equipment staging, could result in degraded views near the work areas, particularly in previously undisturbed areas.

- **Recreation:** Construction activities could conflict with recreational activities and reduce the quality of visitor experience, particularly if they occur during peak visitation periods.

Table 3-12 identifies the potential land use conflicts that could be created by development of the RAs. Reclamation anticipates developing the RAs over the next 30 years with a schedule that would stagger construction activities and increases in visitation. Increased visitation at individual RAs could result in periodic conflicts with nearby land uses as a result of more intensive recreational uses expected at all of the RAs at full build-out. Because of the nature of the recreation developments, any land use conflicts resulting from increased traffic, noise, air emissions, and other effects would be most noticeable during the peak visitor season, particularly on weekends and holidays in the summer. These uses could affect local residents in the area, particularly near Spanish Flat and Steele Canyon RAs. All development would be restricted to the RA boundaries, and no land conversions or changes to uses outside the RAs, such as grazing activities, are anticipated.

Table 3-12. Potential Development-Related Land Use Conflicts

Recreation Area	Development Uses	Potential Conflicts
Putah Canyon	Lodging units, tent and RV campsites, marina, boat dock, launch ramp, day use areas, restaurant, store	Increased boat use, increased traffic to RA along Berryessa Knoxville Road, minor noise, air quality, and visual impacts on existing environment, no conflicts with surrounding uses
Monticello Shores	Lodging units, tent and RV campsites, boat dock, launch ramp, day use areas, restaurant, store	Minor increase in boat use, minor traffic increase to RA along Berryessa Knoxville Road, potential conflicts with Berryessa Pines development
Berryessa Point	Tent and RV campsites, boat dock, launch ramp, day use areas, restaurant, store	Minor increased boat use, minor traffic increase to RA along Berryessa Knoxville Road, no conflicts with surrounding uses
Spanish Flat	Lodging units, tent and RV campsites, marina, boat dock, launch ramp, day use areas, restaurant, store	Minor increased boat use; increased traffic to RA along Berryessa Knoxville Road; potential conflicts with Spanish Flat development from traffic, noise, air quality, and similar
Steele Canyon	Lodging units, tent and RV campsites, marina, boat dock, launch ramp, day use areas, restaurant, store	Increased boat use; increased traffic to RA along Steele Canyon Road; potential conflicts with Berryessa Highlands development from traffic, noise, air quality, and similar

The past uses of the area, while different from the planned future uses of the RAs, suggest that land use conflicts around the lake would not be considered substantial, although localized adverse impacts may occur, as discussed in other sections. Typical indirect use effects (e.g., traffic, congestion, noise) have occurred in the past when the RAs were developed with residential, commercial, and recreational facilities, and the intensity of these expected uses would be comparable to past uses.

Infrastructure Plan Impacts The proposed infrastructure would support the recreation facilities at the RAs and would have minimal construction-related impacts on land uses at or near the RAs, as discussed in other sections of this chapter.

Construction activities scheduled during peak visitation periods at open RAs could generate conflicts with visitors using nearby recreation facilities. Berryessa Point RA is not currently open and may remain closed until after the infrastructure is installed and recreation facilities are developed. To avoid or minimize potential disturbance to visitors, mitigation measures described for other resource topics (e.g., air quality, noise) would be implemented. In addition, construction zones would be properly marked and barricaded to discourage visitors from recreating near them. Given the relatively small footprint of the infrastructure plans at the RAs, visitors would be able to recreate away from the work areas to avoid disruptions to their recreational activities.

Operation-related land use conflicts would also be minimal because once the infrastructure is in place, minimal maintenance is expected. Operation of the wastewater treatment facility at Putah Canyon RA could generate odors that affect visitor experience, and other wastewater facilities (e.g., RV dump stations, septic tanks) could periodically generate odors that are noticeable to visitors. The location of the aboveground wastewater facilities and periodic cleaning of underground wastewater facilities would ensure that minimal conflicts with visitors at nearby recreation facilities would occur. Mitigation measures were not determined to be necessary for operation-related land use impacts associated with the infrastructure plans.

Mitigation Measures

No mitigation measures specific to land use were identified, but measures identified in other sections of this chapter (e.g., air, noise) would minimize potential land use conflicts during construction activities. In addition, the phasing of the developments at each RA in response to visitor and market demand would help alleviate use-related conflicts over the long term, and the distribution of facilities and uses across the RAs would disperse activities around the lake and minimize localized use-related effects.

Noise

The noise setting is based on previous environmental documentation, noise measurements conducted for activities at each of the RAs, and a review of applicable literature and studies of the area. The analysis discusses the potential for noise levels to increase at each RA and how increased noise levels may affect sensitive receptors.

Affected Environment

Regional Setting

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A-weighted sound level containing the same total energy as a time-varying signal over a given time period (usually 1 hour). The L_{eq} is the foundation of the composite noise descriptor, L_{dn} (the day/night average level), and shows very good correlation with community response to noise.

The L_{dn} is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

Table 3-13 lists several examples of the noise levels associated with common situations.

Table 3-13. Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock Band
Jet Fly-over at 1,000 feet	100	
Gas Lawn Mower at 3 feet	90	
Diesel Truck at 50 feet and at 50 mph	80	Food Blender at 3 feet Garbage Disposal at 3 feet

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Noisy Urban Area, Daytime Gas Lawn Mower, 100 feet	70	Vacuum Cleaner at 10 feet
Commercial Area Heavy Traffic at 300 feet	60	Normal Speech at 3 feet
Quiet Urban Daytime	50	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	30	Library
Quiet Rural Nighttime	20	Bedroom at Night, Concert Hall (Background)
	10	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

Source: California Department of Transportation 2009
Notes: dBA = A-weighted decibel, mph = miles per hour

Lake Berryessa is in a remote rural setting with relatively low existing noise levels. Higher-use recreational areas along the western shore generate the most noise, particularly during peak visitation periods in the summer (May through September) and on holiday weekends. Under previous operations, the most intense noise occurred at the RAs on the western and southern shores during summer daylight hours (9:00 a.m. to 4:00 p.m.) due to the concentrated operation of motorized watercraft (i.e., motorboats and personal watercraft) in and around the marinas (Reclamation 2005). Other sources of noise in the area include traffic noise from vehicles along Berryessa Knoxville Road, SR 128, and local roads and typical noise associated with small residential communities.

Sensitive receptors at Lake Berryessa include recreationists at the RAs and other recreation facilities around the lake and residents in nearby residential areas. The sensitivity of recreationists to high noise levels varies based on their activities, with overnight users and wildlife or nature observers being more sensitive to noise than other recreationists. Residents are present year round and are also most sensitive to high noise levels during the evening and nighttime hours. Because the peak recreation season occurs in the summer, the highest noise levels occur in summer, and the greatest number of sensitive receptors are present in summer.

Local Setting

Putah Canyon RA The primary noise sources at the Putah Canyon RA are associated with the boat ramp activities; boats and personal watercraft on the lake; people talking; and music coming from boats, campgrounds, and vehicles in the parking areas. Roadway traffic on Berryessa Knoxville Road is also a noise source. Noise level measurements were conducted during the Labor Day weekend of 2011 at the edge of the boat ramp at the Putah Canyon RA (j.c. brennan & associates, Inc. 2011). Table 3-14 lists the noise measurement results. Existing noise levels can be characterized as moderate to low in amplitude.

Table 3-14. Noise Level Measurements at Putah Canyon RA

Date	Time	L_{eq}, dBA	L_{max}, dBA	Primary Noise Sources
9/4/2011	4:12 p.m.	56.0	64.7	Boats idling, swimmers, music

Source: j.c. brennan & associates, Inc. 2011
Notes: L_{eq} = average, or equivalent, sound level; dBA = A-weighted decibel; L_{max} = maximum sound level during a single noise event

Noise-sensitive land uses at the RA are considered to be the on-site recreationists. Off-site noise-sensitive land uses include recreationists on the lake and recreationists using nearby recreation facilities. No residences are adjacent to the RA; however, some land adjacent to the western boundary of the RA is zoned for rural residential and is part of the Pope Creek community.

Monticello Shores RA Monticello Shores RA is currently closed. The primary noise sources at Monticello Shores RA are associated with the distant boats and personal watercraft on the lake and roadway traffic on Berryessa Knoxville Road. Noise level measurements were conducted during the Labor Day weekend of 2011 at Monticello Shores RA (j.c. brennan & associates, Inc. 2011). Table 3-15 lists the noise measurement results. Existing noise levels can be characterized as moderate to low in amplitude.

Table 3-15. Noise Level Measurements at Monticello Shores RA

Date	Time	L_{eq}, dBA	L_{max}, dBA	Primary Noise Sources
9/4/2011	5:01 p.m.	45.9	55.0	Distant boats, personal watercraft (45–50 dB), auto traffic

Source: j.c. brennan & associates, Inc. 2011
Notes: L_{eq} = average, or equivalent, sound level; dBA = A-weighted decibel; L_{max} = maximum sound level during a single noise event

Noise-sensitive land uses at the RA are considered to be the on-site recreationists. Off-site noise-sensitive land uses include recreationists on the lake and recreationists using nearby recreation facilities. A rural residential development exists north of the RA, in the Berryessa Pines community. As described in the Land Use section, land in the vicinity of the RA is zoned for residential uses.

Berryessa Point RA Berryessa Point RA is currently closed. The primary noise sources at Berryessa Point RA are associated with distant boats and personal watercraft on the lake and roadway traffic on Berryessa Knoxville Road. Noise level measurements were conducted during the Labor Day weekend of 2011 at Berryessa Point RA (j.c. brennan & associates, Inc. 2011). Table 3-16 lists the noise measurement results. Existing noise levels can be characterized as moderate to low in amplitude.

Table 3-16. Noise Level Measurements at Berryessa Point RA

Date	Time	L_{eq}, dBA	L_{max}, dBA	Primary Noise Sources
9/4/2011	5:11 p.m.	44.4	52.8	Distant boats, auto traffic

Source: j.c. brennan & associates, Inc. 2011
Notes: L_{eq} = average, or equivalent, sound level; dBA = A-weighted decibel; L_{max} = maximum sound level during a single noise event

Noise-sensitive land uses at the RA are considered to be the on-site recreationists. Off-site noise-sensitive land uses include recreationists on the lake and recreationists using nearby recreation facilities. No residences are near the RA.

Spanish Flat RA The primary noise sources at Spanish Flat RA are associated with distant boats and personal watercraft on the lake; people talking; and music coming from boats, campgrounds, and vehicles in the parking areas. Roadway traffic on Berryessa Knoxville Road is also a noise source. Noise level measurements were conducted during the Labor Day weekend of 2011 at Spanish Flat RA (j.c. brennan & associates, Inc. 2011). Table 3-17 lists the noise measurement results. Existing noise levels can be characterized as moderate to low in amplitude.

Table 3-17. Noise Level Measurements at Spanish Flat RA

Date	Time	L_{eq}, dBA	L_{max}, dBA	Primary Noise Sources
9/4/2011	4:29 p.m.	51.7	61.9	Distant boats, personal watercraft, waves breaking

Source: j.c. brennan & associates, Inc. 2011
Notes: L_{eq} = average, or equivalent, sound level; dBA = A-weighted decibel; L_{max} = maximum sound level during a single noise event

Noise-sensitive land uses at the RA are considered to be the on-site recreationists. Noise-sensitive land uses include single-family residences and a mobile home park in the community of Spanish Flat, northwest of the RA.

Steele Canyon RA The primary noise sources at Steele Canyon RA are associated with the boat launch ramp; boats revving at the boat launch; distant boats and personal watercraft on the lake; people talking; and music coming from boats, campgrounds, and vehicles in the parking areas. Roadway traffic on Steele Canyon Road is also a noise source. Noise level measurements were conducted during the Labor Day weekend of 2011 at Steele Canyon RA (j.c. brennan & associates, Inc. 2011). Table 3-18 lists the noise measurement results. Existing noise levels can be characterized as moderate to high in amplitude.

Table 3-18. Noise Level Measurements at Steele Canyon RA

Date	Time	L_{eq}, dBA	L_{max}, dBA	Primary Noise Sources
9/4/2011	3:31 p.m.	63.4	75.4	Boats idling, boats revving at the launch, talking, music

Source: j.c. brennan & associates, Inc. 2011
Notes: L_{eq} = average, or equivalent, sound level; dBA = A-weighted decibel; L_{max} = maximum sound level during a single noise event

Noise-sensitive land uses at the RA are considered to be the on-site recreationists. Off-site noise-sensitive land uses include rural residences in the community of Berryessa Highlands to the northeast. As described in the Land Use section, other land further northeast of the RA is zoned for residential.

Environmental Consequences and Mitigation Measures

No-Action Alternative

Under the no-action alternative, no new facilities would be installed at the RAs without prior approval from Reclamation and further environmental review under NEPA. Installation of previously approved facilities would generate temporary noise in the immediate vicinity of the work area. Few sensitive receptors would be affected. Noise would also be generated primarily by visitors to the area, cars and boats in the vicinity, and periodic maintenance activities. Noise levels would be similar to current noise levels at the RAs with fluctuations throughout the day depending on the noise source and proximity of the source to noise receptors (e.g., recreationists, residences).

Proposed Action

Overall Development and Conceptual Site Plan Impacts Noise impacts associated with new recreation facilities developed at the RAs can be divided into two categories: construction-related noise and operation-related noise. Construction noise would be the primary contributor to short-term and overall noise impacts from the proposed development. Any adverse reaction to increased noise levels is expected to be minimal, but would depend on the time of day, duration, and overall noise amplitudes of the construction activities. Increased roadway traffic, watercraft operations, boat ramp activities, and general recreation activities would contribute to the overall noise environment, but noise levels would be similar to historic noise levels when all the RAs were open to the public.

Construction noise would be concentrated primarily in and around the RAs, although some construction equipment on the local roadways may increase overall traffic noise levels. Construction activities can result in annoyance, particularly during nighttime hours, if they take place near residences or other overnight use areas (e.g., campsites, lodging units). Existing residences are within 0.25 mile of some of the RAs, and future residential uses may be closer to the RAs. Construction activities will be scheduled during the daytime hours (7 a.m. to 7 p.m.) when higher noise levels are more acceptable, unless nighttime construction is specifically authorized by Reclamation. In addition, most construction activities will be scheduled during the fall, winter, and spring, when fewer recreationists are present at the RAs, so that few people are affected by construction-related noise. Noise levels during these seasons would likely be lower

than during the peak visitation season, and construction-related noise would be more noticeable. If any construction activities are scheduled during the peak visitation season, more people would likely be affected, but noise levels would also be higher during these periods and increased noise from construction activities would blend in, to some degree, with the recreation-related noise. Nighttime construction is not expected; however, if it is determined to be necessary, construction activities near overnight users could disrupt sleeping patterns and cause annoyance.

Construction activities associated with the RAs would be similar in scale to typical roadway maintenance and construction projects implemented by Napa County. Construction noise could result in maximum noise levels ranging from 75 to 90 dB at a distance of 50 feet, depending on the type of equipment being used (Table 3-19). Construction-related noise in residential areas should be limited to 75 dBA (A-weighted decibels) during daytime hours and 60 dBA during nighttime hours in accordance with the Napa County Noise Ordinance. These noise limits would apply at Monticello Shores, Steele Canyon, and Spanish Flat RAs, where construction activities would be near residential areas and may be considered applicable near overnight uses at the RAs. With development at the RAs being phased, increased construction noise would be periodic over the 30-year development period. Because some construction activities could exceed acceptable noise levels, Reclamation or its concessionaire(s) would be required to implement noise reduction measures during construction, as described in Mitigation Measure NOISE-1.

Table 3-19. Typical Construction Equipment Maximum Noise Levels

Type of Equipment	Predicted Noise Level, L_{max}, dB 50 feet	Predicted Noise Level, L_{max}, dB 100 feet	Predicted Noise Level, L_{max}, dB 200 feet	Predicted Noise Level, L_{max}, dB 400 feet
Backhoe	78	72	66	60
Compactor	83	77	71	65
Compressor (air)	78	72	66	60
Concrete Saw	90	84	78	72
Dozer	82	76	70	64
Dump Truck	76	70	64	58
Excavator	81	75	69	63
Paver	85	79	73	67
Generator	81	75	69	63
Jackhammer	89	83	77	71
Pneumatic Tools	85	79	73	67

Source: Federal Highway Administration 2006
Notes: L_{max} = maximum sound level during a measurement period; dB = decibel

As the RAs are developed, operation-related activities would increase noise levels to varying degrees, depending on the activity. Increased noise could affect recreationists at the RAs and

off-site recreationists or residents. The EPA (1974) identifies a 24-hour exposure level of 70 dBA as the level of environmental noise below which any measurable hearing loss over a lifetime could be prevented. The EPA also indicates that maintaining levels of 55 dBA outdoors and 45 dBA indoors can prevent activity interference and annoyance. These levels of noise allow spoken conversation and other daily human activities, such as sleeping, working, and recreation, without substantial interference. To maintain acceptable noise levels at the RAs and in adjacent residential areas, facility designs should incorporate noise reduction measures, to the extent applicable and feasible, as described in Mitigation Measure NOISE-2. On-site and off-site noise impacts at the RAs would be associated with the following activities:

- **Additional Roadway Traffic:** Increases in intensity of uses would result in additional trips to and from the RAs. This would increase roadway traffic and resulting roadway noise levels, which may affect noise-sensitive uses such as residences along the roadways. The rule of thumb is that a doubling of traffic will generally result in an increase in overall traffic noise of 3 dB. A 3-dB increase in traffic noise is generally considered to be barely perceptible. An increase of 5 dB, which is approaching a quadrupling of traffic, begins to be clearly perceptible.

- **New Day Use Facilities:** New day use facilities would likely result in higher noise levels at each of the RAs. The higher noise levels would result from additional recreationists conversing and yelling, conducting sporting activities, and potentially having amplified music.

- **Tent and RV Campsites and Lodging Units:** New tent and RV campsites would contribute to the noise environment at each of the RAs, but the total contribution from this source would likely be less than the current condition because the numbers of authorized campsites under the proposed action are less than are currently in service. The noise levels from this source would be associated with the use of generators and people conversing and potentially having amplified music. This may be considered a particularly disruptive nuisance during the evening and nighttime hours.

- **Boat Ramps:** Boat ramps and launch facilities have been identified as a primary noise source at the RAs. New ramps would result in more noise at the RAs than under existing conditions and could affect recreationists on the lake. Motorized boats are required to comply with California Department of Boating and Waterways noise standards of 82 dBA for boats manufactured after 1978. The advent of 4-stroke outboard engines and improved muffler systems has resulted in decreases in overall noise emissions.

- **New and Improved Parking Lots:** New and improved parking areas would result in increased noise levels at the RAs. Noise levels are generally associated with arrivals and departures of automobiles and campers, doors slamming, and people conversing.

Infrastructure Plan Impacts Construction activities associated with infrastructure installation at Putah Canyon, Monticello Shores, Berryessa Point, Spanish Flat, and Steele Canyon RAs would result in temporary increases in noise levels, as described above for the development. A discussion of construction-related emissions at the five RAs is presented below and is based on estimates derived from the Federal Highway Administration Roadway Construction Noise

Model, which is a standard model used for construction noise analyses. The combined effects of construction activities at multiple RAs at one time could increase noise impacts across the lake; however, the distances between RAs, topography, and transient nature of construction-related noise reduce the potential for construction-related noise to be noticeable at multiple RAs. Minimal operation-related noise impacts would occur once the infrastructure is in place, so noise estimates over the long term were not modeled.

Putah Canyon RA The infrastructure plan for Putah Canyon RA would involve the installation of new water and wastewater pipelines, construction of a wastewater treatment facility and supporting facilities, establishment of stormwater control areas, installation of electrical lines and transformers, and establishment of parking areas and roads. These facilities would involve varying levels and durations of equipment use, which would generate noise in and near the work area. The primary noise-sensitive receptors are recreationists at the RA, on the lake, or at nearby recreation areas (e.g., Camp Berryessa). No residences or other noise-sensitive land uses exist nearby.

Both maximum and hourly average (L_{eq}) levels were estimated at a distance of 300 feet and 500 feet from the potential construction areas, assuming the use of backhoes, compactors, dozers, excavators, and pavers. The results of the noise model analysis indicate that the hourly L_{eq} noise levels at 300 feet and 500 feet would be 67 dB and 63 dB, respectively. Previous noise level measurements conducted at the RA indicated that hourly L_{eq} levels were 56 dBA and maximum noise levels were 67 dBA. Although the expected noise levels are higher than the background noise levels during the daytime by approximately 10 to 12 dBA, they would not be considered substantial per the California Department of Transportation (2015) noise impact guidance. Implementation of Mitigation Measure NOISE-1 would help reduce noise impacts during construction activities.

Monticello Shores RA As shown in Appendix C, Figure C-2, infrastructure plan elements at Monticello Shores RA are limited to installation of a single access road close gate, located near the southern boundary of the RA, immediately north of the intersection of the two-way circulation road (a conceptual plan element) and Berryessa Knoxville Road. With incorporation of the environmental commitment and standard construction practices set forth in Chapter 2 for the proposed action, and Mitigation Measure NOISE-1, implementing infrastructure plan elements at Monticello Shores RA will not have a significant impact on the noise environment.

Berryessa Point RA The infrastructure plan for Berryessa Point RA would involve the establishment of stormwater control areas, installation of electrical lines and transformers, and establishment of parking areas and roads. These facilities would involve some equipment use, but construction-related noise would be minor based on the few facilities being constructed and the anticipated timing of construction (when the RA is still closed to the public). The primary noise-sensitive receptors are recreationists on the lake or at nearby recreation areas (e.g., Smittle Creek Day Use Area). No residences or other noise-sensitive land uses exist nearby.

The hourly average (L_{eq}) levels were estimated at a distance of 300 feet and 500 feet from the potential construction areas, assuming the use of backhoes, compactors, dozers, excavators, and pavers. The results of the noise model analysis indicate that the hourly L_{eq} noise levels at 300 feet and 500 feet would be 67 dB and 63 dB, respectively. Previous noise level measurements

conducted at the RA indicated that hourly L_{eq} levels were 45 dBA and maximum noise levels were 53 dBA. Although the expected noise levels are considerably higher than the background noise levels during the daytime, the increased noise would only be noticeable to recreationists in the immediate area. Implementation of Mitigation Measure NOISE-1 would help reduce noise impacts during construction activities.

