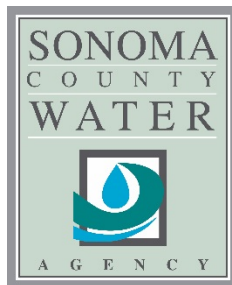


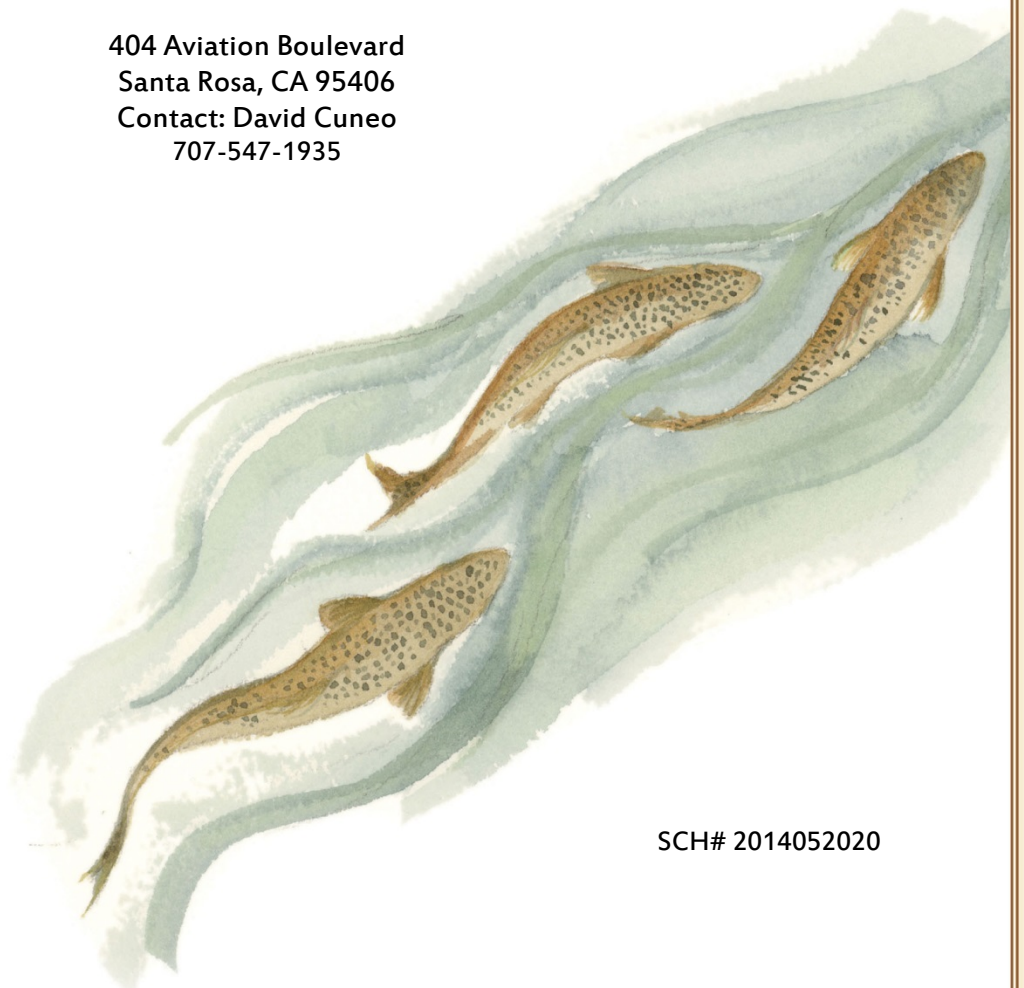
Dry Creek

Dry Creek Habitat Enhancement Miles 2-6 Draft Environmental Impact Report

JULY 2015



404 Aviation Boulevard
Santa Rosa, CA 95406
Contact: David Cuneo
707-547-1935



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American Disabilities Act Compliance

This Draft Environmental Impact Report for the Sonoma County Water Agency's Dry Creek Habitat Enhancement Project (Miles 2-6) has been prepared to be compliant with requirements under the Americans with Disabilities Act (ADA). The ADA mandates that reasonable accommodations be made to reduce "discrimination on the basis of disability." As such, the Sonoma County Water Agency is committed to ensuring that documents we make publicly available online are accessible to potential users with disabilities, particularly blind or visually impaired users who make use of screen reading technology.

This disclaimer is provided to advise that portions of the document, including the figures, charts, and graphics included in the document are non-convertible material, and could not reasonably be adjusted to be fully compliant with ADA regulations. For assistance with this data or information, please contact the Water Agency, at (707) 526-5370 and reference the Draft Environmental Impact Report for the Sonoma County Water Agency's Dry Creek Habitat Enhancement Project (Miles 2-6) Project, dated July 2015.

EXECUTIVE SUMMARY

ES 1 Introduction

The Sonoma County Water Agency (Water Agency), as Lead Agency, has prepared this Draft Environmental Impact Report (EIR) for Dry Creek Habitat Enhancement Project, Miles 2–6 (proposed project) to provide the public and responsible and trustee agencies reviewing the Dry Creek Habitat Enhancement Project an analysis of the potential effects, both beneficial and adverse, on the environment.¹ This project is intended to fulfill federal mandates to implement habitat enhancement within Dry Creek to create both winter and summer rearing habitats for juvenile steelhead and coho salmon, with an emphasis on improving habitats for the survival of juvenile coho salmon while allowing the Water Agency to maintain the existing flow range in Dry Creek for water supply purposes. This Draft EIR considers the following alternatives to the project: No Project and the Dry Creek Habitat Enhancement Location Alternatives.

ES 1.1 Project Background

The Russian River watershed encompasses 1,485 square miles of Sonoma and Mendocino Counties. The project areas, illustrated in **Figure ES-1**, are located in the Dry Creek Valley, approximately 65 miles northwest of San Francisco Bay, near the City of Healdsburg, Sonoma County, California. The Water Agency was created in 1949 by the California Legislature as a special district to provide flood protection and water supply services. The Sonoma County Board of Supervisors acts as the Water Agency's Board of Directors. The Water Agency's powers and duties, as authorized by the California Legislature, include the production and supply of surface water and groundwater for beneficial uses, control of flood waters, generation of electricity, provision of recreational facilities (in connection with the Water Agency's facilities), and the treatment and disposal of wastewater.

From its outlet in Warm Springs Dam, Dry Creek meanders 14 miles to the Russian River. The creek is home to endangered coho salmon, and threatened Chinook salmon and steelhead (including steelhead raised at the Don Clausen Fish Hatchery). The creek also serves as a conduit for water that is released from Lake Sonoma by the U.S. Army Corps of Engineers (USAC) for flood control purposes and by the Water Agency for water supply.

¹ The Draft EIR was prepared in accordance with the provisions of the California Environmental Quality Act (CEQA) of 1970, codified as California Public Resources Code Sections 21000 et. seq., the State CEQA Guidelines in the Code of Regulations, Title 14, Division 6, Chapter 3, and the Water Agency's Procedures for the Implementation of CEQA.