Spanish Flat RA The infrastructure plan for Spanish Flat RA would involve the installation of new water pipelines, possible improvements to an existing storage tank, establishment of stormwater control areas, installation of electrical lines and transformers, and establishment of parking areas and roads. These facilities would involve varying levels and durations of equipment use, which would generate noise in and near the work area. The primary noise-sensitive receptors are recreationists at the RA, on the lake, or at nearby recreation areas (e.g., Steele Canyon RA) and residences in the community of Spanish Flat about 250 feet west of the RA.

Both maximum and hourly average (L_{eq}) levels were estimated at a distance of 250 feet and 500 feet from the potential construction areas, assuming the use of backhoes, compactors, dozers, excavators, and pavers. The results of the noise model analysis indicate that the hourly L_{eq} noise levels at 250 feet and 500 feet would be 69 dB and 63 dB, respectively. Previous noise level measurements conducted at the RA indicated that hourly L_{eq} levels were 52 dBA and maximum noise levels were 62 dBA. Although the expected noise levels are considerably higher than the background noise levels during the daytime by approximately 10 to 15 dBA, they represent a worst-case scenario of all construction equipment being used at the same time (which is not anticipated). Actual noise levels would be lower and would not be considered substantial per the California Department of Transportation (2015) noise impact guidance. Implementation of Mitigation Measure NOISE-1 would help reduce noise impacts during construction activities.

Steele Canyon RA The infrastructure plan for Steele Canyon RA would involve the installation of new water and wastewater pipelines, possible installation of a storage tank, establishment of stormwater control areas, installation of electrical lines and transformers, and establishment of parking areas and roads. These facilities would involve varying levels and durations of equipment use, which would generate noise in and near the work area. The primary noise-sensitive receptors are recreationists at the RA, on the lake, or at nearby recreation areas (e.g., Spanish Flat RA) and residences in the community of Berryessa Highlands about 350 feet northeast of the RA.

Both maximum and hourly average (L_{eq}) levels were estimated at a distance of 350 feet and 500 feet from the potential construction areas, assuming the use of backhoes, compactors, dozers, excavators, and pavers. The results of the noise model analysis indicate that the hourly L_{eq} noise levels at 350 feet and 500 feet would be 66 dB and 63 dB, respectively. Previous noise level measurements conducted at the RA indicated that hourly L_{eq} levels were 63 dBA and maximum noise levels were 65 dBA. Although the expected noise levels are higher than the background noise levels during the daytime by approximately 5 dBA, they would not be considered substantial per the California Department of Transportation (2015) noise impact guidance. Implementation of Mitigation Measure NOISE-1 would help reduce noise impacts during construction activities.

Mitigation Measures

Reclamation will require its concessionaire(s) to comply with applicable laws and regulations for noise reduction and control during construction and operation activities. To minimize construction noise near residential and other recreational uses, all construction activities will be scheduled between the hours of 7 a.m. and 7 p.m., unless specifically authorized by Reclamation. The following mitigation measures would also be implemented to address potential impacts associated with noise.

Mitigation Measure NOISE-1. Construction-Related Noise Reduction Measures Reclamation or its concessionaire(s) will identify appropriate noise reduction measures to implement during construction activities in areas where the activities could increase noise levels in proximity to sensitive receptors (e.g., residents, overnight recreationists). Appropriate measures will be identified in construction contracts. These measures may include, but are not limited to the following:

- Locate fixed construction equipment such as compressors and generators as far as possible from sensitive receptors. Shroud or shield all impact tools, and muffle or shield all intake and exhaust ports on power construction equipment. Ensure construction equipment is in good working order.

- Notify residents within 500 feet of the work area and recreationists at the affected RA or nearby recreation areas of the proposed construction activities by providing information on the schedule and duration of the work and a contact for filing complaints.

- Designate a disturbance coordinator and conspicuously post this person's number around the work area and in adjacent public spaces. The disturbance coordinator will receive all public complaints about construction noise disturbances and will be responsible for determining the cause of the complaint and implementing any feasible measures to be taken to alleviate the problem.

Mitigation Measure NOISE-2. Design-Related Noise Reduction Measures Reclamation or its concessionaire(s) will evaluate the need for design measures to reduce noise exposure near sensitive receptors. As recreation facilities are designed, their locations and design specifications will be assessed to determine whether noise generated by the facility may be a problem for nearby sensitive receptors (e.g., residents adjacent to the RAs, recreationists in overnight use areas). The EPA (1974) identifies a 24-hour exposure level of 70 dBA as the level of environmental noise that would prevent any measurable hearing loss over a lifetime, and levels of 55 dBA outdoors and 45 dBA indoors are identified as preventing activity interference and annoyance. For facilities or use areas that may generate noise in excess of those levels, the following design measures will be considered and incorporated into the facility design:

- Setbacks will be evaluated to minimize noise impacts at nearby residences.

- Barriers can take the form of existing topography, building facades, or temporary barriers. Shielding using these forms of barriers will be considered when facility design plans are developed.

- Facade construction will be evaluated where interior noise impacts are identified, such as where hotel/motel uses are proposed.

- Curfews on loud activities will be considered for campsite areas.

- Motorized boats will be inspected to determine compliance with the Department of Boating and Waterways noise level criteria.

Public Health and Safety

The public health and safety setting is based on previous environmental documentation for activities at Lake Berryessa and a review of applicable literature, studies of the area, and service provider websites and reports. The analysis discusses the potential for increased demand on public health and safety service providers, and increased health and safety risks that would result from development and operation of the RAs.

Affected Environment

Natural and man-made hazards pose a concern for the health and safety of visitors to Lake Berryessa. Known hazards in the region and at the RAs include wild land fire, earthquakes, steep slopes, flooding, contaminated soils, eroding shoreline, and accidents associated with water and other recreational activities. Geologic and soil hazards, such as landslides and soil erosion, are discussed under Geology and Soils; flooding is discussed under Water Resources. This section focuses on the remaining hazards and the law enforcement and emergency response providers that serve the Lake Berryessa area.

Regional Setting

Fire Hazards The primary fire hazard in rural developed areas, such as around Lake Berryessa, is vegetation fires that can destroy homes and built structures and burn many acres of land. The fire hazard rating for lands around Lake Berryessa ranges from moderate to very high as a result of the extensive amount of open space and vegetated areas adjacent to small developed or built-up areas (California Department of Forestry and Fire Protection 2007). Vegetation-related fires have destroyed homes and burned many acres of land at Lake Berryessa in the past (Reclamation 2005). Structures can be protected in high fire hazard areas by providing adequate vegetation clearance around the structure (e.g., removing dead trees near buildings), ensuring on-site water storage for fire protection, and establishing adequate road access and turnaround for emergency vehicles; these are requirements of state and county regulations and codes. Clean-up activities at the RAs have reduced some concerns with wildland fire risks, but fire hazards still exist at the RAs due to dense vegetation and downed and dead trees in some areas and the vast amount of wildlands in the vicinity.

Hazardous Materials and Sites Hazardous materials can be introduced into the environment (e.g., through gas spills) or may occur naturally (e.g., asbestos) and can pose a concern for public health and safety. Routine activities associated with construction and everyday operation of RAs involve the use of various hazardous materials that could accidentally be spilled and contaminate soils and water. Several leaking underground storage tank sites have been documented around Lake Berryessa, including at some of the RAs (State Water Resources Control Board [State

Water Board] 2015c). Some of the storage tanks have been removed, and the contaminated areas have been cleaned up, while others are still being cleaned up or are subject to monitoring. These types of sites can pose a hazard to new structures and the public if soils or groundwater are contaminated.

Naturally occurring asbestos occurs in ultramafic rocks and in soils formed in material weathered from serpentine. These conditions are present within the five RAs. Asbestos and other minerals contained in soils formed from ultramafic rocks can expose humans to elevated risk of contracting asbestos-induced respiratory diseases. A common pathway for human exposure to potentially harmful asbestos is via transmission of fugitive dust particles caused by construction-related earthwork, and by vehicle traffic on unpaved roads.

Water Hazards Water recreation can be hazardous and requires compliance with boating and safety regulations and programs to protect the public and property on or near the water. On-water accidents can result from boat crashes, floating debris, or unsafe water conditions, such as during high winds. People and structures on the shoreline or on docks or marinas can also be at risk from high winds, wave action, or unsafe conditions. Safety statistics compiled by the California Department of Boating and Waterways (2014) indicate that during 2013, 15 boating accidents were reported in Napa County with eight injuries and no fatalities.

Reclamation and Napa County are actively engaged in a land and water safety program that involves educating the public about safe activities while recreating on the water. Topics include using life jackets, maintaining low speeds in designated areas, and adhering to signs and buoys. Some areas of the lake are marked with spherical buoys to reduce boat speeds to less than 5 mph in narrow inlets and coves, reduce boating accidents in congested areas, and prevent undesirable shoreline erosion. Waterway signs are also used to warn boaters of hazards, such as floating debris and submerged hazards.

Service Providers Basic responsibility for the health and safety of visitors is shared among the State of California, Napa County, Reclamation, and RA managers. Fire protection and suppression activities around Lake Berryessa are provided primarily by the California Department of Forestry and Fire Protection, with local support from volunteer and county fire departments. The Napa County Sheriff's Office has an office/station at Lake Berryessa with one sergeant and three deputies to help respond to incidents at Lake Berryessa. Due to the size of the Lake Berryessa area and rural setting, response times can vary, but the local presence of law enforcement allows quick responses in most circumstances.

The RA managers are responsible for providing private security and enforcing compliance with applicable laws within the RAs. Fire protection and suppression is managed under a Fire Management Plan (prepared by Reclamation) that provides policies and management actions for wildfire and fuels management on federal lands at Lake Berryessa. Reclamation has a wildland fire suppression cost reimbursement agreement with the California Department of Forestry and Fire Protection; this agreement authorizes the Department to provide fire prevention services on lands under the administration of Reclamation at Lake Berryessa.

Local Setting

In support of the development of the VSP, Reclamation had each of the RAs evaluated to assess the conditions of facilities and document known hazards. An Environmental Compliance and Facility Condition Assessment Report was completed by Kleinfelder, Inc. in 2002, and the Napa County Fire Marshal conducted an assessment of facilities to identify fire protection needs (Napa County Fire Marshal 2001). Many of the issues identified in the assessments have already been remediated by removing non-compliant facilities and debris and cleaning up the RAs. Remaining issues at each RA are summarized below in addition to other potential hazards that could create a concern for public health and safety.

Putah Canyon RA Existing roads were identified as a potential hazard because of deteriorating conditions and inadequate widths and turnarounds (Kleinfelder, Inc. 2002). Degraded shoreline protection was also identified as a potential hazard, and new reinforcement may be needed to protect the shore from erosion.

The following specific concerns were identified by the Napa County Fire Marshal (2001):

- Signs and buildings need numbering.
- Dead-end roads need adequate turnarounds.
- A hydrant system water supply for fire suppression needs to be available.
- Fire access roadways cannot be blocked.
- One-way roads need turnouts.
- Turning radii of roadways need to be improved.

About 1.72 acres of the RA are currently rescinded from use, including a fenced area with tanks near the main parking lot and monitoring wells on the southern end of the peninsula. Two tanks were removed in 1995, and contaminated soil has been excavated and removed (Reclamation 2011c). Groundwater wells continue to monitor for petroleum hydrocarbons and other contaminants (Regional Water Board 2013). Removal of the rescission is conditional on the complete cleanup of the area.

Monticello Shores RA Existing roads were identified as a potential hazard because of deteriorating conditions and inadequate widths and turnarounds (Kleinfelder, Inc. 2002). Degraded shoreline protection was also identified as a potential hazard, and new reinforcement may be needed to protect the shore from erosion. A gabion wall was constructed at the toe of a landslide in the northern portion of the RA. The wall was determined to be in poor condition, and the landslide may not have been properly stabilized, requiring further assessment and possibly additional repairs. Downed and dead trees at the RA pose a fire hazard.

The following specific concerns were identified by the Napa County Fire Marshal (2001):

- Road widths are inadequate.
- Speed bumps may be needed.
- A hydrant system water supply for fire suppression needs to be available.

- Defensible space is needed around structures and improvements.
- Signs and buildings need numbering.
- Dead-end roads need adequate turnarounds.
- Turning radii of roadways need to be improved.

The State Water Board monitors the status of a remediation site at Monticello Shores RA that has been cleaned up, and continues to monitor groundwater quality. A leaking underground storage tank was identified at the RA, and groundwater wells were installed to monitor water quality for evidence of contamination (Environmental Geology Services 2009). Groundwater monitoring conducted in March of 2014 indicated that no further action was necessary to clean up the site, and the underground storage tank site was approved for regulatory closure by the Central Valley Water Quality Control Board in February 2016.

Berryessa Point RA Existing roads were identified as a potential hazard because of deteriorating conditions and some inadequate widths and turnarounds (Kleinfelder, Inc. 2002). Degraded shoreline protection was also identified as a potential hazard, particularly around the peninsula, and new reinforcement may be needed to protect the shore from erosion. Downed and dead trees at the RA pose a fire hazard.

The following specific concerns were identified by the Napa County Fire Marshal (2001):

- Road widths are inadequate.
- A hydrant system water supply for fire suppression needs to be available.
- Dead-end roads need adequate turnarounds.
- Signs and buildings need numbering.
- Turning radii of roadways need to be improved.

Spanish Flat RA Existing roads were identified as a potential hazard because of deteriorating conditions and inadequate widths and turnarounds (Kleinfelder, Inc. 2002). Shoreline protection was limited but was also identified as a potential hazard, and new reinforcement may be needed in some areas to protect the shore from erosion.

The following specific concerns were identified by the Napa County Fire Marshal (2001):

- Signs and buildings need numbering.
- Road widths are inadequate.
- A hydrant system water supply for fire suppression needs to be available.
- Turning radii of roadways need to be improved.

The State Water Board monitors the status of a remediation site at Spanish Flat RA that is continuing to undergo active remediation (State Water Board 2015a). In 1991 two leaking

underground storage tanks were removed. Petroleum hydrocarbons were detected in soil samples and were later detected in groundwater samples. Remediation efforts at the site have included soil removal and high-vacuum duel-phase extraction. Groundwater plume delineation and remediation activities at the site are ongoing.

Steele Canyon RA Existing roads are generally in good condition, but inadequate widths and turnarounds were identified as a potential hazard (Kleinfelder, Inc. 2002). Degraded shoreline protection was also identified as a potential hazard, and new reinforcement may be needed to protect the shore from erosion.

The following specific concerns were identified by the Napa County Fire Marshal (2001):

- Roads need adequate signing.
- A hydrant system water supply for fire suppression needs to be available.

Four tanks were removed in 1998. Contaminated soil has been excavated and removed, and contaminated groundwater has been extracted. Groundwater wells monitored for petroleum hydrocarbons and other contaminants through 2009. Data indicated decreasing concentrations toward an acceptable level, and a recommendation was submitted in 2010 to the State Water Board to stop further monitoring and cleanup efforts and close the case (Environmental Forensics and Hydrogeological Consultants 2010). The case was closed in December of 2011 (State Water Board 2015b).

Environmental Consequences and Mitigation Measures

No-Action Alternative

Under the no-action alternative, the interim recreation facilities at each RA would continue to be available. Existing hazards at the RAs would not be addressed or remediated beyond the ongoing cleanup efforts associated with former leaking underground storage tanks; these cleanups are independent of the recreation operations. Some existing site conditions would continue to pose hazards to visitors. Vehicle travel on unpaved roads located on soils formed in material weathered from serpentine and other ultramafic rocks would continue to have potential to expose visitors to potentially harmful asbestos via fugitive dust particles. Wildfire would continue to be a risk at the RAs, but few structures and visitors would be exposed to this risk under the no-action alternative.

Visitation would likely be similar to or slightly higher than visitation under current conditions, as discussed under Recreation, and the demands on local service providers would be minimal based on the low visitation. The State of California, Napa County, and Reclamation would continue to provide the needed services with current staff and facilities. The potential for accidents or exposure of visitors to hazards would be similar to the potential under current conditions, with similar potential for accidents based on the current number of visitors.

Proposed Action

Overall Development and Conceptual Site Plan Impacts Site-specific health and safety hazards would be similar across the RAs, with localized concerns at some of the RAs from asbestos-containing soils, steep slopes, and hazardous materials sites. These hazards could pose

a public health and safety concern if facilities are not properly designed with consideration for the localized hazards. Implementation of Mitigation Measure HEALTH-1 would require that localized hazard concerns be taken into account in facility designs to ensure public health and safety. Other general impacts on public health and safety are presented below. Additional analysis may be necessary once specific details about the facilities, their locations, and construction activities are known.

Fire Hazards Construction activities could involve welding for installation of some facilities, which could result in accidental fire. These activities would comply with regulations of Public Resources Code Sections 4428–4442 during dry periods to reduce the potential for fire.

Development of the RAs would increase the number of facilities at and visitation to each RA, which would increase the number of people and structures potentially exposed to fire hazards. The RAs would continue to be at risk for wildfire, and increased recreational use of the RAs would also increase the potential for accidental fires. As part of the development, water supply would be provided to each of the RAs and would help provide fire suppression in times of need. Improvements to roads, increasing road widths, and providing turnouts would improve access for fire suppression resources. Other fire protection measures would be provided in accordance with the Fire Management Plan for Lake Berryessa. Reclamation would take the necessary precautions in the event of a nearby wildfire or fire at the RAs to inform visitors of the risk and evacuate the RAs if needed. These measures would reduce the potential for structures to be damaged by fire and for visitors to be exposed to fire hazards.

Asbestos Soil maps presented in Appendix G depict the locations of serpentine soil types as mapped by the U.S. Department of Agriculture Natural Resources Conservation Service (formerly the Soil Conservation Service) (Lambert et al. 1978). Ground disturbing construction activities (e.g., excavation, filling, grading) and vehicle traffic on unpaved roads located in soils formed in material weathered from serpentine and other ultramafic rocks could expose nearby recreationists, workers, or residents to airborne asbestos, potentially resulting in health impacts.

The proposed action alternative described in Chapter 2 includes an environmental commitment to minimize emissions of fugitive dust containing asbestos and similarly harmful minerals during operation of the RAs. Implementation of Mitigation Measure HEALTH-2 would reduce the potential for asbestos to become airborne during construction involving ground disturbance of all sizes in areas where ultramafic rocks or soils formed in material weathered from serpentine may occur. Mitigation Measure HEALTH-2 includes a requirement for concessionaires to prepare and implement an asbestos dust mitigation plan for all earth-disturbing activities that are larger than one acre.

Hazardous Materials Construction and operation activities associated with the developments at the RAs would entail the use of various hazardous materials, such as fuel, propane, cleaners, and other chemicals, that could be spilled and create a hazard to the environment and public. The effects of such hazards would depend on the nature of the hazardous material, extent of the spill, proximity to water and public use areas, and other factors. Standard construction practices (e.g., a spill prevention and cleanup plan) identified in Chapter 2 would be implemented during all construction phases and would reduce the potential for hazardous materials spills and contamination of the environment. Scheduling of construction activities outside the summer

season and away from public use areas as described in Chapter 2 would also reduce the potential for visitors to be exposed to construction-related hazards.

Water Hazards Increased visitation to the RAs would increase on-water use at the lake, which could lead to congestion and the potential for increased boating accidents. The number of boaters using the lake at one time would be expected to increase over the 30-year development period as more docks and marinas become available and visitation increases. Congestion and the potential for boating accidents would also increase, particularly around marinas, launch ramps, and docks where boaters have to maneuver carefully to park their boats or launch into the water. As it is under current conditions, signs and information brochures would be used to alert boaters to boat safety requirements.

The State-mandated "no wake" zone of 200 feet around facilities at the RAs would be enforced to protect boater safety as well as people on the marinas and docks and near the shore. The "no wake" zones at each RA would be established to protect facilities, the shore, and people as the RAs are built out and visitation increases.

Service Providers Law enforcement would be provided at the RAs to regulate activities, ensure compliance with federal and state laws and policies, and maintain a safe environment for visitors in compliance with the land and water safety program. In the event of an accident or other emergency at the RAs, local emergency response providers would respond to calls for service as they have in the past. Response times vary, depending on the service needed and proximity to the response provider office or station, but the local providers would be expected to continue servicing the RAs and providing assistance as quickly and efficiently as they can. An increase in demand would be expected as the RAs become more developed, and additional staff or facilities may be needed in the future to support the increased visitation. New facilities or staff would be coordinated as the need arises; these may be subject to additional environmental review. Development of each RA would also include an improved roadway/circulation system, which would be designed in coordination with emergency response providers to improve access for emergency vehicles within the RAs.

Infrastructure Plan Impacts Activities associated with construction of the infrastructure plan elements could expose people in nearby areas to various hazards, with impacts similar to those described above for the conceptual plan elements. Impacts resulting from construction of infrastructure would occur at all five RAs to varying degrees, but the potential for hazards would be highest at Putah Canyon, Spanish Flat, and Steele Canyon RAs because more infrastructure would be installed (i.e., more construction activities) and the RAs are open to the public. Localized hazards could include the increased risk of fire from welding or other activities that result in sparks or flames, the release of asbestos into the air from soil disturbance, and the release of chemicals or other hazardous materials into the environment from construction equipment and activities. The potential for these hazards would be minimized with implementation of standard construction practices and BMPs described in Chapter 2, compliance with applicable fire safety and hazardous materials regulations, and implementation of Mitigation Measure HEALTH-2 for controlling asbestos at all five RAs.

Installation of the proposed infrastructure would reduce safety concerns at the RAs and improve access, parking, and general use of the RAs by providing potable water, wastewater services, and

electricity. The detention basins would help manage and control stormwater runoff, especially as impervious surface areas increase across the RAs. Implementation of the infrastructure plans would have an overall benefit for recreational opportunities at the RAs.

Mitigation Measures

Reclamation will require its concessionaire(s) to comply with applicable federal, state, and local laws and regulations concerning hazardous materials, public health and safety hazards, and wildfire. The implementation of standard construction practices regarding hazards and hazardous materials, as identified in Chapter 2, would reduce the potential for impacts on public health and safety. In addition, the following mitigation measures would be implemented to address potential impacts associated with public health and safety.

Mitigation Measure HEALTH-1. Hazard Design and Siting Considerations Prior to approving proposals from concessionaires for implementing ground disturbing and construction activities, including ground disturbing activities for infrastructure and conceptual plan elements described in this EA, Reclamation will determine whether site-specific evaluations of potential hazards and risks to public health and safety are necessary to confirm suitability of the soils to support the facility. Examples of areas and activities that may require evaluation and testing include areas where lodging units, other buildings, campsites, or wastewater systems (e.g., spray field, septic tank) are proposed. This testing will be conducted by the concessionaire, and the concessionaire will submit the results for review by Reclamation before or at the time the concessionaire submits site-specific designs for Reclamation's approval. Results of the testing will be incorporated into the facility designs, as appropriate. If hazardous conditions are identified, the proposed ground disturbing or construction activity will be revised to address the hazard or will be relocated to a suitable location.

Mitigation Measure HEALTH-2. Asbestos Control Measures During Construction Mitigation Measure HEALTH-2 shall be implemented during construction requiring ground disturbance in all areas where the *General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos* (California Department of Conservation, 2000) indicates the presence of ultramafic rocks, and in all areas where the *Soil Survey of Napa County, California* (Lambert et al., 1978) indicates the presence of soils formed in material weathered from serpentine.

For ground disturbing activities up to one acre in size, proposed in areas underlain by ultramafic rocks or soils formed in material weathered from serpentine, the concessionaire shall implement at the start and maintain throughout the duration of construction the following:

- Construction workers shall wear adequate ventilation masks during soil-disturbing activities to prevent inhaling dust that may contain asbestos.
- Vehicle speeds on unpaved surfaces shall not exceed 15 miles per hour;
- Sufficient water or chemical dust suppressants shall be applied to the disturbed area prior to and during disturbance to prevent visible emissions within 25 feet of the point of origin;

- Storage piles shall be kept adequately wetted, treated with chemical dust suppressant, or covered when material is not being added or removed to prevent visible emissions within 25 feet of the point of origin;

- Equipment shall be washed down before moving from property onto paved roadway;

- Visible track-out on paved roads shall be cleaned using wet sweeping or filter equipped vacuum device within 24 hours of discharge.

Prior to initiating ground disturbing activities larger than one acre in size, proposed in areas underlain by ultramafic rocks or soils formed in material weathered from serpentine, the concessionaire shall prepare and submit for review and approval by Reclamation a draft *Asbestos Dust Mitigation Plan* in substantial conformance with guidance provided by the Bay Area Air Quality Management District in *Asbestos Airborne Toxic Control Measure for Construction, Quarrying, and Surface Mining Operations Inspection Guidelines* (Bay Area Air Quality Management District Undated). At minimum the Asbestos Dust Mitigation Plan will stipulate the following:

- Construction workers shall wear adequate ventilation masks during soil-disturbing activities to prevent inhaling dust that may contain asbestos.

- Vehicle speeds on unpaved surfaces shall not exceed 15 miles per hour;

- Sufficient water or chemical dust suppressants shall be applied to the disturbed area prior to and during disturbance to prevent visible emissions within 25 feet of the point of origin;

- Storage piles shall be kept adequately wetted, treated with chemical dust suppressant, or covered when material is not being added or removed to prevent visible emissions within 25 feet of the point of origin;

- Equipment shall be washed down before moving from property onto paved roadway;

- Visible track-out on paved roads shall be cleaned using wet sweeping or filter equipped vacuum device within 24 hours of discharge.

- At the completion of ground disturbing activities disturbed surfaces will be stabilized using vegetative cover, 3” of non-asbestos-containing material, paving, or other measures deemed sufficient to prevent 10 mph winds from causing visible emissions.

Prior to approving ground disturbing activities Reclamation will review the draft *Asbestos Dust Mitigation Plan* submitted by the concessionaire and identify via written comments any revisions or enhancements needed for approval. In reaching its approval decision Reclamation may, at its discretion, consult with the BAAQMD. The concessionaire will incorporate appropriate responses to Reclamation’s comments on the draft *Asbestos Dust Mitigation Plan* and submit it to Reclamation for final approval. The concessionaire shall implement ground disturbing and

other construction activities in conformance with the final *Asbestos Dust Mitigation Plan* approved by Reclamation.

Recreation

The recreation setting is based on previous environmental documentation for activities at Lake Berryessa, estimates of visitation during the 2013–2015 seasons, and a review of applicable literature and studies of the area. The analysis discusses the potential for recreational activities and opportunities to be modified as a result of development of the RAs.

Affected Environment

Regional Setting

Lake Berryessa is the largest reservoir in the eastern foothills of the northern Coast Ranges, and with the exception of the Sacramento-San Joaquin Delta, it is the only large freshwater resource in close proximity to San Francisco Bay Area residents. The lake offers a variety of recreational activities at designated RAs and on surrounding public lands. Lake visitors enjoy many types of water-related activities, including various kinds of boating, fishing, skiing, swimming, and sightseeing. Some land-based recreational activities, such as picnicking, camping, walking, hiking, riding, all-terrain vehicle use, and cycling, also occur on public lands surrounding the lake, but these activities are secondary to the water activities in terms of visitor participation.

The seven RAs at the lake have operated for more than 50 years, providing various recreational opportunities and facilities. With the expiration of the contracts at five of the RAs in 2008–2009, these areas were closed to visitation in 2009 while facilities were removed. Two of the RAs were reopened in 2010, and one additional RA was opened in 2011. These three RAs (Putah Canyon, Spanish Flat, and Steele Canyon) plus the two other RAs (Markley Cove and Pleasure Cove) have remained open for short-term public use, although Spanish Flat RA was temporarily closed in January 2015. In addition to the seven RAs, Reclamation manages three free, public, day use areas (Oak Shores, Smittle Creek, and Eticuera Creek), a free public boat launch (Capell Cove), a visitor center, and three official trails (Smittle Creek, North End, and Pope Canyon Trails) that are segments of a proposed regional Lake Berryessa Trail (Figure 3-2). Several smaller trails exist around the lake and will eventually be integrated with the Lake Berryessa Trail.

Visitation to Lake Berryessa during the 1990s and early 2000s was reported at more than 1 million visitors annually, with an annual average of 1.5 million visitors. Visitor use has been higher in the summer with an estimated 75 percent of total visitation between Memorial Day and Labor Day weekends (Reclamation 2005). Since 2005, visitation at the RAs has fluctuated due to the closure of some of the RAs in 2009 and 2010. The average annual visitation during 2011–2013 was 487,493, which is a 68 percent decrease from visitation averages for the period before 2008/2009. Table 3-20 identifies the annual visitation to all seven RAs for 2005–2010 and 2013–2015 (not all RAs were open the entire period) based on Reclamation traffic/vehicle counts.

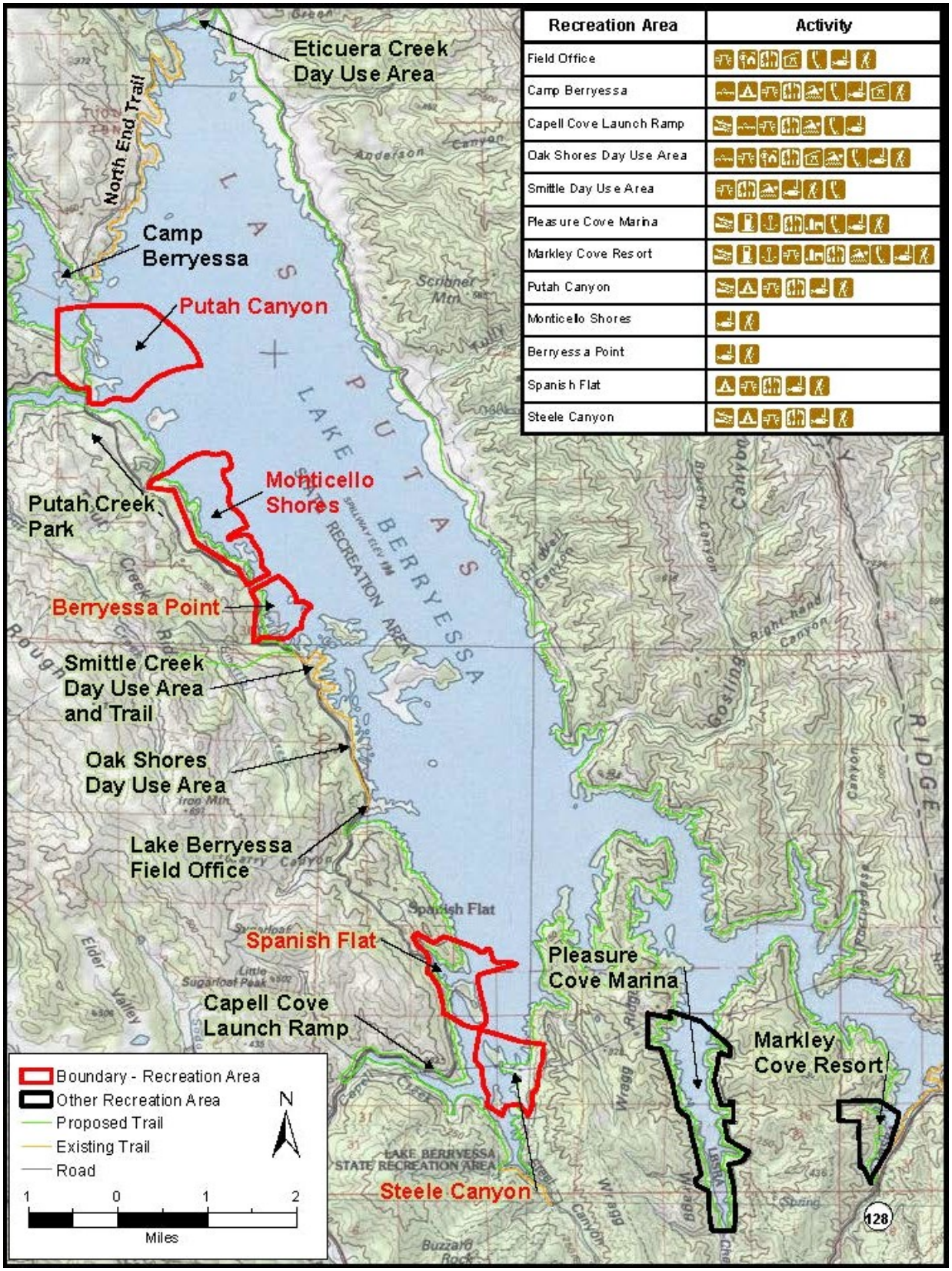

Figure 3-2. Recreation Facilities at Lake Berryessa

Table 3-20. Annual Visitation to Lake Berryessa RAs (2005–2010; 2013–2015)

Year	Estimated Visitation
2005	671,289
2006	790,868
2007	968,506
2008	509,600
2009	230,588
2010	97,969
2013	195,744
2014	203,144
2015 (January-July)	89,808

Source: U.S. Bureau of Reclamation 2011d and 2015
Note: Estimated visitation is number of people per year and is based on vehicle counters at each RA.

Based on data provided by Reclamation, overall visitation to the open RAs in 2015 was highest in June at approximately 23,568, which included an estimated 9,756 visitors to Steele Canyon RA and 3,668 visitors to Putah Canyon RA.

Visitation to Lake Berryessa is projected to increase as populations of nearby cities and metropolitan areas grow and the demand for outdoor recreational opportunities—particularly on or near bodies of water—grows. Visitor use at Lake Berryessa is dependent on the availability of facilities to meet visitor demand, the carrying capacity of the lake and those facilities, visitor experience, and other factors that influence people's decision to visit RAs. The VSP and RAMP EISs evaluated the carrying capacity of the lake and facilities in place before the change in RA management and the demand for facilities at the lake (Reclamation 1992, 2005). Short-term use facilities have been at capacity during the summer season, demonstrating a need for additional facilities. The limit for the number of vessels on the lake was established in the RAMP ROD at 3,000 per day. This limit has been exceeded during peak use weekends, but the number of vessels on the water on most days is well below the limit. Visitor use has been concentrated in areas with short-term facilities and areas that are more desirable for visitors (e.g., Spanish Flat, the Narrows, areas around Putah Canyon). Use concentration in popular areas has resulted in congestion, use conflicts, and occasional serious accidents, and it demonstrates a need for more dispersed facilities. With the substantial decrease in visitation since 2007 and closure of some of the RAs, user conflicts have decreased, but visitor use has become more concentrated.

Local Setting

The VSP ROD describes the main recreational uses at Lake Berryessa and the types of uses desired by visitors, and it provides the management direction for future use of the RAs and other RAs at the lake (Reclamation 2005). The uses and facilities currently available at the five RAs are described below.

Putah Canyon RA Putah Canyon RA is currently open to the public and provides campsites, day use sites, vault toilets, a launch ramp, and a retail sales area. The RA is in a fairly remote

part of the lake and is bordered to the north and south by different arms of the lake, to the east by the main body of the lake, and to the west by open space. The boat launch at Putah Canyon RA is one of the few launch sites available in the northern part of the lake. Boat users travel up Putah Creek, which forms an arm of the lake north of the RA, and access the main body of the lake from the launch ramp. The setting offers excellent opportunities for quality visitor experience in a rural and natural environment.

During 2005–2007, Putah Canyon RA received about 100,000 visitors annually (Reclamation 2011d). Visitation in 2010, after the RA was reopened to the public, was estimated at 12,000. The most recent visitation estimate from 2015 was 9,272 people during the months of January through June (Reclamation 2015). Total visitation in 2014 was estimated at 27,924, which included 4,417 campers, 21 RV users, 2,259 visitors launching boats, and 284 visitors parking cars, with the remaining visitors doing day use activities.

Monticello Shores RA Monticello Shores RA is accessible off Berryessa Knoxville Road and is near the Berryessa Pines residential community. It is bordered on the east by the main body of the lake, on the west by open space, and on the north by residential development. Berryessa Point RA lies to the south. The accessibility of Monticello Shores RA makes it attractive to visitors, although it has not been well-visited in the past due to a lack of adequate recreation facilities. The semi-remoteness of the immediate area likely improves the quality of visitor experience.

Between 2005 and 2007, Monticello Shores RA received 68,000–115,000 visitors annually (Reclamation 2011d). This RA is not currently open to public use and does not contain any built facilities.

Berryessa Point RA Berryessa Point RA is accessible off Berryessa Knoxville Road in a fairly remote part of the lake. The lake is to the east of the RA, and open space is on all other sides. The Monticello Shores RA lies to the north, and other recreation facilities are further south. The accessibility of the RA makes it attractive to visitors, although it has not been well-visited in the past due to a lack of adequate recreation facilities. The remoteness of the immediate area likely improves the quality of visitor experience.

During 2005–2007, Berryessa Point RA received 85,000–195,000 visitors annually (Reclamation 2011d). This RA is not officially open to public use and does not contain any built facilities.

Spanish Flat RA Spanish Flat RA is currently open to the public and provides campsites, day use sites, boat launch, and vault toilets. This area is accessible from the Berryessa Knoxville Road along the west shore. The RA is bordered to the east by the main body of the lake, to the south and north by arms of the lake, and to the west by open space. Spanish Flat, a rural residential development that shares the same name, is to the northwest, and Steele Canyon RA is across the water to the southeast. The proximity to other uses can affect visitor experience, and the cove to the south likely has a fair amount of water traffic as a result of the Capell Cove launch ramp further west along the arm of the lake.

During 2005–2007, Spanish Flat RA received more than 120,000 visitors annually, with a high of more than 170,000 visitors in 2006 (Reclamation 2011d). This RA was temporarily closed to

the public in January 2015, so no visitation estimates are available for 2015. In 2014, the RA received an estimated 10,072 visitors, which included 2,239 campers, and 279 visitors parking cars, with the remaining visitors doing day use activities (Reclamation 2015).

Steele Canyon RA Steele Canyon RA is currently open to the public and provides campsites, day use sites, vault toilets, a launch ramp, and boat storage. This is currently one of the more developed RAs. Compared to other RAs at the lake, Steele Canyon RA is in a less accessible part of the lake off the main roads; access is via Steele Canyon Road, about 5 miles from SR 128. The RA is bordered to the north by the main body of the lake, to the west by an arm of the lake, to the east by a residential development, and to the south by open space. Berryessa Highlands, a rural residential development, is to the east, and Spanish Flat RA is across the water to the northwest. The proximity to other uses can affect visitor experience, and the cove to the west likely has a fair amount of boat traffic as a result of the Capell Cove launch ramp further west.

During 2005–2008, Steele Canyon RA received more than 100,000 visitors annually, with a high of almost 170,000 visitors in 2007 (Reclamation 2011d). This RA was closed for a portion of 2009 and after it was reopened to the public in 2010, visitation was estimated at 16,089. The most recent visitation estimate from 2015 was 31,880 people during the months of January through July (Reclamation 2015). Total visitation in 2014 was estimated at 52,456, which included 1,018 campers, 3,193 RV users, 5,264 visitors launching boats, and 3,639 visitors parking cars, with the remaining visitors doing day use activities.

Environmental Consequences and Mitigation Measures

No-Action Alternative

Under the no-action alternative, the interim facilities and recreational opportunities currently available at three of the RAs would continue to be available, and previously approved facilities would be installed to support the interim uses. No other new recreation facilities would be constructed without Reclamation approval and separate NEPA compliance. The current facilities provide limited opportunities for recreation and attract a relatively low number of visitors to the area (less than 100,000 in 2014). Future visitation would likely be similar to visitation under current conditions, with the potential for a slight increase as nearby populations grow and the demand for freshwater recreation grows. The current facilities would not have the capacity to provide the extent of opportunities that were available in the past or serve the number of visitors recorded at the lake in the past. Ongoing competition for facilities and services would continue and may worsen without additional facilities and opportunities at the RAs or visitation could decline. Lake Berryessa and its RAs would have the capacity to provide additional opportunities, but Reclamation would not be able to meet its goals for recreation at the lake under the no-action alternative.

Proposed Action

Overall Development and Conceptual Site Plan Impacts Development at the five RAs is projected to generate 1.5 million visitors annually to the Lake Berryessa area. The numbers and types of facilities across the five RAs have been planned with this target in mind. The intent of the development is to provide diverse recreational opportunities in response to visitor and market demands. The developments would provide various levels of recreational opportunities across

the RAs and would require different levels of construction activity to build the necessary infrastructure.

Some disruptions to recreational activities would be expected during construction of new facilities. Such disruptions could include visitor parking access restrictions due to the need for equipment staging areas near construction zones; lodging and camping disruptions from construction-related noise, traffic, air pollutants, and site access restrictions; and public safety hazards created by construction activities. Motorists may encounter construction equipment on roadways and in parking areas, which could restrict or limit access to the RAs, and boaters may experience reduced access on the water during construction of marinas and boat launch ramps. Competition for facilities may occur locally at each RA where facility availability becomes limited or restricted during construction and users concentrate into open areas. Temporary issues such as this would be alleviated as new facilities are developed and recreation becomes more dispersed.

The general construction schedule would minimize all of these impacts to the extent practicable, by scheduling work for the fall, winter, or early spring to avoid construction activities during the peak visitor season. At the two RAs that are currently closed (Monticello Shores and Berryessa Point), these types of disruptions would not occur until some facilities are in place and the RAs are open to public use. As new facilities are brought on-line, they would benefit recreationists by providing expanded parking, improved camping and lake access, and increased dispersal of recreation uses around the lake.

The RAs would offer some level of camping or overnight facilities and day uses to support hiking, fishing, and other recreational activities. Visitation to the area is projected to increase annually as new facilities and opportunities are available. Of the five RAs discussed here, visitation to Putah Canyon, Spanish Flat, and Steele Canyon RAs would likely be highest because they would offer the most facilities and opportunities. The level of visitation would be similar to visitation under past conditions when the RAs were operated with various short- and long-term uses, and visitation would be expected to exceed previous levels as the RAs are developed.

Infrastructure Plan Impacts Construction activities associated with infrastructure installation could disrupt recreational activities at open RAs or near open recreation facilities, as described above for the development. Impacts would be similar at Putah Canyon, Spanish Flat, and Steele Canyon RAs based on the similarity of the infrastructure plans, and fewer recreation-related impacts would be expected at Berryessa Point RA because it would likely still be closed to the public during infrastructure installation. Infrastructure plan elements at Monticello Shores RA are limited to installation of a single access road close gate, located near the southern boundary of the RA, immediately north of the intersection of the two-way circulation road (a conceptual plan element) and Berryessa Knoxville Road.

Construction activities would be temporary, and standard construction practices would be implemented to avoid or minimize disruptions to nearby recreational activities. To the extent feasible, construction activities would be scheduled outside the peak visitation season and away from open recreation facilities. In addition, mitigation measures, such as those identified for air quality and noise, would be implemented to minimize construction-related disturbance to

recreational activities. Overall visitor experience to the RAs would be maintained, as visitors could use other portions of the RAs or nearby areas away from the work areas during the construction period.

As discussed under Socioeconomics, the infrastructure plans would facilitate development of the RAs, as described for the development, but would not directly result in an increase in visitation to the RAs.

After the infrastructure is in place, minimal recreational disturbance is expected during periodic maintenance activities, as described in other sections of this chapter. Overall visitor experience at the RAs would not be adversely affected by operation of the infrastructure. Mitigation measures were not determined to be necessary for operation-related recreation impacts associated with the infrastructure plans.

Mitigation Measures

No mitigation measures specific to recreation were identified, but measures identified in other sections of this chapter (e.g., air, noise) would minimize potential recreation disruptions during construction activities. In addition, concessionaires will be required to implement standard construction practices, as described in Chapter 2, and Reclamation will ensure the concessionaires schedule construction activities outside the peak recreation season, to the extent practicable. The phasing of the developments at each RA in response to visitor and market demands would help alleviate competition for facilities over the short term, and the distribution of facilities and uses across the RAs would disperse activities around the lake and minimize localized recreation-related conflicts over the long term.