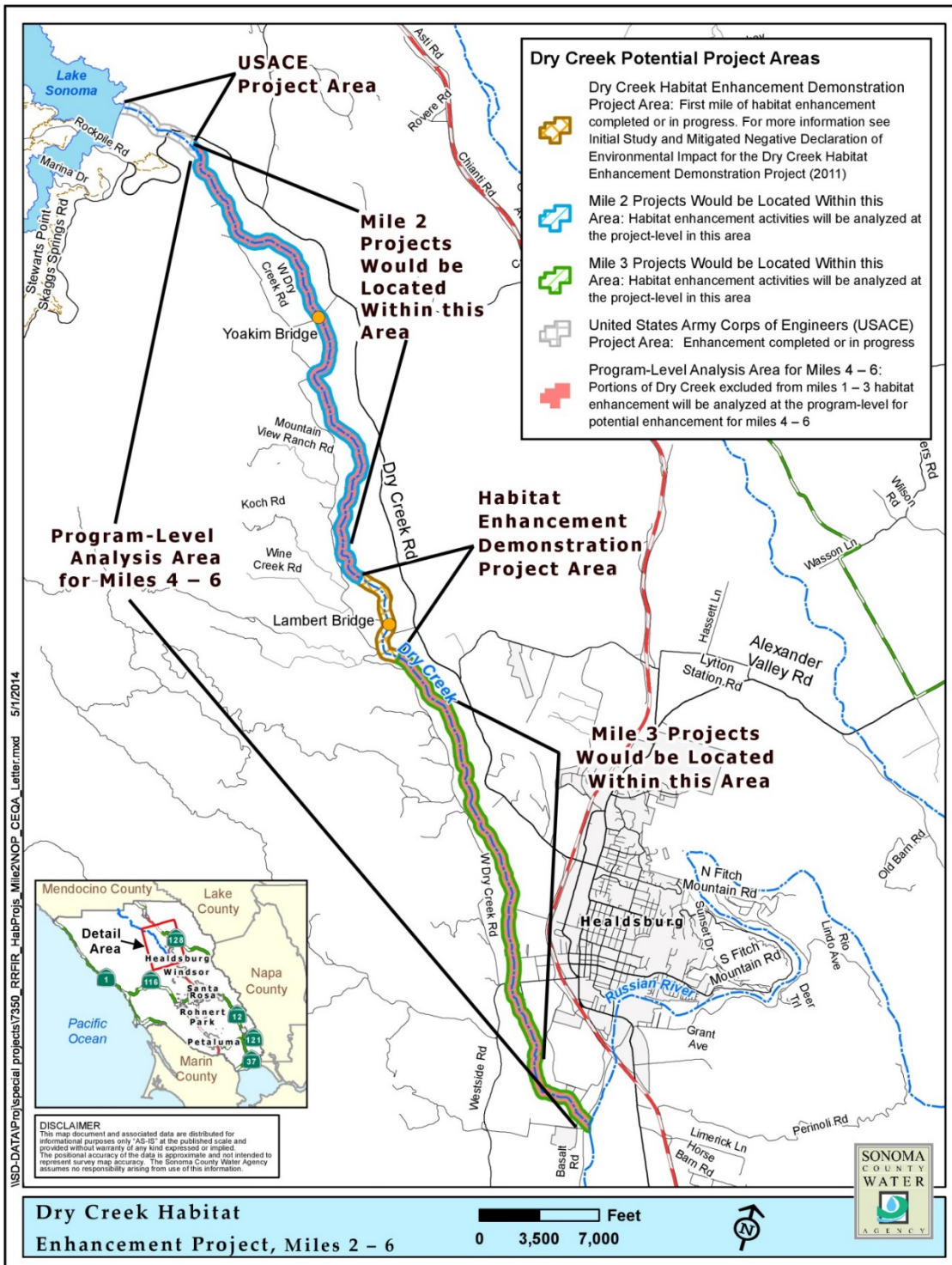


Figure ES-1: Showing the Dry Creek project area.

The National Marine Fisheries Service's (NMFS) concluded in the Russian River Biological Opinion (Biological Opinion) that the continued operations of Coyote Valley Dam and Warm Springs Dam by the USACE and the Water Agency in a manner similar to recent historic practices, together with the Water Agency's stream channel maintenance activities and estuary management, are likely to jeopardize and adversely modify critical habitat for endangered coho salmon and threatened steelhead.

The NMFS Biological Opinion (described in detail in Chapter 1.0, Introduction) mandates the Water Agency and USACE to implement a series of actions [identified as Reasonable and Prudent Alternatives (RPAs)] to modify existing water supply and flood control activities to mitigate or remove the effects of ongoing Water Agency and USACE operations on endangered coho salmon and threatened Chinook salmon and steelhead in the region.

One of these RPAs requires six miles of lower Dry Creek habitat enhancements to create both winter and summer rearing habitats for juvenile steelhead and coho salmon, with an emphasis on improving habitats for the survival of juvenile coho salmon while allowing the Water Agency to maintain the existing flow range in Dry Creek of 110 to 175 cfs for water supply purposes. The six miles of enhancements are to be distributed over the 14 miles, implemented at a minimum of eight locations on Dry Creek (NMFS 2008).

The six miles of habitat enhancements will emphasize natural stream characteristics, or geomorphology, which refers to the manner in which water and sediment combine to create habitat features friendly to fish. By using enhancement practices that emulate natural geomorphic conditions, the benefits provided to young coho and steelhead and their longevity are optimized. Enhancement techniques such as streambank stabilization, backwater channels, alcoves and ponds, side channels, log jams, pool enhancement, riffle construction, and riparian vegetation management, are critical components in producing high quality coho and steelhead habitat. Success of these enhancement practices are determined through monitoring activities such as fish surveys, stream profile and cross-section measurements, vegetation surveys, wildlife surveys, and photo documentation of structures.

The Biological Opinion requires the Water Agency to enhance salmonid rearing habitat in Dry Creek using the below five phase approach to construction. The phased approach allows for evaluation of the effectiveness of the enhancements as the effort progresses.

1. Two years of conceptual project design and planning (2009-2010);
2. Two years for project review, permitting, and pre-monitoring (2011-2012);

3. Two years of initial construction of at least one mile of modified stream channel (2013-2014).
4. Two years of construction (years 8 and 9 covered by the Russian River Biological Opinion) of an additional two miles of modified stream channel (2016-2017).
5. Two years of construction (years 11 and 12 covered by the Russian River Biological Opinion) of an additional three miles of modified stream channel (2019-2020).

The Water Agency began construction in 2012 for Item 3 from the above list with the first phase of the Dry Creek Habitat Enhancement Demonstration Project (Demonstration Project). Construction activities continued in 2013 on the Demonstration Project and was completed in November of 2014. In 2013, the USACE also completed construction of a Dry Creek Habitat Enhancement Project (Reach 15) in a section of Dry Creek immediately below Warm Springs Dam. Together, the Water Agency's Demonstration Project and the USACE's Reach 15 Project make up just over the first mile of modified stream channel work to improve habitat for listed salmonid species in Dry Creek.

Miles 2-6 of habitat enhancement in Dry Creek consist of Item 4 above (construction of 2 additional miles of habitat enhancements by 2017) and Item 5 (construction of 3 additional miles of habitat enhancements by 2020) and is the subject of the Dry Creek Project evaluated in this document. Miles 2 and 3 habitat components, which are to be constructed by the end of 2017, are evaluated on a project-specific basis in this EIR because specific locations of potential sites for habitat projects that make up the work for these miles have been identified. Miles 4-6, which do not yet have specific potential site locations narrowed down, will be evaluated on a programmatic basis in this EIR.

As required by the Russian River Biological Opinion, the additional 2 miles of habitat enhancement projects (portions of the proposed project) is being implemented along Dry Creek. Refinement of activities, as identified in an adaptive management plan, may redirect Water Agency efforts such that target conditions may be achieved. Once the additional 2 miles of habitat are constructed, the success at providing high quality habitat for coho and steelhead would be evaluated by the Water Agency, NMFS and California Department of Fish and Wildlife. If the habitat construction is determined to have successfully created high quality coho and steelhead habitat, then an additional 3 miles of habitat enhancement projects would be constructed (for a total of 6 miles of habitat).

The Biological Opinion identifies an alternative stipulation following construction of a total of 3 miles of habitat enhancement along Dry Creek. If monitoring shows that the habitat enhancement projects have not resulted in the creation of the expected features necessary for high quality coho and steelhead habitat, then the Water Agency is to

proceed with implementing a bypass pipeline between Warm Springs Dam and the Russian River to alleviate the need for high flows in Dry Creek for water supply purposes. In the event that habitat enhancement in Dry Creek does not provide the necessary high quality salmonid habitat, the Water Agency would be required to prepare additional environmental documentation before approving and constructing a Dry Creek bypass pipeline. This EIR will consider the Dry Creek bypass pipeline as an alternative identified but not considered further, because it is speculative and does not achieve the habitat enhancement objectives of the proposed project.

ES 1.2 Project Purpose, Objectives and Need

This EIR has been developed to provide the public and responsible and trustee agencies reviewing the Dry Creek Habitat Enhancement Project an analysis of the potential effects, both beneficial and adverse, on the local and regional environment associated with implementation of the Dry Creek Habitat Enhancement Project. In order to comply with the requirements of the Biological Opinion, the Water Agency will implement the Dry Creek Habitat Enhancement Project.

The purpose of the Dry Creek Habitat Enhancement Project is to provide habitat in Dry Creek for threatened and endangered fish in order to comply with NMFS' Biological Opinion. NMFS concluded in the Biological Opinion that the continued operations of Coyote Valley Dam and Warm Springs Dam by the U.S. Army Corps of Engineers and the Water Agency in a manner similar to recent historic practices, together with the Water Agency's stream channel maintenance activities and estuary management, are likely to jeopardize and adversely modify critical habitat for endangered coho salmon and threatened steelhead.

In order to comply with the requirements of the Russian River Biological Opinion, the Water Agency will implement the Dry Creek Habitat Enhancement Project to enhance channel and riparian conditions on lower Dry Creek to benefit juvenile life stages of listed coho salmon and steelhead trout, which will aid in their recovery within the region. The following are the objectives for the Dry Creek Habitat Enhancement Project, Miles 2-6:

- Enhance summer rearing habitat for coho salmon and steelhead to 'near-ideal' conditions;
- Create refugia from winter high-flow releases for coho salmon and steelhead;
- Enhance habitat, and to the extent feasible, minimize impacts on private property and infrastructure; and
- Enhance habitat without adversely affecting Chinook salmon.

ES 1.3 Summary of Public Involvement Activities

In accordance with CEQA Guidelines Section 15082, the Water Agency circulated a Notice of Preparation (NOP) to local, state, and federal agencies, and to other interested parties on May 5, 2014. The NOP was circulated for a 39-day public review period, which ended on June 12, 2014, to solicit both written and verbal comments on the EIR's scope and provide information on the public scoping meeting. Additionally, the NOP presented the background, purpose, description, and location of the proposed project, potential issues to be addressed in the EIR, and contact information for additional information regarding the project. The NOP was directly mailed to 650 parties.