Socioeconomics

The socioeconomics setting is based on previous environmental documentation for activities at Lake Berryessa and a review of applicable literature, plans, and studies of the area. The analysis discusses the potential for development of the RAs to affect or be affected by socioeconomics of the regional and local areas.

Affected Environment

Regional Setting

Lake Berryessa is a popular destination for residents of Napa County, the San Francisco Bay Area, and the Sacramento metropolitan area. Projected growth in these nearby areas is expected to result in increased use of the Lake Berryessa area, as well as other recreation destinations in the region. Nearby cities of Napa, Vacaville, Fairfield, and Winters, as well as smaller towns along the highways, provide amenities to visitors at Lake Berryessa. An overview of current and projected growth in these areas and employment characteristics of Napa County is provided below.

Napa County and Nearby Cities According to the U.S. Census Bureau (2010), the 2010 population in Napa County totaled 136,484. The City of Napa is the largest incorporated and urban area in Napa County. Its population in 2010 was estimated at 76,915, approximately 55

percent of the total population in the county. The population of Napa County is projected to increase by up to 18,000 people through the year 2030, resulting in a total county population of more than 150,000.

Vacaville and Fairfield are incorporated cities in Solano County. Vacaville had an estimated population of 92,428 in 2010 (City of Vacaville 2013), and Fairfield had a similar estimated population of 107,684 in 2012 (City of Fairfield 2014). The population of Vacaville is projected to grow by approximately 18,500 by 2035, resulting in approximately 111,100 residents (City of Vacaville 2013). Fairfield is projected to grow by about 2 percent per year, resulting in a population of approximately 160,000 by 2035 (City of Fairfield 2014).

The unemployment rate of Napa County has averaged about 4.5 percent during the first half of 2014, which is lower than the state estimate of about 7.6 percent (Employment Development Department 2014). Most job opportunities in Napa County are in manufacturing, transportation and utilities, education and health services, leisure and hospitality, and government. Median annual income for Napa County during 2008–2012 was estimated at $69,571 (U.S. Census Bureau 2012).

San Francisco Bay Area The San Francisco Bay Area is defined as the nine-county area represented by the Association of Bay Area Governments, including Sonoma, Marin, Napa, Solano, Contra Costa, Santa Clara, Alameda, San Mateo, and San Francisco Counties. According to the Association of Bay Area Governments (2013), the 2010 population of the Bay Area was 7.2 million, and the Bay Area's population is projected to grow to 8.5 million people by 2030.

Sacramento Metropolitan Region The Sacramento Metropolitan Region is defined as the six-county area represented by the Sacramento Area Council of Governments, which includes El Dorado, Placer, Sacramento, Sutter, Yuba, and Yolo counties. According to the U.S. Census, the 2010 population of this region was 2.3 million. The region is projected to grow to 3.35 million people by 2035 (Sacramento Area Council of Governments 2014).

Local Setting

The Lake Berryessa area is primarily rural with limited residential uses; however, four private, unincorporated communities have been established around the lake: Berryessa Estates at the northwestern extent of the Putah Creek arm of the lake; Berryessa Pines and Pope Creek on the western shore just north of Monticello Shores RA; Spanish Flat on the western shore, north of Spanish Flat RA; and Berryessa Highlands on the southern shore, east of Steele Canyon RA. These communities are classified as rural residential areas and have limited commercial uses. Employment opportunities in the area are primarily recreation-based and are associated with the RAs and commercial facilities that support visitors and the local residents. Local government offices, including Reclamation's Lake Berryessa office, the Napa County Sheriff office/station at Spanish Flat, and the California Department of Forestry and Fire Protection station at Spanish Flat, also provide employment opportunities.

Lake Berryessa and the unincorporated communities around the lake are in the U.S. Census Tract number 2018. The estimated population of this tract was 1,457 in 2010 (U.S. Census Bureau 2010). Developments in this tract have had a gradual increase in population since 1970, when

the population was estimated at 463. Former mobile home and trailer parks at the RAs contributed to the local population until the removal of these homes and temporary closure of some of the RAs in 2009–2010. Berryessa Estates had an estimated population of 483 in 2010 (Local Agency Formation Commission [LAFCO] of Napa County 2011). Build-out of this community would more than double the population, resulting in approximately 979 residents. Berryessa Highlands had an estimated population of 920 in 2010, and build-out of this community would result in a residential population of about 1,606. Berryessa Pines and Spanish Flat had an estimated population of 401 in 2010, and build-out of these communities would result in a residential population of about 560.

The median household income estimate in this census tract in 2012 was $74,760 (U.S. Census Bureau 2012). Most workers in this census tract were in construction, education, healthcare, and manufacturing. Former developments at the RAs contributed to the economy of the region through sales for short-term recreational uses and amenities from nearby commercial areas and through employment opportunities. Total estimated gross receipts when the RAs operated in 2002 were more than $12 million (Reclamation 2005). Putah Canyon, Spanish Flat, and Steele Canyon RAs have been generating revenue since they have been open to the public, but the contributions to the local economy are likely less than in the past due to the limited amount of opportunities currently available and lower visitor numbers.

Visitors to the RAs at Lake Berryessa come from nearby major cities (e.g., San Francisco and Sacramento), the local communities, and more distant communities. The recreational opportunities are available to all groups of people and income brackets, as demonstrated by past visitor use. The fee-for-use activities may be less attractive to lower-income visitors, but no-fee day use areas and activities are available around the lake.

Environmental Consequences and Mitigation Measures

No-Action Alternative

Populations in the region would continue to grow, independent of the operations at the RAs. Interim facilities and various recreational opportunities would continue to be available at the RAs under the no-action alternative, which would continue to attract visitors to the area, but may not provide the diversity of opportunities expected from nearby populations. Visitation would likely be comparable to current conditions, and continued operations would generate some revenue for the local economy from the few employment opportunities for seasonal workers and sales of goods and services. Overall, socioeconomic conditions would be similar to current conditions.

Proposed Action

Overall Development and Conceptual Site Plan Impacts With the proposed development at the RAs, the RAs would provide a diversity of short-term recreational opportunities that would be expected to attract an estimated 1.5 million visitors or more annually to the Lake Berryessa area. None of the RAs would support long-term populations, although the generation of employment opportunities could encourage workers to move to the local communities at Lake Berryessa or to cities in the region. Generally, populations in the region would continue to grow independently of development at the RAs.

Operation of the RAs is expected to increase the number of available jobs at Lake Berryessa. The types of jobs created by the RAs would likely include hospitality, retail, maintenance, management, accounting, administration, and sales positions. Because the developments would be spread out over a period of time, these employment opportunities would become available over a span of years, with construction jobs being primarily available as facilities are constructed and operational jobs becoming available over the long term. The employment opportunities would likely contribute to local employment, with beneficial effects on local communities.

Other businesses in the Lake Berryessa area are also dependent on visitors to the area, and they would be expected to benefit from the increased visitation. Examples of businesses that would be most affected include convenience stores, gas stations, restaurants, snack bars, motels, boat storage facilities, beauty shops, and real estate offices. Overall, given that local average incomes are relatively low by statewide standards, the locally generated revenue and seasonal employment could be a substantial benefit to local residents.

Each of the RAs would generate revenue from boat storage and launches, campsite users, overnight lodging, and day users, although no initial revenue is anticipated at Monticello Shores RA and little revenue would be received at Berryessa Point RA. Monticello Shores (at full build-out), Spanish Flat and Steele Canyon RAs would also generate revenue from lodging units. Some RAs would be expected to require more expenditures to develop facilities while also generating more revenue based on the proposed uses and facilities. The projected revenue was not estimated for each RA because it would be dependent on visitation and the types of activities taking place and would be expected to increase as more facilities become available. Use fees would also be adjusted in response to market demand and would ultimately be expected to help offset the initial expenditures. Reclamation has the authority to approve use fees at the RAs.

Infrastructure Plan Impacts The proposed infrastructure would support the recreation facilities at four of the RAs and facilitate development of the RAs. Construction activities associated with the infrastructure would generate temporary employment for construction contractors and could increase revenue in nearby communities over the construction periods, while also resulting in initial expenditures to purchase materials. The infrastructure would not directly generate an increase in visitors to the RAs, but they would facilitate development of the RAs, as described above for the development. Overall the infrastructure plans would be beneficial to the local economies, and no mitigation measures were determined to be necessary.

Mitigation Measures

No mitigation measures were determined to be necessary for socioeconomic impacts because the impacts would be primarily beneficial from increased employment opportunities and revenue in the region. The phased development would provide longer-term benefits to the local economy over the 30-year development period.

Transportation and Circulation

The transportation and circulation setting is based on regional traffic and roadway conditions available from Napa County and Reclamation and local traffic levels measured at each RA by

Reclamation. The analysis presents a qualitative discussion of increased traffic levels and changes to circulation at the RAs and around Lake Berryessa.

Affected Environment

Regional Setting

Regional access to Lake Berryessa is provided by SR 121 and SR 128, which intersect with major highways in the region (Interstate 5 and 80). The state highways connect to local county roads (Berryessa Knoxville Road, Pope Canyon Road, Steele Canyon Road, and Wragg Canyon Road) to provide access to each of the RAs. The local roads are paved, two-lane roads designed for speeds of 25 to 55 mph. Primary access roads in the area operate below capacity except on weekends and holidays, and accident rates are comparable to those of other state roads on similar terrain.

The Berryessa Knoxville Road provides the only access to the western shore of the lake, including four of the RAs, two public day use areas, public launch ramp, several small stores, and three private residential developments. This road is a two-lane, north-south county road. Traffic on Berryessa Knoxville Road includes commercial, residential, and recreation users, and daily traffic counts vary depending on the time of year and road segment. During early May 2004, traffic counts estimated an average daily traffic range of 652 to more than 3,000 vehicles (Napa County Department of Public Works 2009). Current traffic is likely lower due to the closure of some of the RAs and recent reductions in visitation to the lake. Based on the average daily traffic, Berryessa Knoxville Road operates at levels of service of A and B (Napa County 2008). Level of service A means that traffic is relatively free flowing, with little or no limitation on vehicle movement or speed. Level of service B means that traffic flow is steady, with only slight delays in vehicle movement and speed. A level of service of D or better is the desired condition for county roads.

Local Setting

Putah Canyon RA Putah Canyon RA is currently open to the public with access from Berryessa Knoxville Road. Two entrances are available, one on each side of the road to access facilities on both sides. Current roads at the RA generally follow the road alignments associated with the previous development, but some road surfaces have been removed and some roads are no longer used. The internal circulation system (associated with the previous development) consisted of two primary collector roads and approximately eight secondary roads (Kleinfelder, Inc. 2002). None of the roads had tight curves or overly steep grades, but most of the secondary roads were not wide enough to accommodate two-way traffic. The circulation system also had few opportunities for large vehicles, such as fire trucks, to turn around. Some asphalt associated with the former roads has been removed, and some roads are dirt or gravel.

Monticello Shores RA Monticello Shores RA is not currently open to the public for recreational uses, and a gate at the former entrance location off Berryessa Knoxville Road restricts access. The internal circulation system associated with the previous development consisted of one main collector road through the center of the RA and other collector and secondary roads (Kleinfelder, Inc. 2002). The main collector roads had adequate width for two-way traffic. Most of the secondary roads were not wide enough to accommodate two-way traffic. None of the roads had tight curves or overly steep grades. The circulation system also

had few opportunities for large vehicles, such as fire trucks, to turn around. Some asphalt associated with the former roads has been removed, and some roads are dirt or gravel.

Berryessa Point RA Berryessa Point RA is not currently open to the public for recreational uses, and a gate at the former entrance location off Berryessa Knoxville Road restricts access. The internal circulation system associated with the previous development consisted of a primary north-south collector road, a second east-west collector road, and several secondary roads (Kleinfelder, Inc. 2002). The main collector roads had adequate width for two-way traffic with the exception of a segment in the northern part of the RA. Most of the secondary roads were not wide enough to accommodate two-way traffic. One road had a tight curve that posed a hazard for fire truck access, but none of the roads had overly steep grades. The circulation system also had few opportunities for large vehicles, such as fire trucks, to turn around. Some asphalt associated with the former roads has been removed, and some roads are dirt or gravel.

Spanish Flat RA Spanish Flat RA is currently open to the public with access from Berryessa Knoxville Road. Current roads at the RA generally follow the road alignments associated with the previous development, but some road surfaces have been removed and some roads are no longer used. The internal circulation system (associated with the previous development) consisted of one primary collector road (Spanish Flat Resort Road) and several secondary roads (Kleinfelder, Inc. 2002). The main collector roads had adequate width for two-way traffic, but most of the secondary roads were not wide enough to accommodate two-way traffic. One road had a tight curve that posed a hazard for fire truck access, but none of the roads had overly steep grades. The roads tended to get congested as a result of street-side parking due to inadequate parking areas. The circulation system also had few opportunities for large vehicles, such as fire trucks, to turn around. Some asphalt associated with the former roads has been removed, and some roads are dirt or gravel.

Steele Canyon RA Steele Canyon RA is currently open to the public with access from Steele Canyon Road off SR 128, which also provides the primary access to the Berryessa Highlands residential community. Current roads at the RA generally follow the road alignments associated with the previous development, but some road surfaces have been removed and some roads are no longer used. The internal circulation system (associated with the previous development) consisted of one main north-south collector road (Steele Resort Road) through the center of the RA and several other collector and secondary roads (Kleinfelder, Inc. 2002). The main collector roads had adequate width for two-way traffic. One road had a tight curve that posed a hazard for fire truck access, but none of the roads had overly steep grades. The circulation system also had few opportunities for large vehicles, such as fire trucks, to turn around.

Environmental Consequences and Mitigation Measures

No-Action Alternative

Under the no-action alternative, transportation in and adjacent to the RAs would remain similar to transportation under current conditions, possibly increasing slightly over time. Traffic levels would remain similar to levels under current conditions with most traffic occurring along Berryessa Knoxville Road. Monticello Shores and Berryessa Point RAs would continue to be closed and would not have much traffic. Traffic would occur primarily in and near the open RAs. Road conditions and access within the RAs would remain unchanged, which would not

meet Reclamation goals for the provision of short-term recreational uses over the long term. Specifically, some roads would not allow efficient emergency access or ideal circulation due to lack of turn around areas.

Proposed Action

Overall Development and Conceptual Site Plan Impacts Development of the RAs would increase on- and off-site traffic and could affect transportation patterns around the lake as a result of construction activities and longer-term operations. Construction-related traffic and transportation impacts would be temporary, and operation-related traffic from visitors would likely be comparable to historic traffic levels when all of the RAs were open. New circulation systems at each RA would be established to serve the proposed developments and would likely incorporate previous road alignments to the extent practicable.

Construction activities could require temporary road detours, lane or road closures, or trail closures within the RAs, but no main road closures outside the RAs are expected to be necessary. In addition, a slight increase in traffic to the RAs would occur during construction activities, as a result of construction equipment and materials being transported to the work area and periodic worker trips. Temporary closures would affect the circulation systems and parking within the RAs and could cause delays for visitors at the RAs if the RAs are open to the public during construction. Increased construction traffic could also increase delays, particularly if construction occurs during the peak visitor season at RAs that are open to the public. With construction activities primarily being scheduled during the fall, winter, or spring, these impacts would affect few visitors and would not restrict access to primary use areas. As discussed in Chapter 2, appropriate traffic control measures would also be implemented where needed along the main access roads to the RAs and within the RAs. These measures would reduce the potential for traffic-related impacts from construction activities.

As discussed in the Recreation section, development of the RAs would result in increased visitation to the RAs. Visitation levels would be comparable to those in the past when all of the RAs were open. Increased visitation would result in greater demand for parking within the RAs and would increase the number of vehicles using roads and parking areas for internal circulation and using public roads to access Lake Berryessa. During the peak use season, travelers along Berryessa Knoxville Road and other main roads near the lake may have increased delays, periodic congestion, and difficulty accessing the RAs due to high vehicle numbers. These traffic impacts would be similar to those in the past when all of the RAs were open. Improvements to the entry stations at each RA and the internal circulation systems within the RAs could alleviate some traffic issues through proper design, and Reclamation may need to coordinate with Napa County on road improvements needed outside the RAs to accommodate the increased visitors.

Additional personnel would be needed for the operation and maintenance of new facilities at the RAs, which would generate additional vehicle trips to and from the RAs. These additional trips would likely blend into the overall trips on main roads around the lake and would not likely increase congestion or delays by themselves.

Infrastructure Plan Impacts Construction activities associated with infrastructure installation would generate temporary traffic, as described above for the development. Traffic-related impacts would be similar at Putah Canyon, Spanish Flat, and Steele Canyon RAs based on the

similarity of the infrastructure plans for each RA. On-site traffic-related impacts would not be expected at Monticello Shores RA or Berryessa Point RA during infrastructure installation, assuming the RAs remain closed to the public during construction.

Construction traffic would be localized primarily around the work area in the RAs during infrastructure installation, but periodic trips along major roads, such as Berryessa Knoxville Road, would be needed for transport of construction equipment and materials and worker vehicle access to the RAs. Roads at the RAs may need to be closed during installation of underground pipelines, causing temporary disruptions to travel at the RAs, but detours would be provided for visitors using recreation facilities. The increased number of trips associated with construction activities would be minimal in comparison to the current traffic conditions on nearby roads; therefore, major delays or congestion would not occur as a result of the proposed action. As described in Chapter 2, traffic control measures would be implemented during construction activities to alert travelers on nearby major roads and visitors to the RAs of the construction activities. Additional measures were not determined to be necessary for construction-related traffic impacts associated with the infrastructure plans.

Minimal traffic impacts are anticipated after the infrastructure is in place. Pipelines and other facilities would require periodic maintenance, which could involve temporary road detours and traffic similar to that anticipated for the construction activities. Standard construction practices for traffic control would be implemented during these activities. Mitigation measures were not determined to be necessary for operation-related traffic impacts associated with the infrastructure plans.

Mitigation Measures

No mitigation measures were determined to be necessary for Transportation and Circulation impacts. With implementation of traffic control measures, as described in Chapter 2, only minimal impacts on traffic would occur during construction activities. In addition, Reclamation would coordinate with Napa County on road improvements outside the RAs that fall under the County's jurisdiction.

Utilities and Service Systems

The utilities and service systems setting is based on previous environmental documentation for activities at Lake Berryessa and a review of applicable literature, studies of the area, and service provider websites and reports. The analysis discusses the potential increased demand on service providers from development of the RAs.

Affected Environment

Regional Setting

Private utility companies and public districts provide energy, water supply, wastewater treatment, and solid waste disposal services to customers around Lake Berryessa. PG&E is the primary electricity and natural gas provider in Napa County. Three local public service providers, NBRID, Lake Berryessa Resort Improvement District (LBRID), and SFWD, provide water supply and wastewater services to communities in the Lake Berryessa area. The Upper

Valley Waste Management Agency coordinates solid waste disposal services to the unincorporated area around Lake Berryessa, and Berryessa Garbage Service collects and disposes of solid waste.

PG&E Facilities PG&E operates three major transmission corridors and nine electrical substations in the county (Napa County 2005). The normal transmission capacity for Napa County is estimated at 390 megavolt-amps. Six energy-producing facilities in the county provide a total capacity of 20.06 megawatts. Total electricity consumption in the county is much greater than the capacity of the six energy-producing facilities, resulting in a need to obtain energy from outside sources. In 2004, for example, the county facilities supplied only 8.5 percent of the peak electrical demand. With PG&E's transmission lines, the electricity demand for the county is being met.

NBRID Facilities NBRID provides potable water and sewer services to Berryessa Highlands and formerly provided service to Steele Canyon RA (when it was open as the Steele Park Resort). The NBRID sphere of influence encompasses approximately 251 acres of land at the southern extent of Lake Berryessa in unincorporated Napa County (LAFCO of Napa County 2011). Services are provided to 350 water and 351 sewer connections (LAFCO of Napa County 2011), and NBRID has planned to serve about 860 connections based on the anticipated build-out of its service area (NBRID 2010). The RA under previous management was allocated 228 Equivalent Dwelling Units according to NBRID (2010).

Water Supply The Napa County Flood Control and Water Conservation District (Napa County Water District) has a contract with Reclamation for an annual amount of up to 1,500 acre-feet from Lake Berryessa. The District has subcontracts for this water with property owners in the Lake Berryessa area and three special districts. Through an agreement with Napa County Water District, NBRID is entitled to 300 acre-feet of water from Lake Berryessa annually through 2028 (LAFCO of Napa County 2011).

Water supply is drawn from Lake Berryessa via a floatable, submerged intake system and is treated at the Napa-Berryessa Water Treatment Plant. The treatment plant has a daily treatment capacity of 612,000 gallons (Napa County 2005). Distribution pipelines currently extend from the treatment plant to the residential connections and to Steele Canyon RA. NBRID also has a 500,000-gallon storage tank and a pump station. The estimated peak day water demand for the 350 service connections in 2010 was 488,000 gallons, and the annual demand was 71.4 acre-feet. As of 2011, the peak day demand was at 79 percent of the treatment plant's daily capacity, and the storage tank was operating under capacity. Based on 2011 estimates, the projected build-out of the service area would result in a peak day demand of 1.018 million gallons, which would exceed the capacity of the water treatment plant and storage tank, resulting in the need to expand the facilities. NBRID is upgrading its treatment plant to expand capacity and meet regulatory agencies' requirements for the facilities (NBRID 2012).

Wastewater Treatment NBRID is upgrading its wastewater treatment plant to meet waste discharge requirements and expand capacity. The upgraded treatment plant has a design capacity for treating and disposing approximately 33.4 million gallons of wastewater at full build-out and 39.2 million gallons during a 100-year flood condition (Reclamation 2013b). Wastewater facilities include a membrane bioreactor style package treatment plant that provides tertiary

treatment; three wastewater ponds; lift stations; collection pipelines; and a spray field to dispose of the treated wastewater. Sewer connections to Steele Canyon RA were disconnected when the previous resort was closed, but pipelines that extend to Berryessa Highlands are still in place along Steele Park Road.

The average dry- and wet-weather flows for 351 connections in 2010 were 63,000 and 80,000 gpd, respectively (LAFCO of Napa County 2011). Peak wet-weather flows, however, were substantially higher at 310,000 gpd and exceeded the capacity of the system, resulting in unauthorized spills into the Lake Berryessa watershed. The system has capacity to serve projected average flows at build-out of the NBRID service area (126,000 gpd dry-weather and 160,000 gpd wet-weather), which includes an estimated 100 connections at Steele Canyon RA, but projected peak flows (624,000 gpd) would substantially exceed the system capacity until the facilities are expanded. NBRID is upgrading its treatment plant to expand capacity and meet regulatory agencies' requirements for the facilities (NBRID 2012).

LBRID Facilities LBRID provides potable water and sewer services to the Lake Berryessa Estates subdivision, which lies at the northwestern extent of the Putah Creek arm of the lake. Its sphere of influence encompasses approximately 176 acres of unincorporated Napa County (LAFCO of Napa County 2011). Services are provided to 181 water and sewer connections.

Water Supply LBRID draws water supply from Lake Berryessa pursuant to an agreement with the Napa County Water District (Napa County 2005, LAFCO of Napa County 2011). LBRID is entitled to 200 acre-feet of water from Lake Berryessa annually through 2024. LBRID operates a floatable intake system on the lake at Putah Creek, a water treatment plant (currently being upgraded), a distribution system, three storage tanks with total capacity of 400,000 gallons, and a pump station. The treatment plant has a treatment capacity of 250,000 gpd. The peak day water demand for LBRID customers in 2010 was approximately 130,400 gallons for 181 service connections, which is 52 percent of the water treatment plant's daily capacity (LAFCO of Napa County 2011). The plant has a peak day capacity of 0.77 acre-feet and will require upgrades to meet the projected demands at build-out of the service area (0.85 acre-feet peak day demand from 374 total estimated connections). The storage tanks currently operate under capacity and are capable of providing the projected peak day demand at build-out of the service area.

Wastewater Treatment LBRID operates 7.5 miles of sewer lines and a secondary-level treatment facility with a holding tank, wastewater ponds, and a 6-acre spray field. The treatment system has a design capacity of 44,000 gpd for dry weather flows and 84,000 gpd for wet-weather flows (LAFCO of Napa County 2011). The storage ponds have capacity for 7.86 million gallons. Sewer service is provided to 181 sewer connections, and the average dry- and wet-weather flows in 2010 were 21,000 and 30,000 gpd, respectively. Peak wet-weather flows, however, were substantially higher at 270,000 gpd and exceeded the capacity of the system, resulting in unauthorized spills into the Lake Berryessa watershed. The system has capacity to serve projected average flows at build-out of the LBRID service area (43,900 gpd in dry weather and 70,400 gpd in wet weather), but peak flows would continue to exceed the system capacity, resulting in the need to expand the facilities.

SFWD Facilities SFWD provides potable water and sewer services to the Spanish Flat and Berryessa Pines communities along the western shoreline of Lake Berryessa and formerly served

the Spanish Flat RA when it was operated as the Spanish Flat Resort. Its sphere of influence encompasses approximately 1,334 acres of unincorporated Napa County, including the Spanish Flat RA (LAFCO of Napa County 2011). Services are provided to 127 water and 115 sewer connections.

Water Supply SFWD draws water from Lake Berryessa pursuant to an agreement with the Napa County Water District and treats it at the Spanish Flat and Berryessa Pines Water Treatment Plants, which were upgraded in 2007. SFWD is entitled to 200 acre-feet of water from Lake Berryessa annually through 2024.

The Berryessa Pines Water Treatment Plant has a capacity of 144,000 gpd and is currently operating at less than 40 percent capacity (LAFCO of Napa County 2011). The peak day demand for Berryessa Pines residents in 2010 was 55,400 gallons. The projected peak day demand at build-out of the community is 72,000 gallons, which is within the capacity of the plant.

The Spanish Flat Water Treatment Plant has a capacity of 172,800 gpd and is currently operating at less than 60 percent capacity (LAFCO of Napa County 2011). The peak day demand for Spanish Flat residents in 2010 was 100,000 gallons. The projected peak day demand at build-out of the community is 375,000 gallons, which exceeds the current capacity of the plant. The projection includes an estimated 221 Equivalent Dwelling Units at the Spanish Flat RA.

Wastewater Treatment SFWD operates two wastewater treatment plants at the Spanish Flat and Berryessa Pines communities. The Berryessa Pines Treatment Plant provides secondary-level treatment and has two wastewater ponds with capacity to store 2.5 million gallons of wastewater (LAFCO of Napa County 2011). The plant has a design dry-weather flow capacity of 14,000 gpd. Average dry- and wet-weather flows in 2010 were 3,000 and 12,000 gpd, respectively, and peak wet-weather flows were 22,000 gpd. The capacity of the facility with respect to wet-weather flows is unknown, but the facility is assumed to be able to accommodate current peak flows. Projected flows at build-out of the Berryessa Pines community are 3,800 gpd in dry weather and 15,400 gpd in wet weather, which are within the capacity of the plant. Peak wet-weather flows are projected to increase to 28,100 gpd.

The Spanish Flat treatment plant also provides secondary-level treatment, and it has a 4.2-million-gallon holding pond and two spray fields. The plant's design dry- and wet-weather capacities are 8,000 and 22,000 gpd, respectively, and the peak wet-weather capacity is 48,000 gpd. Average dry- and wet-weather flows in 2010 were 8,000 and 22,000 gpd, respectively, and peak wet-weather flows were 48,000 gpd. Projected flows at build-out of the Spanish Flat service area are 20,300 gpd in dry weather and 56,000 gpd in wet weather, which are within the capacity of the plant. Peak wet-weather flows are projected to increase to 122,000 gpd, which would exceed the plant's capacity. This projection does not include sewer connections at the Spanish Flat RA.

Solid Waste Disposal Berryessa Garbage Service operates the Steele Canyon Road transfer station south of Lake Berryessa at the site of a former landfill. The station receives mixed municipal, construction, and demolition waste. Waste collected by Berryessa Garbage Service is transported to the Potrero Hills landfill in Suisun City, Solano County, which has capacity to

receive up to 4,330 tons of waste daily and had 13.8 million cubic yards of remaining capacity as of 2006 (California Department of Resources Recycling and Recovery 2014).

Local Setting

Steele Canyon and Spanish Flat RAs currently have limited water service that utilizes existing water lines. A groundwater well and limited water distribution system were installed at Putah Canyon RA in June 2017. However the yield from that well is not anticipated to be adequate to support full build out of this site. The remaining two RAs (i.e., Monticello Shores and Berryessa Point), which are closed to the public, do not have water service. NBRID serves Steele Canyon RA for water supply, SFWD serves and Spanish Flat RA. No RAs currently have wastewater service. Electrical service is provided to each of the open RAs by PG&E, and power lines and poles still exist at all of the RAs. Solid waste disposal and recycling services are provided for visitors at the open RAs.

Environmental Consequences and Mitigation Measures

No-Action Alternative

Under the no-action alternative, interim facilities would continue to be available. Reclamation authorized installation of a groundwater well and associated distribution system at Putah Canyon RA (see Reclamation 2014b for NEPA document for these facilities). The groundwater produced by this well was of limited quantity.

Under the no-action alternative no other facilities would be installed without prior approval from Reclamation and appropriate environmental review. Water service would continue to be available at Steele Canyon, Spanish Flat, and Putah Canyon RAs. Wastewater treatment facilities would not be available at any of the RAs. Limited electrical service would be available in some areas. Solid waste disposal would continue to be available to visitors via on-site trash cans. The demand for utility services would not increase under this alternative, and none of the nearby service providers (e.g., NBRID) would be affected.

Proposed Action

Overall Development and Conceptual Site Plan Impacts Development at the RAs would result in an increase in demand for water supply, water and wastewater treatment, electricity, and other services, which would vary depending on the actual number and type of facilities constructed at each RA and the actual annual visitation. The general impacts associated with installation of utilities are presented below, and site-specific impacts for the infrastructure plans are presented in the following section. Additional analysis may be necessary for some utilities once specific details about the facilities, their locations, and construction activities are known.

Development at the RAs would include infrastructure at each RA, including additional water supply and water and wastewater treatment infrastructure at some RAs to support operations. Some RAs may connect to off-site facilities, and those that do not would have self-supporting facilities. On-site water supply systems may involve installation of groundwater wells, which could require deep drilling to reach the groundwater aquifer. Regardless of the source of water supply, new distribution pipelines would need to be installed at each of the RAs.

On-site wastewater systems may require leach fields or treatment facilities, which could also involve substantial ground disturbance depending on the location. Construction activities could result in a temporary disruption to service within the RAs if they are open to the public during construction. Standard construction practices and BMPs described in Chapter 2 and mitigation measures described for other resource topics (e.g., air quality, noise) would help minimize disruptions at the RAs during construction activities.

The development of various recreation facilities at each of the RAs and increased use of the RAs would increase the demand for utility services. For RAs with self-supporting systems, no impacts on off-site service providers (e.g., NBRID, SFWD) would be expected, and the on-site facilities would be designed to accommodate the projected demands. For RAs requiring off-site service, the development would increase the demand on the service providers, and Reclamation or the concessionaire(s) would need to coordinate with them in advance to ensure that adequate facilities would be available. Electricity demand would also increase by full build-out of the RAs, and PG&E would be expected to continue providing electrical service to the RAs. Many of existing electrical poles and transformers will have to be replaced or relocated to accommodate new development. Reclamation or the concessionaire(s) would coordinate with PG&E as facilities are developed so that adequate service can be provided.

Solid waste disposal service would continue to be provided as it has in the past. Trash bins and recycle facilities would be provided at each of the RAs. With development, the volume of solid waste generated by RA operations would increase gradually, which would give the local service providers and landfill operators the ability to plan in advance for any needed facility modifications. Reclamation or the concessionaire(s) would coordinate with the appropriate entities so that adequate service can be provided. Based on the available capacity of the Potrero Hills landfill, which is the disposal site for solid waste collected by Berryessa Garbage Service, solid waste generated at the RAs could likely be accommodated within the existing landfill. In addition, given the nature of the recreational uses, solid waste would not be generated year-round and would vary annually in response to actual uses. Overall, solid waste generation may be comparable to or less than past annual generation rates by full build-out because of the lack of permanent uses, which tend to generate more solid waste than short-term recreational uses.

Infrastructure Plan Impacts Impacts to utilities and service systems that would result from implementing infrastructure plan elements at the five RAs are summarized below.

Putah Canyon RA Implementing the infrastructure plan for Putah Canyon RA would involve the installation of new water and wastewater pipelines, construction of a wastewater treatment facility and supporting facilities, establishment of stormwater control areas, installation of electrical lines and transformers, and establishment of parking areas and roads. These facilities would involve varying levels of ground disturbance, vegetation removal, and general disruptions to local recreational activities at the RA while it is open during construction. Temporary service disruptions may occur while installing new infrastructure or modifying existing infrastructure for utilities that are already online. Construction-related impacts on air quality, biological resources, soils, noise, water quality, and other resource topics would be minimized through implementation of standard construction practices and BMPs described in Chapter 2 and mitigation measures described in other sections of Chapter 3.

Monticello Shores RA Infrastructure plan elements at Monticello Shores RA are limited to construction of a single access road close gate, located near the southern boundary of the RA, immediately north of the intersection of the two-way circulation road (a conceptual plan element) and Berryessa Knoxville Road. With incorporation of the environmental commitment and standard construction practices set forth in Chapter 2 for the proposed action, implementing infrastructure plan elements at Monticello Shores RA will not have a significant impact on utilities and service systems.

Berryessa Point RA Implementing the infrastructure plan for Berryessa Point RA would involve the establishment of stormwater control areas, installation of electrical lines and transformers, and establishment of parking areas and roads. These facilities would involve minor levels of ground disturbance and vegetation removal. Construction-related impacts on air quality, biological resources, soils, noise, water quality, and other resource topics would be minimized through implementation of standard construction practices and BMPs described in Chapter 2 and mitigation measures described in other sections of Chapter 3.

Spanish Flat RA Implementing the infrastructure plan for Spanish Flat RA would involve the installation of new water pipelines, possible improvements to an existing storage tank, establishment of stormwater control areas, installation of electrical lines and transformers, and establishment of parking areas and roads. These facilities would involve varying levels of ground disturbance, vegetation removal, and general disruptions to local recreational activities at the RA while it is open during construction. Temporary service disruptions may occur while installing new infrastructure or modifying existing infrastructure for utilities that are already online. Construction-related impacts on air quality, biological resources, soils, noise, water quality, and other resource topics would be minimized through implementation of standard construction practices and BMPs described in Chapter 2 and mitigation measures described in other sections of Chapter 3.

Steele Canyon RA Implementing the infrastructure plan for Steele Canyon RA would involve the installation of new water and wastewater pipelines, possible installation of a storage tank, establishment of stormwater control areas, installation of electrical lines and transformers, and establishment of parking areas and roads. These facilities would involve varying levels of ground disturbance, vegetation removal, and general disruptions to local recreational activities at the RA while it is open during construction. Temporary service disruptions may occur while installing new infrastructure or modifying existing infrastructure for utilities that are already online. Construction-related impacts on air quality, biological resources, soils, noise, water quality, and other resource topics would be minimized through implementation of standard construction practices and BMPs described in Chapter 2 and mitigation measures described in other sections of Chapter 3.

Minimal operational impacts are anticipated after the infrastructure is in place. Pipelines and other facilities would require periodic maintenance, which would involve the use of construction equipment and possible ground-disturbing activities similar to those anticipated with construction activities. Mitigation measures were not determined to be necessary for operation-related impacts associated with the infrastructure plans.

Mitigation Measures

No mitigation measures were determined to be necessary for utilities and service systems impacts. Measures identified in other sections of this chapter, such as for biological resources, would reduce the potential for environmental impacts from infrastructure installation and construction of facilities for water and wastewater service. Implementation of standard construction practices, as described in Chapter 2, would also reduce the potential for impacts from installation of utilities. In addition, Reclamation or the concessionaire(s) will coordinate with off-site service providers if their service(s) are needed at any of the RAs.

Visual Resources

The visual resources setting is based on site visits and photographs of the Lake Berryessa area and a review of applicable literature and studies of the area. The analysis discusses the potential for changes to the visual environment from development of the RAs. Representative photographs are presented in Appendix H.

Affected Environment

Regional Setting

Lake Berryessa, as one of the largest freshwater lakes in California, is an important scenic and visual resource for visitors and residents in the region. Views of the area encompass scenic variations and dramatic panoramas of the lake and surrounding mountains. Key public viewpoints are available at the RAs and other public use areas around the lake, as well as along local roads and on the water. No eligible or designated state scenic highways exist around Lake Berryessa, but Berryessa Knoxville Road along the western side of Lake Berryessa is a Napa County-designated scenic road and is subject to viewshed protection (Napa County 2008).

Scenic views around the lake are defined by steep hills that descend directly into the lake with a mixture of dense vegetation and open grasslands. Scattered buildings are visible along the western and southern sides of the lake and are interspersed with oak woodlands and grasslands. Vegetation communities on the west shore consist of gray pine and oak woodland, which are interspersed with sloping grasslands, chaparral, and rural development. The east shore is undeveloped and provides exceptional scenic views of a mixture of dense vegetation and open grasslands. Built features, the exposed shoreline during low water levels, and poorly maintained roads detract from the scenic quality of the environment and can affect visitor experience.

Viewer groups at Lake Berryessa include motorists, recreationists, and residents. Motorists have tree-filtered views of the lake and surrounding environment from the local roads and highways. Motorists include travelers passing through the area or visiting the lake as well as local commuters. This viewer group is less sensitive to localized changes in the visual setting because they tend to have shorter duration views of an area as they drive by. Recreationists have views of the lake and surrounding environment from the RAs and while on the water, and these views contribute to visitor experience, making them sensitive to changes in the visual setting. Residents have views from their homes or properties and tend to be acclimated to the views, making them more likely to notice changes in the visual setting.

Local Setting

Each of the RAs offers views of the surrounding lake and mountains with varying levels of obstructions and detractions, and views of each RA vary from nearby roads, the water, and other public viewing areas. This section describes the views to and from the RAs. Representative photographs of the RAs are provided in Appendix H.

Putah Canyon RA Views from Putah Canyon RA are of the northern portion of the lake, mountains on the far (east) side of the lake, and the hills to the west. Areas along the shoreline have the best views across the lake, whereas views from areas closer to Berryessa Knoxville Road are partially obscured by surrounding vegetation and topography.

Putah Canyon RA is visible from Berryessa Knoxville Road, the lake, and trails to the north and south. Roadside vegetation masks views of most of the RA. Some of the interim facilities are visible from nearby viewpoints, but for the most part, the facilities are obscured by surrounding vegetation and topography, particularly for views from the road and water. Facilities along the shoreline are visible from the water and North End Trail to the north, although the distance between the RA and most viewpoints makes the facilities less prominent in the viewshed. Visitors at Camp Berryessa to the north also have views of the northern portion of the RA and of the Putah Creek arm. Disturbed areas with bare earth and invasive vegetation and collapsed retaining walls detract from the scenic quality of the RA.

Monticello Shores RA Views from Monticello Shores RA are of the central portion of the lake and surrounding hills and mountains. This RA extends along the shore of the lake and provides views of the lake and mountains from many viewpoints.

Monticello Shores RA is visible from Berryessa Knoxville Road, the tip of the peninsula at Berryessa Point RA, a small island, and the lake. Motorists along Berryessa Knoxville Road have very limited views of the RA due to dense vegetation along the road and the downward-sloping topography. All of the RA is visible from the water, although vegetation partially obscures areas closer to Berryessa Knoxville Road. The Monticello Shores RA peninsula is visible from the tip of the peninsula at Berryessa Point RA. Disturbed areas with bare earth and invasive vegetation and collapsed retaining walls detract from the scenic quality of the RA.

Berryessa Point RA Views from Berryessa Point RA are of the central portion of the lake, small coves adjacent to the RA, a small island to the east, and surrounding hills and mountains. A peninsula at the RA extends into the lake and provides views of the lake and mountains. Views of the surrounding landscape are available from most of the RA.

Berryessa Point RA is visible from Berryessa Knoxville Road, a small island on the lake, some portions of Monticello Shores RA, and the lake. Motorists along Berryessa Knoxville Road have somewhat limited views of the RA due to dense vegetation along the road and the topography. All of the RA is visible from the water, although vegetation partially obscures areas closer to Berryessa Knoxville Road. Disturbed areas with bare earth, invasive vegetation, and collapsed peninsula wall detract from the scenic quality of the RA.

Spanish Flat RA Views from Spanish Flat RA are of the southern portion of the lake, coves adjacent to the RA, Steele Canyon RA across the water to the south, and surrounding hills and

mountains. A peninsula at the RA extends into the lake and provides views of the lake and mountains. A hill on the peninsula offers excellent views across the lake. Views from the western part of the RA are obscured by vegetation and topography, including the peninsula and hill, limiting views of the surrounding landscape from the western part.

Spanish Flat RA is visible from Berryessa Knoxville Road, Steele Canyon RA, and the lake. Motorists along Berryessa Knoxville Road have somewhat limited views of the RA due to dense vegetation along the road and the topography. Most of the RA is visible from the water, with views of the southern and central portions from the cove to the south and views of the eastern portion from the main part of the lake to the east. Vegetation and topography of the peninsula block views of the western portion of the RA from the main part of the lake. The southern part of the peninsula and central portion of the RA are visible, to some extent, from Steele Canyon RA, but vegetation and topography block some views of Spanish Flat RA from the other RA. Interim facilities at Spanish Flat RA are visible from the water and some areas of Steele Canyon RA, but vegetation and topography limit most views. Disturbed areas with bare earth and invasive vegetation in the western portion of the RA detract from the scenic quality of the RA.

Steele Canyon RA Views from Steele Canyon RA are of the southern portion of the lake, coves adjacent to the RA, Spanish Flat RA to the north, and surrounding hills and mountains. This RA is more open with less obscuring vegetation in the central part than in other parts, providing excellent views of the lake and surrounding landscape. Views from the southern portion of the RA are more obscured by vegetation, limiting views of the surrounding landscape.

Steele Canyon RA is visible from Steele Canyon Road, Spanish Flat RA across the water to the north, and the lake. Motorists along Steele Canyon Road are primarily residents of Berryessa Highlands or visitors to the RA, and views from the road are somewhat limited by the topography and vegetation. All of the RA is visible from the water, with views of the southern and central portions from the cove to the west and views of the northern portion from the main part of the lake to the north. Vegetation and topography block views of Steele Canyon RA from the launch ramp to the west. The southern end of the peninsula at Spanish Flat RA offers direct views of Steele Canyon RA. Interim facilities at Steele Canyon RA are visible from some surrounding viewpoints, and vegetation and topography partially limit views from some viewpoints. Disturbed areas with bare earth and invasive vegetation detract from the scenic quality of the RA.

Environmental Consequences and Mitigation Measures

No-Action Alternative

Under the no-action alternative, no changes in the visual settings of the RAs would occur. Interim facilities would continue to be available, and disturbed areas at the locations of former facilities would continue to be visible from within and near the RAs. No additional improvements to the RAs would take place without approval from Reclamation and additional NEPA compliance.

Proposed Action

Overall Development and Conceptual Site Plan Impacts Development of the five RAs would provide new short-term use facilities and associated infrastructure, landscaping, and signs.

New facility development would result in changes to views of the RAs and the appearances of recreation facilities from roadways, use areas, and the lake. Visual changes resulting from construction activities associated with new facility development would have the greatest potential to degrade the visual setting; however, these changes would be temporary. With development, longer-term changes would be more noticeable, but they would generally improve the visual setting of the RAs.

Changes to views during construction would result from the presence of construction equipment; unfinished facilities; and exposed areas that require extensive grading, cut and fills, or vegetation removal. The general construction schedule would reduce the potential for visitors to the RAs to be affected by temporary visual changes by scheduling work for the fall, winter, or early spring, to the extent practicable, to avoid construction activities during the peak visitor season. Furthermore, most of the construction activities within the RAs would be readily visible to motorists on Berryessa Knoxville Road, and nearby residents. Visitors on the water may have views of some construction activities, but the activities would not be expected to detract from the larger scenic viewshed.

Overall, impacts on the visual setting would vary across the RAs, with some changes being more noticeable than others, and some locations being less sensitive to change than others. Generally, the developments would improve the visual setting of the RAs by installing new, up-to-date, and aesthetically pleasing recreation facilities in place of unvegetated, previously disturbed areas. Some facilities would require vegetation removal and grading, but the designs would incorporate native vegetation, particularly trees that provide shade and overstory cover, to maintain the natural visual setting of the RAs. All development would be consistent with Reclamation's design guidelines, which require all recreation facilities to be harmonious in form, line, color, and texture with the surrounding landscape while meeting Reclamation goals for the RAs.

Infrastructure Plan Impacts Construction activities associated with infrastructure installation at Putah Canyon, Monticello Shores, Berryessa Point, Spanish Flat, and Steele Canyon RAs would involve temporary visual disturbance in localized areas of the RAs, as described above for the development.

A discussion of visual impacts at the five RAs is presented below. Most construction activities would be masked by surrounding vegetation and topography and would not be visible from public viewpoints outside the RAs. With most infrastructure being installed in previously disturbed areas or in place of existing infrastructure, the overall visual quality of the RAs after infrastructure installation would be similar to the quality in the current visual environment, and the modern facilities would improve the visual character of developed portions of the RAs. Based on the minimal changes to the visual setting, no mitigation measures were determined to be necessary for construction-related impacts.

Putah Canyon RA The infrastructure plan for Putah Canyon RA would involve the installation of new water and wastewater pipelines, construction of a wastewater treatment facility and supporting facilities, establishment of stormwater control areas, installation of electrical lines and transformers, and establishment of parking areas and roads.

Most of the infrastructure would be installed in previously disturbed areas, such as under existing roads or parking areas and at current or previously used recreation sites. Installation of underground infrastructure would result in temporary visual changes while trenches are excavated and pipes are installed, but the underground infrastructure would not be visible once installed. New aboveground infrastructure would modify the visual setting, but it would also improve the quality of the developed areas with the new facilities being designed in accordance with Reclamation guidelines.

Temporary construction-related visual disturbances would occur as vegetation is removed and soils are graded, but most activities would be masked by surrounding vegetation and topography and would be minimally visible from nearby public viewpoints. Construction of the wastewater treatment facility, particularly the ponds, at Putah Canyon RA would result in greater ground disturbance than other facilities and modify the visual setting the most. The facility would, however, be located away from proposed and existing recreation sites and would be minimally visible from the lake and other public viewpoints.

Monticello Shores RA Infrastructure plan elements at Monticello Shores RA are limited to construction of a single access road close gate, located near the southern boundary of the RA, immediately north of the intersection of the two-way circulation road (a conceptual plan element) and Berryessa Knoxville Road. Construction of the access road close gate would be briefly visible to passersby on the road, and from the lake itself, but those views would be largely obstructed by vegetation, and the construction activities would not diminish the existing visual quality.

Berryessa Point RA The infrastructure plan for Berryessa Point RA would involve the establishment of stormwater control areas, installation of electrical lines and transformers, and establishment of parking areas and roads. All of the infrastructure would be installed in previously disturbed areas and would result in minimal changes to the visual setting. Electrical lines may be visible from the lake and nearby public viewpoints, but it would be primarily masked by vegetation and generally blend in with the surrounding environment. Paved areas may also be noticeable, but they would be at ground level and would not degrade the visual environment.

Spanish Flat RA The infrastructure plan for Spanish Flat RA would involve the installation of new water pipelines, possible improvements to an existing storage tank, establishment of stormwater control areas, installation of electrical lines and transformers, and establishment of parking areas and roads.

Most of the infrastructure would be installed in previously disturbed areas, such as under existing roads or parking areas and at current or previously used recreation sites. In steep areas, such as on the peninsula at Spanish Flat RA, the infrastructure may be more visible as it follows the hillside. Installation of underground infrastructure would result in temporary visual changes while trenches are excavated and pipes are installed, but the underground infrastructure would not be visible once installed. New aboveground infrastructure would modify the visual setting, but it would also improve the quality of the developed areas with the new facilities being designed in accordance with Reclamation guidelines. Temporary construction-related visual disturbances would occur as vegetation is removed and soils are graded, but most activities

would be masked by surrounding vegetation and topography and would be minimally visible from nearby public viewpoints.

Steele Canyon RA The infrastructure plan for Steele Canyon RA would involve the installation of new water and wastewater pipelines, possible installation of a storage tank, establishment of stormwater control areas, installation of electrical lines and transformers, and establishment of parking areas and roads.

Most of the infrastructure would be installed in previously disturbed areas, such as under existing roads or parking areas and at current or previously used recreation sites. In steep areas, such as on the peninsula in the northern portion of the RA, infrastructure may be more visible from the lake. Installation of underground infrastructure would result in temporary visual changes while trenches are excavated and pipes are installed, but the underground infrastructure would not be visible once installed. New aboveground infrastructure would modify the visual setting, but it would also improve the quality of the developed areas with the new facilities being designed in accordance with Reclamation guidelines. Temporary construction-related visual disturbances would occur as vegetation is removed and soils are graded, but most activities would be masked by surrounding vegetation and topography and would be minimally visible from nearby public viewpoints.

Mitigation Measures

No specific mitigation measures were determined to be necessary for visual resource impacts.

Water Resources

The water resources setting is based on previous environmental documentation for activities at Lake Berryessa and a review of applicable literature and studies of the area, including the *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins* (Regional Water Board 2011). The analysis discusses the potential for changes in drainage patterns, water quality impacts, and increased groundwater withdrawal to result from development of the RAs.

Affected Environment

Surface Water Features Lake Berryessa is the main feature of the Solano Project. Other important features of the Solano Project are Putah Diversion Dam; Putah South Canal with a small terminal reservoir; and the necessary waterways, laterals, and drainage works. The Solano Project provides a variety of benefits including water supply for irrigation, municipal, and industrial uses, as well as providing for recreation and flood control.

Lake Berryessa collects surface flow from the Upper Putah Creek watershed, a 568-square-mile drainage basin above Monticello Dam (Reclamation 2005). Four principal tributaries flow into Lake Berryessa: Capell Creek, Pope Creek, Eticuera Creek, and Putah Creek. Putah Creek is the primary tributary to Lake Berryessa, and it enters the lake just north of Putah Canyon RA. Other smaller tributaries include Butts Creek, Smittle Creek, Adams Creek, Maxwell Creek, and numerous other small, unnamed, intermittent, and ephemeral drainages. Several ephemeral and intermittent streams flow through the RAs, as described in the Biological Resources section.

The lake's storage capacity is 1.6 million acre-feet at a water surface elevation of 440 feet above msl, which is the elevation of the bell-shaped spillway ("glory hole") near the dam (Reclamation 2005). Lake levels can fluctuate substantially, depending on hydrological and meteorological conditions, water demands, flood control, hydropower needs, and operation of Monticello Dam. Lake levels may fluctuate from a maximum elevation (high water level) of 455 feet to a minimum elevation of 253 feet.

Precipitation is the primary source of water in the Upper Putah Creek watershed. Almost all precipitation falls in the form of rain, usually between November and April, and the average annual rainfall is 22.6 inches. The average annual inflow to the reservoir is 369,000 acre-feet (Reclamation 2005). Monticello Dam is operated to store high winter flows and release them later in the summer months for water deliveries and hydroelectric power generation. Some water is released between January and February for flood control. The annual firm yield of the lake is 201,000 acre-feet. A release of 22,000 acre-feet is required annually to meet downstream water rights along Putah Creek.

The State Water Board reserved 33,000 acre-feet of water in the Putah Creek watershed for future development upstream of Monticello Dam. Reclamation received a permit for 7,500 acre-feet of this amount to provide for municipal, domestic, and stockwatering uses around the reservoir. This amount has since been reduced to a maximum of 2,500 acre-feet.

The entire lake is designated Zone A by the Federal Emergency Management Agency and has a 1 percent annual chance of being inundated by a 100-year flood event. The flood zone extends to 455 feet above msl, which is the elevation of the top of the spillway. Reclamation restricts development in the reservoir floodplain or water influence zone (440 feet to 455 feet above msl) (Reclamation 2005). The reservoir floodplain has been subject to flooding, resulting in damage to facilities and the potential for hazardous chemicals to enter the lake. All upland areas are in Zone X and have a very low potential to become flooded by a 100-year flood event.

Surface Water Quality

The Regional Water Board designated several beneficial uses for Lake Berryessa in the *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins* (Regional Water Board 2011). These uses include municipal and domestic supply, agricultural supply, hydropower generation (potential use), water contact recreation, non-contact water recreation, warm freshwater habitat, cold freshwater habitat, warmwater fish spawning, and wildlife habitat. For each beneficial use, the Regional Water Board identified water quality objectives to protect the lake. The objectives include thresholds for certain water quality parameters and requirements to minimize turbidity, toxins, and other chemicals and to maintain temperatures for the warm and coldwater fisheries.

Water quality conditions in Lake Berryessa are generally consistent with the water quality objectives identified in the basin plan to protect beneficial uses; however, mercury and fecal coliform bacteria have been identified as water quality problems. The EPA listed Lake Berryessa as a water quality-limited segment for mercury contamination pursuant to Section 303(d) of the CWA. Mercury contamination in fish has been a problem at the lake, and signs have been posted cautioning fishermen to limit fish intake. Fecal coliform bacteria has been a

concern because of leaky wastewater ponds and minimally treated wastewater at the RAs and other developments around the lake.

Reclamation collects water quality data at Lake Berryessa for analysis of fecal coliform bacteria and also tests water samples taken from Putah Creek below the dam to determine the presence of biological agents such as *Giardia* and *Cryptosporidium*; inorganic materials such as chloride, fluoride and sulfate; and a variety of minerals including mercury, arsenic, barium and zinc. The concentrations of biological agents in the water samples are compared to the water quality objectives for the lake identified in the basin plan (Regional Water Board 2011). For waters designated for contact recreation, the fecal coliform concentration cannot exceed a geometric mean of 200/100 milliliters over a 30-day period. In the past, the summer data have indicated exceedances of the fecal coliform concentration (Reclamation 2011b). With the removal of old wastewater ponds at the RAs and improvements to the NBRID wastewater facility, fecal coliform bacteria in surface waters has been greatly reduced over the past several years.

Groundwater Basin

As described in the Geology and Soils section, the geologic features in the Lake Berryessa region are predominantly made up of sandstone and shale of the Great Valley Complex (Graymer et al. 2002, 2007). The Lake Berryessa area has limited groundwater resources because the rocks of the Great Valley Complex are relatively impermeable and act as confining units that restrict the horizontal and vertical movement of groundwater (Napa County 2005). The major aquifers in the county are associated with Napa Valley to the west, which is underlain by water-bearing deposits such as alluvium and tuffaceous beds of volcanic rocks. Alluvium beds in the basins around Lake Berryessa, particularly Pope Valley and Capell Valley, are the most significant water-bearing units of the area.

Pope Valley is to the northwest of Lake Berryessa, and Capell Valley is just west of Lake Berryessa in the southernmost portion of the Upper Putah Creek watershed. Both valleys lack large streams, which has prevented thick layers of alluvium from being deposited and resulted in limited groundwater storage capacity (Napa County Water District 1991). The estimated thickness of alluvium in Pope Valley is between 25 and 30 feet. The storage capacity of the aquifer underlying Pope Valley is estimated at approximately 7,000 acre-feet of water. Capell Valley has less underlying alluvium, resulting in a lower storage capacity of approximately 700 acre-feet. These groundwater basins are estimated to yield less than 400 acre-feet per year.

Groundwater quality is monitored at Putah Canyon and Monticello Shores RAs as part of the cleanup efforts associated with former leaking underground storage tanks. Data collected at Putah Canyon RA indicates a depth to groundwater of about 2–33 feet, depending on proximity to the lake and the lake water surface elevation (Reclamation 2011b). Groundwater flow tends to be toward the lake. The data also indicates varying concentrations of contaminants such as gasoline, benzene, and methyl tertiary-butyl ether (MTBE) in the groundwater around the location of a storage tank (southwest corner of the peninsula near a parking area), and the concentrations continue to be above federal and state standards.

Data at Monticello Shores RA indicates a depth to groundwater of about 4–26 feet, depending on proximity to the lake and the lake water surface elevation (Environmental Geology Services 2009). Groundwater flow tends to be toward the lake. A leaking underground storage tank was

identified at the RA, and groundwater wells were installed to monitor water quality for evidence of contamination. Groundwater monitoring conducted in March of 2014 indicated that no further action was necessary to clean up the site and that the site was closed.

Groundwater was monitored through 2009 at Steele Canyon RA to track concentrations of contaminants, primarily benzene and MTBE, as a result of a leaking underground storage tank that was near the former launch ramp. Data indicated decreasing concentrations toward an acceptable level, and a recommendation was submitted in 2010 to the State Water Board to stop further monitoring and cleanup efforts and close the case (Environmental Forensics and Hydrogeological Consultants 2010). The case was closed in December of 2011. Depth to groundwater at the RA ranges from 5 to 35 feet, and the general trend of groundwater flow from the southern portion of the RA is toward a cove to the west.

Environmental Consequences and Mitigation Measures

No-Action Alternative

A groundwater well and associated distribution system were installed at the Putah Canyon RA in June 2017. The well increases groundwater withdrawal to serve the interim facilities. Under the no-action alternative, no new facilities would be installed at the RAs without prior approval from Reclamation and further environmental review under NEPA. Installation of previously approved facilities that are not yet installed would cause some ground disturbance, but would result in minimal water quality impacts with implementation of standard BMPs. Routine maintenance and upkeep of interim facilities, similar to that under current conditions, would cause minimal ground disturbance and would not affect water quality with implementation of standard BMPs. Use of the RAs would continue to be limited to previously disturbed areas. Drainage patterns across the RAs would be similar to those under current conditions. No new facilities would be installed in Lake Berryessa, and water access would continue to be available via the existing launch ramps.

Proposed Action

Overall Development and Conceptual Site Plan Impacts Hydrology and water quality impacts associated with development of the RAs would be similar across the RAs; localized concerns would be associated with more extensive ground disturbance or installation of in-water facilities. Compliance with a SWPPP and implementation of BMPs during all ground disturbance activities, as described in Chapter 2, would reduce the potential for water quality impacts at each RA. The general level and types of impacts on water quality and hydrology are presented below. Additional analysis may be necessary once specific details about the facilities, their locations, and construction activities are known.

Water Quality Construction activities could release pollutants into Lake Berryessa or its tributaries through increased sediment loads or an accidental spill of hazardous materials. Most of the recreation facilities would be constructed or installed on the land, outside of the water influence zone, except marinas, docks, and launch ramps, which are allowed in this zone. As discussed in the Geology and Soils section, ground-disturbing activities would vary by the type of facility being constructed. Activities that require more disturbance, such as the creation of level pads for lodging units, have a greater potential for resulting in the discharge of pollutants or sediment into the lake or its tributaries. Most construction would be scheduled outside the peak

visitor season; therefore, construction would coincide with the wet season when rain events have a greater potential to carry pollutants in runoff. With implementation of standard construction practices and compliance with a SWPPP, the potential for water quality impacts would be minimized during construction activities.

As discussed in the Recreation section, development of the RAs is expected to result in increased visitation to the RAs. Visitation levels would be comparable to those in the past when all of the RAs were open. Long-term use of the RAs would result in periodic ground disturbance and other activities typical of past uses of the RAs and could result in the discharge of pollutants or sediment into the lake. Ground disturbance would result from routine maintenance activities, such as cleanup efforts and invasive plant removal, and recreational uses, such as camping and hiking. Maintenance activities could also involve the use of chemicals or hazardous materials that could affect water quality. In addition, boats and other watercraft could release fuel or other pollutants into the lake.

New water treatment infrastructure would be needed at the Putah Canyon, Monticello Shores, and Berryessa Point RAs to bring groundwater or surface water to potable standards. No new water supply or treatment infrastructure is anticipated for the Spanish Flat and Steele Canyon RAs because potable water for these RAs would be provided by existing municipal systems. New or upgraded wastewater collection, storage, and treatment facilities would be installed at Putah Canyon, Monticello Shores, Spanish Flat, and Steele Canyon RAs. These new or upgraded water and wastewater treatment facilities would alleviate past concerns about fecal coliform bacteria in the lake by properly containing and treating wastewater generated by recreational uses.

With proper planning and design of new facilities, development of the RAs would not conflict with the *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins* or contribute to past and current violations of mercury and fecal coliform bacteria levels in Lake Berryessa. Compliance with a SWPPP and implementation of BMPs would increase the likelihood that construction activities meet applicable water quality objectives.

Water Resources Potable water supply would be provided at each of the RAs using surface or groundwater resources and on- or off-site facilities. As previously mentioned, a groundwater well was installed at the Putah Canyon RA in 2017, and Reclamation has performed some limited well exploration at the Putah Canyon, Monticello Shores, and Berryessa Point RAs. The groundwater at the tested locations at Putah Canyon, Monticello Shores, and Berryessa Point RAs was of limited quantity, and would not meet projected consumptive and fire suppression needs at build-out. Projected consumptive and fire suppression needs at build-out are summarized in Chapter 10 of the *Draft Infrastructure Basis of Design Report: Lake Berryessa Concession Infrastructure Design, Napa County, California* (Bureau of Reclamation. 2015a.)

Development of potable water supplies for the Putah Canyon, Monticello Shores, and Berryessa Point RAs, whether through groundwater or surface water, is authorized and will be the responsibility of the concessionaire(s). See the *Draft Infrastructure Basis of Design Report: Lake Berryessa Concession Infrastructure Design, Napa County, California* (Bureau of Reclamation. 2015a.) for more detailed information on the exploration of groundwater resources at the RAs.

The use of groundwater would be subject to applicable state and federal laws and regulations, and applicable permits would be obtained. The withdrawal of groundwater at the RAs could affect groundwater levels and result in reductions in the groundwater table or indirect impacts from subsidence or lack of proper recharge of the aquifer. Groundwater contamination from existing hazardous sites could affect the quality of water withdrawn from wells. Implementation of Mitigation Measure WATER-1 would reduce the potential for impacts on groundwater by requiring a groundwater study to assess localized effects on the groundwater aquifer. Specific designs and plans for the water supply source and facilities at each RA would be identified at a future date and would require additional analysis, once details on those facilities are known.

If selected as the desired source of potable water, the use of lake water for water supply would be in accordance with applicable agreements and permits and would not exceed the allowed withdrawal amount available under existing water rights. The agreements and permits would identify the withdrawal requirements and any necessary conservation measures to ensure the volume of water stored in Lake Berryessa would not be adversely affected.

Marinas and boat docks would float on the water with anchors placed at the bottom of the lake and would not be expected to affect the storage capacity or hydrology of the lake. Launch ramps would involve placement of a relatively small quantity of fill material into the lake compared with the size of the lake, and they would not affect storage capacity or hydrology of the lake.

Flood Hazards Extensive soil removal or large cuts to install recreation facilities could result in changes to topography and affect drainage patterns across the RAs. Increases in impervious surfaces could increase the rate of runoff across the RAs. Most of the recreation facilities would require minimal ground disturbance or changes to topography because the facilities would be designed and located to incorporate existing vegetation and topography. Facilities at some of the RAs, such as lodging units and wastewater facilities, may require more grading and filling to establish level pads. These activities could alter the drainage pattern of the local area and increase localized flooding, but large-scale changes across the RAs would not be expected. With proper design of facilities, localized flooding is not expected to affect new facilities.

Reclamation would continue to restrict development in the water influence zone (440 to 455 feet above msl), and no facilities, other than marinas, docks, or launch ramps, would be installed in this zone. In-water facilities would either move with the elevation of the lake (i.e., marinas and boat docks) or be inundated as the lake level increases (i.e., launch ramps). These facilities would be designed to accommodate the fluctuating lake levels and would not be adversely affected by flood events.

Infrastructure Plan Impacts Construction activities associated with infrastructure installation at Putah Canyon, Monticello Shores, Berryessa Point, Spanish Flat, and Steele Canyon RAs would involve varying levels of potential water quality and surface water impacts similar to the impacts described above for the development.

Below is a discussion of construction-related water impacts at the five RAs. Some water-related impacts would be localized at each RA, although greater impacts on water quality of the lake could result from multiple activities being conducted at one time across the RAs. As described in Chapter 2, standard construction practices and BMPs would be implemented during all

construction activities to minimize water quality impacts during construction. In addition, compliance with Clean Water Act requirements for protecting waters of the United States and minimizing discharges into surface waters would ensure that construction activities do not conflict with the *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins*. Mitigation measures were not determined to be necessary for construction-related impacts on water quality or surface waters.

Putah Canyon RA Most of the infrastructure plan elements at the Putah Canyon RA would be installed in previously disturbed areas, such as under existing roads or parking areas and at current or previously used recreation sites. Ground-disturbing activities to install infrastructure could discharge pollutants into surface waters, such as streams and the lake. Establishment of a road near the proposed wastewater treatment facility and installation of an electrical line to the facility could discharge pollutants directly into two ephemeral streams; implementation of Mitigation Measure BIO-4 would ensure that proper permits are received before discharging fill into the streams. With implementation of standard construction practices and BMPs described in Chapter 2, mitigation measures were not determined to be necessary at Putah Canyon RA for construction-related impacts on water resources.

Monticello Shores RA Infrastructure plan elements at Monticello Shores RA are limited to construction of a single access road close gate, located near the southern boundary of the RA, immediately north of the intersection of the two-way circulation road (a conceptual plan element) and Berryessa Knoxville Road. With implementation of standard construction practices and BMPs described in Chapter 2, mitigation measures were not determined to be necessary at Monticello Shore RA for construction-related impacts on water resources.

Berryessa Point RA All of the infrastructure plan elements at the Berryessa Point RA would be installed in previously disturbed areas and would involve minimal ground disturbance and a low potential for water quality impacts. With implementation of standard construction practices and BMPs described in Chapter 2, mitigation measures were not determined to be necessary at Berryessa Point RA for construction-related impacts on water resources.

Spanish Flat RA Most of the infrastructure plan elements at the Spanish Flat RA would be installed in previously disturbed areas, such as under existing roads or parking areas and at current or previously used recreation sites. In steep areas, such as on the peninsula at Spanish Flat RA, extensive cuts are anticipated to create suitable level areas for the infrastructure. Ground-disturbing activities to install infrastructure could discharge pollutants into surface waters, such as streams and the lake. Establishment of the main road could discharge pollutants directly into a perennial stream and vegetated ditch; implementation of Mitigation Measure BIO-4 would ensure that proper permits are received before discharging fill into the stream and ditch. With implementation of standard construction practices and BMPs described in Chapter 2, mitigation measures were not determined to be necessary at Spanish Flat RA for construction-related impacts on water resources.

Steele Canyon RA Most of the infrastructure plan elements at the Steele Canyon RA would be installed in previously disturbed areas, such as under existing roads or parking areas and at current or previously used recreation sites. In steep areas, such as on the peninsula in the northern portion of the RA, extensive cuts are anticipated to create suitable level areas for the

infrastructure. Ground-disturbing activities to install infrastructure could discharge pollutants into surface waters, such as streams and the lake. Establishment of the main road could discharge pollutants directly into perennial and intermittent streams; implementation of Mitigation Measure BIO-4 would ensure that proper permits are received before discharging fill into the streams. With implementation of standard construction practices and BMPs described in Chapter 2, mitigation measures were not determined to be necessary at Steele Canyon RA for construction-related impacts on water resources.

Minimal water quality impacts are anticipated after the infrastructure is in place. Pipelines and other facilities would require periodic maintenance, which could involve ground-disturbing activities similar to those anticipated for the construction activities. Standard construction practices to minimize water quality impacts would be implemented during these activities. With the improved wastewater facilities, water quality impacts associated with previous discharge of wastewater into the lake would be alleviated. In addition, the proposed detention basins would help detain stormwater runoff from developed areas and allow the water to infiltrate into the ground, which would prevent pollutants from entering the lake. Mitigation measures were not determined to be necessary for operation-related water impacts associated with the infrastructure plans.

Mitigation Measures

Reclamation will require its concessionaire(s) to comply with applicable federal, state, and local laws and regulations concerning surface and groundwater hydrology and water quality. The implementation of standard BMPs, a SWPPP, and drainage control measures, as described in Chapter 2, would reduce the potential for impacts on water resources during construction activities. In addition, if wells are used for water supply, the following mitigation measure would be implemented to address potential impacts on the groundwater aquifer.

Mitigation Measure WATER-1. Groundwater Study The use of groundwater will be subject to applicable state and federal laws and regulations, and applicable permits will be obtained. Prior to placing a groundwater well into service the concessionaire shall perform and submit to Reclamation a groundwater study to assess localized effects on the groundwater aquifer from operation of the well. The groundwater study will evaluate the groundwater aquifer around Lake Berryessa to identify the depth to the groundwater table, assess quality and quantity of groundwater available for water supply, identify other groundwater users in the vicinity, and assess current and historic concerns with use of groundwater in the region (e.g., subsidence, depletion of groundwater resources, quality of groundwater, recharge). If Reclamation concludes the study reveals a severe concern with groundwater withdrawal, the concessionaire shall identify other water supply sources to avoid adverse impacts on the groundwater aquifer.

Cumulative Impacts

Under NEPA, cumulative impacts on environmental resources result from incremental effects of proposed actions when combined with other past, present, and reasonably foreseeable future projects. Cumulative impacts can result from individually minor, but collectively major actions undertaken over a period of time by various agencies (federal, state, and local) or individuals. This analysis of cumulative impacts considers the combined effects of developing recreation

facilities and associated infrastructure at five RAs along the western and southern shores of Lake Berryessa and implementing other reasonably foreseeable actions at the lake over the 30-year development period. Past and present impacts are characterized in the affected environment section and reflect current or baseline conditions.

Additional environmental documentation pursuant to NEPA may be required if facilities, infrastructure, or uses not already evaluated in this EA are proposed to be located within the five RAs, or if Reclamation finds that conceptual site plan elements identified in this EA are located in portions of RAs for which the documentation of biological, cultural, and other resources and hazards is not adequate to support reasoned decision-making by Reclamation pursuant to NEPA and interconnected environmental statutes. Accordingly, this cumulative impact analysis may be refined in subsequent environmental documents as more specific details about the developments at the RAs are known.

Under the ESA, cumulative effects are those effects of future state or private activities—not involving federal activities—that are reasonably certain to occur within the action area of the federal action. The action area encompasses the boundaries of the five RAs, within which only a portion of the land would be developed or subject to activities that could affect federally listed species, as described in the Biological Resources section of Chapter 3. Because the land within the RA boundaries is managed by Reclamation, no state or private activities would be implemented at the RAs without approval from Reclamation; thus, future activities at the RAs would be subject to federal regulations. No cumulative impacts, for purposes of the ESA, are anticipated.

Past, Present, and Reasonably Foreseeable Actions

Reclamation is implementing its Visitor Services Plan to improve recreational opportunities at Lake Berryessa. The VSP ROD identifies a number of actions at the lake to expand or modify existing facilities and provide new recreation opportunities. The proposed action analyzed in this EA is a component of the VSP and is intended to develop the five RAs with short-term use facilities. Other ongoing and reasonably foreseeable activities at the lake include the following:

- modification of Camp Berryessa (formerly used as a Boy Scout camp) to serve as an Environmental Education and Group Camp area;
- ongoing operation and upkeep of the Pleasure Cove and Markley Cove RAs;
- construction of a regional trail system for non-motorized recreation; and
- improvement of day use areas to meet recreation needs and provide Americans with Disabilities Act compliance.

In addition to the VSP improvements, hazardous sites, such as former leaking underground storage tanks and wastewater ponds, at the RAs continue to be remediated and monitored (see the discussion of these activities in Public Health and Safety), and NBRID and LBRID have been upgrading their water and wastewater facilities to improve operations and address concerns from the Regional Water Board. These projects were considered in the context of the cumulative impact analysis discussed in this section.

Analysis of Cumulative Impacts

Air Quality

Development of the five RAs at Lake Berryessa would result in temporary, localized emissions and fugitive dust during construction activities and periodic emissions and fugitive dust over the long term during operation of the RAs. Standard construction practices and BAAQMD-recommended measures (see Mitigation Measure AIR-1) would be implemented to reduce construction-related air quality impacts and ensure compliance with federal and state air quality standards. Each RA would be developed separately, under separate timelines, and development across multiple RAs would not occur during the same construction season.

Increased visitation to the RAs would also increase vehicle-related emissions, but the increased emissions would be comparable to past emissions when the RAs were developed with various uses. Operation-related air quality impacts would also comply with federal and state air quality standards.

Other construction projects implemented around Lake Berryessa during the same construction periods as activities at the RAs would also contribute to emissions in the local area, but cumulative impacts would not be expected to adversely affect regional air quality. The other projects would result in similar types of emissions and air quality impacts as the proposed action, which would be minor and primarily temporary. Emissions would be expected to dissipate within the vicinity of the work areas, and emission control and reduction measures would be implemented during all projects in compliance with BAAQMD requirements. Cumulative impacts on local and regional air quality from the proposed action and other projects around the lake would be minor.

Biological Resources

Development of the five RAs at Lake Berryessa would primarily take place in previously disturbed and non-native habitat, resulting in a minimal loss of native habitat (e.g., blue oak woodlands, foothill pine). Construction activities could cause temporary disturbance to wildlife species (e.g., the federally listed California red-legged frog and nesting birds) that may use the habitats in and adjacent to the RAs. Removal of elderberry shrubs could affect the federally listed valley elderberry longhorn beetle, but the likelihood for this to occur is too small to be of concern because the five RAs are located outside of the beetle's historic range of occurrence. No impacts on special-status plants are anticipated. Some recreation facilities could also affect wetlands, streams, and the lake. These biological impacts would be minimized with implementation of Mitigation Measures BIO-1, BIO-2, BIO-3, and BIO-4. Other projects at the lake could also result in the loss of native habitats or disturbance to wildlife, but they would be expected to incorporate design or construction measures to avoid or minimize impacts on native vegetation, wetlands, and special-status species. Cumulative impacts on biological resources from the proposed action and other projects at the lake would be minor.

Cultural Resources

Development of the five RAs at Lake Berryessa would not affect historic properties or other cultural resources and would not contribute to cumulative impacts on cultural resources around Lake Berryessa. Other projects subject to Reclamation or other federal agency review would comply with consultation requirements under Section 106 of the NHPA and incorporate

mitigation measures to minimize or avoid impacts on important cultural resources. No cumulative impacts on cultural resources are anticipated.

Geology and Soils

Development of the five RAs at Lake Berryessa would result in localized soil disturbance at the RAs, primarily in previously disturbed areas. BMPs would be implemented to minimize soil erosion during ground-disturbing activities. The proposed action would result in minimal disturbance to or loss of native soils and would have a minimal contribution to cumulative soil impacts around the lake. Other projects around Lake Berryessa would also involve varying levels of soil disturbance, and standard construction practices would likely be implemented to minimize the potential for soil erosion. These impacts would also be localized, and the cumulative effects on soils would be minimal.

Facility design for the proposed action and other projects would be based on site-specific conditions to reduce the potential for facility damage from seismic hazards or unstable soils and would not contribute to cumulative impacts.

Increased water activities as a result of the proposed action could contribute to increased shoreline erosion around the lake, but designated "no wake" zones would help protect the shores. Other projects around the lake would not be expected to increase water activities to a level that would exacerbate shoreline erosion. As a result, cumulative effects on shoreline erosion would be minimal.

Land Use

Development of the five RAs at Lake Berryessa would be consistent with the land use plans for the area (i.e., RAMP and VSP) and with the current zoning of the RAs. Other projects under the VSP would also be consistent with the plan, and non-Reclamation projects would be expected to comply with the applicable land use plans for their project areas. Periodic land use conflicts may arise throughout the 30-year development period as the various projects are implemented around the lake, but most conflicts would be localized and would not result in cumulative land use impacts. Cumulative impacts from noise, traffic, and other issues that may result in more regional impacts are discussed under the other resource topics.

Noise

Development of the five RAs at Lake Berryessa would result in an increase in localized noise in and around the RAs during construction activities and with increased visitation to the lake. Few sensitive receptors outside the RAs would be exposed to the increased noise levels. Sensitive receptors at the RAs would include recreationists, and construction measures in addition to Mitigation Measures NOISE-1 and NOISE-2 would minimize noise-related disturbance to sensitive receptors at or near the RAs. Other construction projects implemented at the same time as and near the RAs would also contribute to increases in noise from construction activities, but noise from these projects would also be localized around the work area and would affect few receptors. Because of the existing ongoing sources of noise associated with recreational activities at the lake and few sensitive receptors in most areas, cumulative noise impacts would be minimal.

Public Health and Safety

Development of the five RAs at Lake Berryessa would result in increased visitation to the lake and an increased potential for health and safety risks. Increased water activities could increase accidents on the lake; construction activities would create hazards from asbestos, fire risks, and hazardous materials; and the demand on law enforcement and emergency response providers could increase. Standard construction practices, site-specific mitigation measures (see Mitigation Measures HEALTH-1 and HEALTH-2), and compliance with hazard and safety regulations would minimize public health and safety impacts associated with the proposed action. Other projects around the lake would have risks similar to those of the proposed action during construction, and standard construction practices and site-specific mitigation measures could be implemented to minimize the risks. Ongoing efforts to remediate hazardous sites would reduce potential risks in and near the RAs.

The cumulative increase in visitation to the lake, particularly from the proposed action and Camp Berryessa improvements, would result in a cumulative increase in the potential for accidents and the demand on service providers. Reclamation and the concessionaires responsible for managing the recreation facilities would coordinate with public service providers to ensure adequate coverage of services. Improvements to the RAs, in particular, would allow easier access in the event of an emergency, and operation-related cumulative impacts would be minor.

Recreation

Development of the five RAs at Lake Berryessa would increase the number and types of recreation facilities at the sites, improve recreational opportunities at the lake, and increase visitation to the area, which is projected to increase to 1.5 million visitors annually. The improvements would take place over the 30-year development period and would be phased in response to visitor and market demands. Other recreation improvements around the lake would also be expected to increase visitation to the lake and provide more opportunities for diverse recreational activities and improve the overall visitor experience. Some projects, such as trail improvements, may temporarily disrupt use of the facility during construction, but the improvement would benefit recreation over the long term. The proposed action and other recreation projects would result in a cumulative benefit to recreational opportunities at Lake Berryessa.

Socioeconomics

Development of the five RAs at Lake Berryessa would contribute to the local economy during the 30-year development period as a result of job creation and increased visitation to the area. Other projects around the lake would also result in temporary jobs during construction, and some projects would increase visitation and contribute to the local economy over the long term. The proposed action and other projects would result in a cumulative benefit to the local economy around the lake and in nearby communities.

Transportation and Circulation

Development of the five RAs at Lake Berryessa would result in a temporary increase in traffic to and from the RAs during construction activities and a long-term increase in traffic from increased visitation. Traffic control measures would be implemented during construction activities to minimize disruptions to traffic on roads in and near the RAs. Overall access to and from the RAs would be similar to access under current conditions, and improvements to access

and parking at the RAs would occur as they are developed. Other projects around the lake would also result in slight increases in construction and operational traffic, but these increases would not be considered substantial. Cumulative traffic impacts would be minor.

Utilities

Development of the five RAs at Lake Berryessa would result in increased demand for water supply, wastewater treatment, electricity, and other utility services. Some services would be provided by on-site facilities, which would not affect local service providers or contribute to cumulative effects on these services in the region. For services provided by off-site facilities, the developments would contribute to an increased demand on the service provider, but Reclamation has coordinated with the providers to ensure they can adequately provide service for the proposed developments.

None of the other projects around the lake would require new or expanded off-site water supply or wastewater services; the Camp Berryessa improvements would include on-site facilities. The upgrades to off-site service provider facilities would result in a cumulative benefit to the areas they serve by providing improved facilities, and these upgrades could help meet the demands from some of the developments at the RAs. Other projects would also result in a minimal effect on other utility services, such as solid waste disposal and electricity, based on the designs of the projects. Cumulative impacts on utility services would be minimal.

Visual Resources

Development of the five RAs at Lake Berryessa would change the visual setting of the RAs from the existing, mostly undeveloped, disturbed areas to facilities that are visually similar to each other and match the surrounding environment in accordance with Reclamation design requirements. Some of the new facilities would be visible from various viewpoints around the lake, while others would be masked by the vegetation and topography at the RAs. Other projects around the lake would have mostly localized effects on the visual setting because of the small sizes of the other projects. The proposed action would contribute the most to cumulative changes to the visual setting of the lake, but the changes would be beneficial because the development would be consistent with the planned uses of the RAs and would improve overall aesthetics around the lake.

Water Resources

Development of the five RAs at Lake Berryessa would result in localized ground disturbance at the RAs, primarily in previously disturbed areas, and an increased potential for pollutants to enter the lake. Although ground disturbance impacts would be localized at the RAs, pollutants could affect the water quality of the lake and contribute to cumulative effects on water quality. BMPs would be implemented to minimize the potential for pollutants to enter the lake during and following ground-disturbing activities. Other projects around Lake Berryessa would also involve varying levels of ground disturbance and use of hazardous materials that could pollute the lake, and standard construction practices would likely be implemented to minimize the potential for water quality effects. With implementation of appropriate measures to protect water quality during each project, cumulative impacts on water quality of Lake Berryessa would be minimal. In addition, improvements to wastewater treatment facilities and remediation of hazardous sites would result in a cumulative benefit to water quality of the lake.

The proposed action may require the use of groundwater as a source for water supply. The combined effects of groundwater pumping at the three RAs where new water supplies would be needed to meet demands at build-out could contribute to cumulative impacts on the groundwater aquifer (Reclamation and Napa County Regional Park and Open Space District 2011). Implementing mitigation measure WATER-1 would minimize adverse impacts on the groundwater aquifer. Groundwater use would be in accordance with applicable laws and regulations, and permits would be required for operating groundwater wells, which would establish limitations on groundwater use to minimize cumulative effects on the aquifer.

Chapter 4 Consultation and Coordination

North State Resources, an environmental consulting firm, prepared this EA on behalf of Reclamation. North State Resources coordinated with Reclamation environmental and design staff and technical specialists, including Pacific Legacy and j.c. brennan & associates, during preparation of this EA. Reclamation provided design information for the description of the proposed action. North State Resources also conducted a delineation of waters of the United States, including wetlands; a California red-legged frog habitat assessment; botanical surveys; and elderberry shrub surveys at the RAs to support the biological resources analysis. Pacific Legacy conducted a cultural resources survey of the RAs, prepared a technical report for Reclamation review, and provided supporting information for the cultural resources analysis in the EA. The company j.c. brennan & associates conducted noise monitoring at the RAs and provided technical input for the noise analysis in the EA. Reclamation reviewed this EA and supporting technical reports for compliance with Reclamation's NEPA policies and guidelines and for technical adequacy.

Reclamation has had ongoing correspondence with other agencies and stakeholders with resource interests at Lake Berryessa, including the following:

- CDFW,
- USFWS,
- USACE,
- Regional and State Water Boards,
- Napa County,
- LBRID,
- NBRID, and
- SFWD.

Reclamation has also coordinated with Native American tribes to obtain information on resources that are of interest to them around the lake. Tribal input was considered during the environmental analysis process and is documented in the cultural resources report.

In 2013, Reclamation established a Community Forum to engage members of the public and other agencies and stakeholders in regular informal communications to promote public input during the planning and design processes of recreation facilities at Lake Berryessa. The first meeting held on this topic was on January 17, 2013, and several subsequent meetings were held in 2013 to establish the forum and invite input on topics to discuss and of interest to the public. In support of the NEPA process, Reclamation held a focused scoping session on January 16, 2014, to obtain input on issues to consider during the environmental review process and the types of facilities and services visitors desire. Subsequent meetings were held in 2014, 2015, and 2016 to keep the forum members and public updated on ongoing activities at the lake and to present

the draft conceptual site plans and infrastructure plans for long-term development of the five RAs.

Reclamation informally consulted with the USFWS on the potential effects of the proposed action on VELB, in a request for concurrence with its determination that the proposed action may affect, but is not likely to adversely affect the species, dated April 13, 2016. In a memorandum dated June 2, 2016 USFWS concurred with Reclamation's determination and clarified a minimum avoidance buffer of 25 feet for direct impacts.

In subsequent informal communications culminating with an email from Mr. Leif Goude, USFWS, dated July 5, 2017, the USFWS informed Reclamation of a new *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (USFWS, 2017). This Framework indicates the unlikely occurrence of VELB in the areas proposed for development (i.e., western shores of Lake Berryessa).

Reclamation has concluded that the proposed action has no potential to affect historic properties and has informed the SHPO of its determination in compliance with Section 106 of the NHPA.

Chapter 5 Compliance with Environmental Statutes

This chapter identifies the federal environmental statutes applicable to the proposed action and summarizes the requirements of the statutes. Applicable environmental laws, regulations, and executive orders, as well as management plans, were considered during preparation of this EA.

National Environmental Policy Act

The proposed action would occur on federal land at Lake Berryessa and is managed by Reclamation. Under NEPA, Reclamation serves as the lead agency. This EA was prepared in compliance with NEPA, the CEQ NEPA regulations, and the Department of the Interior Manual. Reclamation will be responsible for preparing a decision document on the findings of this EA and determining whether to approve the proposed action. Environmental commitments comprising standard construction measures and best management practices (BMPs), incorporated into the proposed action described in Chapter 2, and mitigation measures described in Chapter 3 by resource area, would be implemented during site planning and construction, to avoid or minimize environmental impacts. Environmental commitments and mitigation measures are summarized in the Summary, in Table S-1.

Clean Water Act, as Amended

The proposed action could result in the placement of fill material into waters of the United States and potential impacts on water quality, which would require compliance with Sections 401, 402, and 404 of the CWA. Section 401 of the CWA identifies conditions for which a water quality certification is required for federal permits. Section 402 establishes the National Pollutant Discharge Elimination System program and requires compliance with stormwater permits. Section 404 of the CWA identifies conditions for which a regulatory permit is required for projects that result in the placement of dredged or fill material into waters of the United States.

Endangered Species Act of 1973, as Amended

Before any federal action is implemented, Section 7 of the ESA requires that the agency taking the action determine whether any listed species could be affected by the proposed action and consult with the USFWS or the National Marine Fisheries Service if listed species may be affected. Consultation with the USFWS will be initiated, as needed, for individual facilities at the RAs once specific details on the locations and designs of the facilities are known.

Migratory Bird Treaty Act

Migratory birds that may nest or otherwise use the habitats in and near the RAs are protected under the Migratory Bird Treaty Act. Construction activities could affect nests, eggs, young, or individuals of migratory birds. Under the Migratory Bird Treaty Act, taking, killing, or possessing migratory birds or their parts is unlawful. Measures have been identified to minimize the potential for adverse impacts on migratory birds, and the proposed action would be in compliance with this act.

Bald and Golden Eagle Act

The Bald and Golden Eagle Act provides for the protection of bald and golden eagles by prohibiting the take; possession; sale; purchase; barter; offer to sell, purchase, or barter; transport; export; or import of any bald or golden eagle, alive or dead, including any part, nest, or egg, unless allowed by permit (16 United States Code Sec. 668(a), 50 CFR 22). Measures have been identified to minimize the potential for adverse impacts on bald and golden eagles, and the proposed action would be in compliance with this act.

Clean Air Act, as Amended

The Clean Air Act requires any federal entity engaged in an activity that may result in the emission of air pollutants to comply with all applicable air pollution control laws and regulations (federal, state, or local). Measures have been identified to ensure compliance with the federal General Conformity Rule regarding air quality, and the proposed action would be in compliance with the Clean Air Act.

National Historic Preservation Act of 1966, as Amended

The NHPA requires federal agencies to identify significant cultural resources that may be affected by an action and to consult with the Advisory Council on Historic Preservation and the SHPO concerning effects on significant cultural resources. The proposed action would not have an adverse effect on historic properties or other significant cultural resources. Reclamation will consult with the SHPO to obtain concurrence on the effects of the proposed action.

Indian Trust Assets

It is the policy of the federal government to identify, conserve, and protect Indian Trust resources. This policy has been outlined in a Department of the Interior Order, a Departmental Manual supplement, and a memorandum from Reclamation's Commissioner detailing Reclamation's Indian Trust policy. No Indian Trust assets would be affected by the proposed action.

Executive Order 11988, Floodplain Management

Executive Order 11988 requires federal agencies to avoid, to the extent possible, adverse impacts associated with human occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development whenever there is a practicable alternative. The proposed action would not involve development of land-based facilities in the water influence zone of Lake Berryessa; only authorized facilities, including docks and launch ramps, would be developed in this zone. The proposed action would be in compliance with this executive order.

Executive Order 11990, Protection of Wetlands

Executive Order 11990 prescribes wetlands policy for all agencies managing federal lands, sponsoring federal projects, or providing federal funds to state or local projects. The order requires federal agencies to follow "avoidance-mitigation-preservation" procedures and provides the opportunity for public input before proposing new construction in wetlands. Wetlands may be affected by some components of the proposed action, and measures have been identified to avoid the wetlands to the extent feasible and comply with terms of a Section 404 permit, including compensatory mitigation, if avoidance is not feasible. The proposed action would be in compliance with this executive order.

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

Executive Order 12898 established environmental justice as a federal agency priority, and all federal agencies were directed to make environmental justice part of their mission. The proposed action would not disproportionately affect low-income or minority communities that may recreate at Lake Berryessa. The RAs would be open to all visitors. The proposed action would be in compliance with this executive order.

Executive Order 13112, Invasive Species

Executive Order 13112 requires federal agencies to use relevant programs and authorities to prevent the introduction of invasive plant species. The proposed action includes measures to prevent the introduction, spread, or reestablishment of invasive plant species and to remove non-native vegetation from the RAs. The proposed action would be in compliance with this executive order.

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Chapter 7 References

References Cited in Chapter 1

National Park Service. 1959. Public Use Plan. Monticello Reservoir (Lake Berryessa), Solano Project, California. Prepared for U.S. Department of the Interior, Bureau of Reclamation and National Park Service. Prepared by William L. Bigler and Walter J. McCallum. October.

Bureau of Reclamation (Reclamation). 1992. Final Environmental Impact Statement for the Lake Berryessa Reservoir Area Management Plan. U.S. Department of the Interior, Bureau of Reclamation.

_____. 1993. Record of Decision, Environmental Impact Statement: Lake Berryessa Reservoir Area Management Plan. U.S. Department of the Interior, Bureau of Reclamation. February.

_____. 2005. Future Recreation Use and Operation of Lake Berryessa Final Environmental Impact Statement. U.S. Department of the Interior, Bureau of Reclamation.

_____. 2006. Record of Decision Future Recreation Use and Operations of Lake Berryessa. U.S. Department of the Interior, Bureau of Reclamation. June 2, 2006.

References Cited in Chapter 2

Bureau of Reclamation (Reclamation). 2013a. Environmental Assessment for Interim Recreation Services at Lake Berryessa. U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region, Central California Area Office. Folsom, California. April.

_____. 2014a. Finding of No Significant Impacts and Environmental Assessment for Installation of RV Dump Stations at Lake Berryessa. FONSI 14-2-CCAO. U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region, Central California Area Office. Folsom, California. April 7, 2014.

_____. 2014b. Finding of No Significant Impacts and Environmental Assessment for Installation, Repair, and Enhancement of Water Distribution Systems at Lake Berryessa. FONSI 14-3-CCAO. U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region, Central California Area Office. Folsom, California. April 7, 2014.

_____. 2014c. Assessment of Market Conditions for Outdoor Recreation Facilities and Services at Lake Berryessa. Napa County, California. Draft Final Report. U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region, Central California Area Office. Folsom, California. May.

_____. 2015a. Draft Infrastructure Basis of Design Report: Lake Berryessa Concession Infrastructure Design, Napa County, California. U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region, Mid-Pacific Regional Office. Sacramento, California. July. Available at: <https://www.usbr.gov/mp/ccao/berryessa/rec-updates/index.html>.

_____. 2015b. Financial Feasibility Evaluation Report: Lake Berryessa Concession Infrastructure Design, Napa County, California. U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region, Central California Area Office. Folsom, California. July.

California Department of Boating and Waterways. 1991. Layout, Design and Construction Handbook for Small Boat Launching Facilities.

CDM Smith. 2015. Final 60% Design Geotechnical Engineering Report. Concession Infrastructure Design, Lake Berryessa, California. Prepared for U.S. Department of the Interior, Bureau of Reclamation, Technical Service Center, Denver Federal Center. June 5, 2015.

U.S. Army Corps of Engineers (USACE). 1982. Design of Recreation Areas and Facilities, Access and Circulation Engineering and Design Manual EM 1110-2-410. December 31, 1982.

References Cited in Chapter 3

Altamira, Fr. José. 1860. Journal of a Mission-Founding Expedition North of San Francisco in 1823. Translated from the Spanish. Hutching's California Magazine. Vol. 5:58–62, 115–119.

Association of Bay Area Governments. 2013. Bay Area Plan Projections 2013. Available at: <http://www.abag.ca.gov/planning/housing/projections13.html>. Accessed September 2015.

Barrett, Samuel A. 1908. The Ethno-Geography of the Pomo and Neighboring Indians. University of California Publications in American Archaeology and Ethnology. Vol. 6(1). Berkeley.

Bay Area Air Quality Management District. Undated. Asbestos Airborne Toxic Control Measure for Construction, Quarrying, and Surface Mining Operations Inspection Guidelines. Available at <http://www.baaqmd.gov/~/media/files/compliance-and-enforcement/policies-and-procedures/inspection_guidelines_012604.pdf>. Accessed August 2017.

Bureau of Reclamation (Reclamation). 1992. Final Environmental Impact Statement for the Lake Berryessa Reservoir Area Management Plan. U.S. Department of the Interior, Bureau of Reclamation.

_____. 2005. Future Recreation Use and Operation of Lake Berryessa Final Environmental Impact Statement. U.S. Department of the Interior, Bureau of Reclamation.

_____. 2011a. Berryessa Facts. Central California Area Office, Lake Berryessa. Prepared March 4, 2011.

_____. 2011b. Environmental Monitoring Database: Lake Berryessa Water Quality. U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region. Available at: <http://www.usbr.gov/mp/mp150/mp157/env_query_station.cfm?pCode=LB_WQ>. Accessed September 2015.

_____. 2011c. Putah Creek Resort, Lake Berryessa, California Annual Monitoring Report: Fourth Quarter 2010 Monitoring Event and Annual Report. Prepared by Gerald Robbins, Natural Resource Specialist. January.

_____. 2011d. Visitor Data Estimates at Lake Berryessa Concession Sites, 2005–2010. Unpublished data.

_____. 2013a. Environmental Assessment for Interim Recreation Services at Lake Berryessa. U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region, Central California Area Office. Folsom, California. April.

_____. 2013b. Napa Berryessa Resort Improvement District – Water and Wastewater Treatment Upgrades and Expansion Draft Environmental Assessment. U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region, Central California Area Office. Folsom, California. January.

_____. 2014a. Finding of No Significant Impacts and Environmental Assessment for Installation of RV Dump Stations at Lake Berryessa. FONSI 14-2-CCAO. U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region, Central California Area Office. Folsom, California. April 7, 2014.

_____. 2014b. Finding of No Significant Impacts and Environmental Assessment for Installation, Repair, and Enhancement of Water Distribution Systems at Lake Berryessa. FONSI 14-3-CCAO. U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region, Central California Area Office. Folsom, California. April 7, 2014.

_____. 2015. Visitor estimates at Lake Berryessa Recreation Areas, 2013–2015. Unpublished data.

_____. 2015a. Draft Infrastructure Basis of Design Report: Lake Berryessa Concession Infrastructure Design, Napa County, California. U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region, Mid-Pacific Regional Office. Sacramento, California. July. Available at: <https://www.usbr.gov/mp/ccao/berryessa/rec-updates/index.html >.

Bureau of Reclamation and Napa County Regional Park and Open Space District. 2011. Environmental Assessment/Initial Study for Camp Berryessa, Napa, California. February 2011.

Burns, J. ND. Class II Cultural Resources Inventory for the Lake Berryessa Concession Project. Unpublished manuscript in possession of Pacific Legacy, Inc., Berkeley, CA.

California Air Resources Board. 2015. Site Information for Napa-Jefferson Avenue. Air Quality and Meteorological Information System data and trends. Available at: <http://www.arb.ca.gov/qaweb/site.php?s_arb_code=28783>. Accessed September 28, 2015.

California Department of Boating and Waterways. 2014. 2013 California Recreational Boating Accident General Statistics for Northern California. Available at: <http://www.dbw.ca.gov/Reports/BSRs/2013/2013_AccidentStats_NorthernCal_05_08_2014.pdf>. Accessed September 2015.

California Department of Conservation. 2000. A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos. Available at: <ftp://ftp.consrv.ca.gov/pub/dmg/pubs/ofr/ofr_2000-019.pdf>. Accessed August 2017.

California Department of Forestry and Fire Protection. 2007. Fire Hazard Severity Zones in SRA: Napa County. Adopted by California Department of Forestry and Fire Protection on November 7, 2007.

California Department of Resources Recycling and Recovery. 2014. Solid Waste Information System: Facility/site Summary Details, Potrero Hills Landfill and Steele Canyon Road Transfer Operation. Available at: <http://www.CalRecycle.ca.gov/SWFacilities/Directory/>. Accessed October 2014.

California Department of Transportation. 2009. Technical Noise Supplement. Prepared by ICF Jones & Stokes for California Department of Transportation Division of Environmental Analysis. November.

_____. 2015. Standard Environmental Reference, Volume 1: Chapter 12 Noise. Last updated March 17, 2015. Available at: <http://www.dot.ca.gov/ser/vol1/sec3/physical/ch12noise/chap12noise.htm>. Accessed September 2015.

California Geological Survey. 2002. Note 36: California Geomorphic Provinces. Revised December 2002.

_____. 2003. Earthquake Shaking Potential for the San Francisco Bay Region, Counties, Summer 2003. California Department of Conservation, Geological Survey.

California Regional Water Quality Control Board (Regional Water Board). 2011. Fourth Edition of the Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin Delta River Basins. California Regional Water Quality Control Board, Central Valley.

_____. 2013. Monitoring and Reporting Program R5-2013 for Lake Berryessa Resort Improvement District, Lake Berryessa Wastewater Treatment Facility, Napa County. California Regional Water Quality Control Board, Central Valley Region.

CDM Smith. 2015. Final 60% Design Geotechnical Engineering Report. Concession Infrastructure Design, Lake Berryessa, California. Prepared for U.S. Department of the Interior, Bureau of Reclamation, Technical Service Center, Denver Federal Center. June 5, 2015.

City of Fairfield. 2014. About Fairfield: Demographics. Available at: <http://www.fairfield.ca.gov/about/demographics.asp>. Accessed September 2015.

City of Vacaville. 2013. Draft Environmental Impact Report for the City of Vacaville General Plan and Energy and Conservation Action Strategy. Section 4.12 Population and Housing. Available at: <http://www.vacavillegeneralplan.org/documents/>. Accessed September 2015.

Employment Development Department. 2014. Napa County Profile. Available at: <http://www.labormarketinfo.edd.ca.gov/>. Accessed September 2015.

Environmental Forensics and Hydrogeological Consultants. 2010. Site Closure Summary Report for the UST Site at the Steele Park Marina, 1605 Steele Canyon Road, Napa, CA. Letter report submitted to the Central Valley Regional Water Quality Control Board by Franklin J. Goldman. July 26, 2010.

Environmental Geology Services. 2009. March 25, 2009 Semi-annual Monitoring, Rancho Monticello Resort, 6590 Knoxville Road, Napa, California. Letter report submitted to the Napa County Department of Environmental Management. April 10, 2009.

Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. U.S. Army

Engineer Waterways Experiment Station. Report No. Y-87-1.

Federal Highway Administration. 2006. FHWA Roadway Construction Noise Model User's Guide. Final Report. FHWA-HEP-05-054, DOT-VNTSC-FHWA-05-01. U.S. Department of Transportation, Federal Highway Administration. January.

Graymer, R.W., D.L. Jones, and E.E. Brabb. 2002. Geologic Map and Map Database of Northeastern San Francisco Bay Region, California: Most of Solano County and Parts of Napa, Marin, Contra Costa, San Joaquin, Sacramento, Yolo, and Sonoma Counties. U.S. Department of the Interior, Geological Survey.

Graymer, R.W., E.E. Brabb, D.L. Jones, J. Barnes, R.S. Nicholson, and R.E. Stamski. 2007. Geologic Map and Map Database of Eastern Sonoma and Western Napa Counties, California. Scientific Investigations Map 2956. U.S. Department of the Interior, Geological Survey.

Holm, L., T. Schneider, H. Ballard, G. Dalldorf, and J. Holson. 2012. Historic Context and Research Design for Cultural Resources on Bureau of Reclamation Lands, Lake Berryessa, Napa County, California. On file with the U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region, Sacramento, California.

Holm, L., M. O'Neill, and J. Holson. 2015. Final Report: Cultural Resources Inventory for the Putah Canyon, Monticello Shores, Berryessa Point, Spanish Flat, and Steele Canyon Concession Sites, Lake Berryessa, Napa County, California. Prepared for U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region, Sacramento, California. Prepared by Pacific Legacy, Inc. January.

Holson, J. and S. Ledebuhr. 2013. Cultural Resources Inventory For The Pleasure Cove, Putah Canyon, Spanish Flat, Monticello Shores, Berryessa Point, and Markley Cove Concession Sites, Lake Berryessa, Napa County, California. On file with the US Bureau of Reclamation, Mid-Pacific Region, Sacramento, California.

Hoover, M.B., H.E. Rensch, and D. E. Kyle. 1990. Historic Spots in California. 4th Ed. Stanford University Press. Stanford, California.

j.c. brennan & associates, Inc. 2011. Noise Measurements at Lake Berryessa Concession Sites. Conducted in support of NEPA documentation for the Lake Berryessa Concession Sites Development. Unpublished data.

Johnson, P.J. 1978. Patwin. In *California*, edited by Robert F. Heizer, pp. 350–360. Handbook of North American Indians, vol. 8. Smithsonian Institution, Washington, D.C.

Kleinfelder, Inc. 2002. Environmental Compliance and Facility Condition Assessment Report, Seven Concession Areas, Lake Berryessa, California. Prepared for U.S. Department of the Interior, Bureau of Reclamation. Napa, California. December 19, 2002.

Lambert, G., J. Kashiwagi, B. Hansen, P. Gale, and A. Endo. 1978. Soil Survey of Napa County, California. USDA Natural Resources Conservation Service, Pacific Southwest Major Land Resource Area Soil Survey Office, Region 2.

Local Agency Formation Commission (LAFCO) of Napa County. 2011. Lake Berryessa Region: Municipal Services Review. Agencies evaluated: Lake Berryessa Resort Improvement District, Napa Berryessa Resort Improvement District, and Spanish Flat Water District. Draft Report. February. Available at: <http://www.napa.lafco.ca.gov/uploads/documents/Berryessa%20Region%20Final%20MSR%20(No%20Appendices).pdf>. Accessed September 2015.

Markham, H.H. 1893. Resources of California. Prepared in Conformity with a Law Approved March 11, 1893. State Office, Sacramento.

Mayer, K. E. and W. F. Laudenslayer, Jr. 1988. A Guide to Wildlife Habitats of California. California Department of Forestry and Fire Protection, Sacramento, California.

McKern, W.C. 1923. Patwin Houses. University of California Publications in American Archaeology and Ethnology 20(10):159–171. Berkeley.

Milliken, R., R.T. Fitzgerald, M.G. Hylkema, R. Groza, T. Origer, D.G. Bieling, A. Leventhal, R.S. Wiberg, A. Gottsfield, D. Gillette, V. Bellifemine, E. Strother, R. Cartier, and D.A. Fredrickson. 2007. Punctuated Culture Change in the San Francisco Bay Area. In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn Klar, pp. 99–123. Alta Mira Press/Rowman & Littlefield Publishers, Lanham, Maryland.

Napa Berryessa Resort Improvement District (NBRID). 2010. The Water & Wastewater Treatment Plant & Infrastructure Improvements. Presentation. January 28, 2010.

_____. 2012. Napa Berryessa Resort Improvement District Wastewater Treatment System Upgrade and Expansion Initial Study/Mitigated Negative Declaration. October 2012.

Napa County. 2005. Napa County Baseline Data Report: Chapter 5 Energy Resources, Chapter 13 Public Facilities and Services, Chapter 16 Groundwater Hydrology. November 30, 2005.

_____. 2008. Napa County General Plan. Adopted by Board of Supervisors Resolution 08-86, June 3, 2008.

_____. 2013. Napa County Zoning. As of 12/23/2013.

Napa County Department of Public Works. 2009. Napa County Department of Public Works – Traffic Volumes. Available at: <http://www.countyofnapa.org/Pages/DepartmentContent.aspx?id=4294967657>. Accessed September 2015.

Napa County Fire Marshal. 2001. Fire Safety Analysis Lake Berryessa Resort Areas. Letter report submitted to U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region. November 13, 2001.

Napa County Flood Control and Water Conservation District (Napa County Water District). 1991. Water Resources Study for the Napa County Region. Prepared by James M. Montgomery Consulting Engineers, Inc. January.

Nickels, A.M. 2007. Cultural Resource Inspection of Proposed Mobile Home Removal at Lake Berryessa, Napa County, California. U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region, Division of Environmental Affairs, Sacramento, California. Study S-35191 on file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.

North State Resources, Inc. 2014a. Lake Berryessa Recreation Areas Development California Red-Legged Frog Site Assessment. Prepared for U.S. Department of the Interior, Bureau of Reclamation, Central California Area Office. September.

North State Resources, Inc. 2014b. Berryessa Point Recreation Area Development Delineation of Waters of the United States. Prepared for U.S. Department of the Interior, Bureau of Reclamation, Central California Area Office. September.

North State Resources, Inc. 2014c. Monticello Shores Recreation Area Development Delineation of Waters of the United States. Prepared for U.S. Department of the Interior, Bureau of Reclamation, Central California Area Office. September.

North State Resources, Inc. 2014d. Putah Canyon Recreation Area Development Delineation of Waters of the United States. Prepared for U.S. Department of the Interior, Bureau of Reclamation, Central California Area Office. September.

North State Resources, Inc. 2014e. Spanish Flat Recreation Area Development Delineation of Waters of the United States. Prepared for U.S. Department of the Interior, Bureau of Reclamation, Central California Area Office. September.

North State Resources, Inc. 2014f. Steele Canyon Recreation Area Development Delineation of Waters of the United States. Prepared for U.S. Department of the Interior, Bureau of Reclamation, Central California Area Office. September.

Pacific Coast Area River Basin Surveys. 1948. Appraisal of the Archaeological Resources of Monticello Reservoir Area, Napa County, California. Smithsonian Institute. On file at the U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region, Division of Environmental Affairs, Sacramento, California.

Powers, Stephen. 1976 [1877]. Tribes of California. University of California Press, Berkeley.

Sacramento Area Council of Governments. 2014. SACOG Information Center.

Sawyer, J.O. and T. Keeler-Wolf. 1995. A Manual of California Vegetation. California Native Plant Society. Sacramento, California.

State Water Resources Control Board (State Water Board). 2015a. Case Summary: Spanish Flat Marina. Available at: <http://geotracker.waterboards.ca.gov/case_summary.asp?global_id=T0605500186>. Accessed September 2015.

_____. 2015b. Case Summary: Steele Canyon Marina. Available at: <http://geotracker.waterboards.ca.gov/case_summary.asp?global_id=T0605500312>. Accessed September 2015.

_____. 2015c. GeoTracker: Lake Berryessa, Napa County. Available at: <http://geotracker.waterboards.ca.gov/map/?CMD=runreport&myaddress=lake+berryessa%2C+ca>. Accessed September 2015.

True, D.L., and M.A. Baumhoff. 1982. Archaeological Investigations at Lake Berryessa, California. Prepared for the U.S. Department of the Interior, Bureau of Reclamation. Mid Pacific Region, Sacramento, CA. (P.O. 2-01-20-00734). Study S-6052 on file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.

U.S. Army Corps of Engineers. 2008. Regional supplement to the Corps of Engineers wetland delineation manual: Arid West (version 2.0): U.S. Army Engineer Research and Development Center.

U.S. Census Bureau. 2010. American FactFinder Census 2010 Summary File: DP-1 Profile of General Demographic Characteristics, Napa County and Other Geographies.

_____. 2012. American Fact Finder DP03 Selected Economic Characteristics, 2008–2012 American Community Survey 5-Year Estimates. Napa County and Census Tract 2018.

U.S. Environmental Protection Agency. 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. Washington, D.C. March.

U.S. Fish and Wildlife Service (USFWS). 1999. Conservation Guidelines for the Valley Elderberry Longhorn Beetle. U.S. Fish and Wildlife Service. July 9, 1999.

U.S. Fish and Wildlife Service (USFWS). 2005. Revised guidance on site assessment and field surveys for California red-legged frog. U.S. Fish and Wildlife Service. August 2005.

U.S. Fish and Wildlife Service (USFWS). 2017. Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*). U.S. Fish and Wildlife Service, Sacramento, CA. Available at: <https://www.fws.gov/sacramento/documents/VELB_Framework.pdf>.

University of California, Davis. 2005. Quail Ridge Reserve: Human History. The Mexican Land Grant Era. Available at: <http://nrs.ucdavis.edu/Quail/Natural/Human.htm>. U.C. Davis Natural Reserve System. Last updated July 5, 2005. Accessed September 2015.