During the scoping period, the Water Agency hosted a meeting in cooperation with the Dry Creek Valley Association, Winegrowers of Dry Creek Valley, and Sonoma County Supervisor Mike McGuire to discuss the project and to solicit public input as to the scope and content of this EIR. The purpose of the scoping meetings was to present the proposed project to the public through use of display maps and handouts describing project components and potential environmental impacts. Attendees were provided an opportunity to voice comments or concerns regarding potential effects of the proposed project. Appendix 9.1 of this Draft EIR contains a copy of the NOP and the Scoping Report, which provides a summary of all verbal and written comments received, and copies of the written comments.

A total of five comment submittals (letters, emails, comment cards) were received. The comments included questions regarding CEQA technical issues, including potential effects on cultural resources, water quality, sedimentation, and transportation.

ES 2 Proposed Project

ES 2.1 Mile 2

The project sites being evaluated for Mile 2 habitat enhancement work are located in enhancement reach areas 8, 9 through 11, and 14 (RM 8.2-8.9, RM 9.2-10.5, and RM 12.4-13.2 (**Figures ES-2** through **ES-4**). Concept designs for the Mile 2 sites are included in Appendix 9.2 (10% Conceptual Design for Mile 2) (Inter-Fluve 2014).

The proposed enhancements include combinations of pool and riffle enhancement, off-channel backwater and alcove enhancement and/or creation, side-channel enhancement and/or creation, and enhancement and stabilization of streambanks. Pools may be enhanced with large woody debris which provide places for juvenile coho and steelhead to avoid predators, escape high water velocities, and find food. Enhancements of riffles may include expanding existing riffles or constructing new riffles

in appropriate locations, which may also enhance pools by slowing pool velocities. Streambank enhancements may address chronic erosion in critical locations and provide additional cover along the channel margins.

Construction activities will vary depending upon which structures are installed and where they are located, but typically these types of construction activities can include dewatering the construction area, grading, installation of large boulders as anchor material, installation of large wood logs, planting of vegetation, and installation of erosion control measures (e.g. fabric, straw, seeding). Some construction activities may consist of working in the active flow of Dry Creek, such as large boulder placement where dewatering the section of creek to place boulders would be more disruptive to the environment. Construction activities will likely require staging areas outside of the footprint of the habitat work, as well as requiring the creation of access routes through the riparian corridor in order to access the habitat work site.

While it is not anticipated that the habitat enhancement structures will require regular maintenance work over the long term, temporary irrigation may be required to maintain newly-installed vegetation and periodic vegetation management may take place in certain locations to enhance fish habitat. Maintenance activities may also include repair to damaged structures or adjustments to structures if they are not functioning as intended.

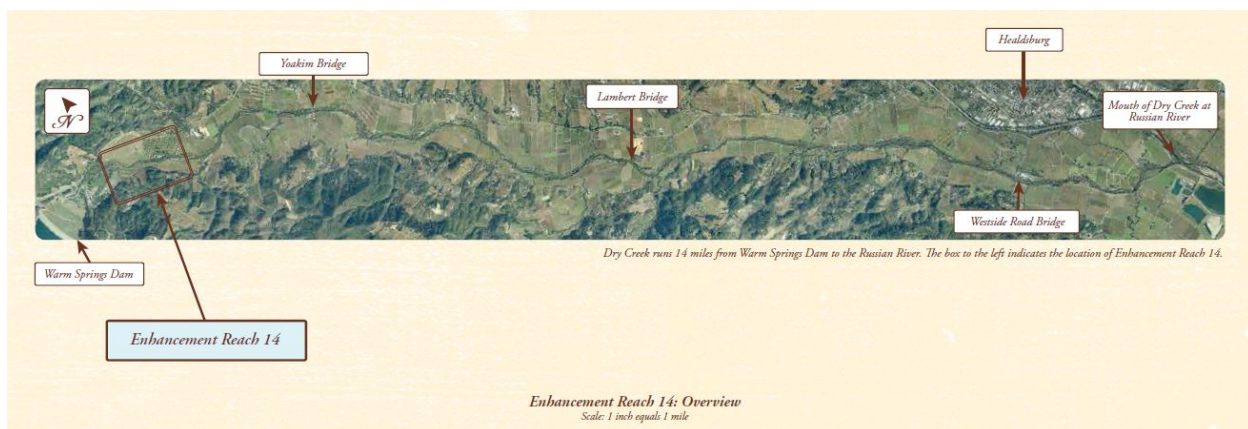


Figure ES-2. Showing location of enhancement reach 14, which is part of the Mile 2 enhancement area.

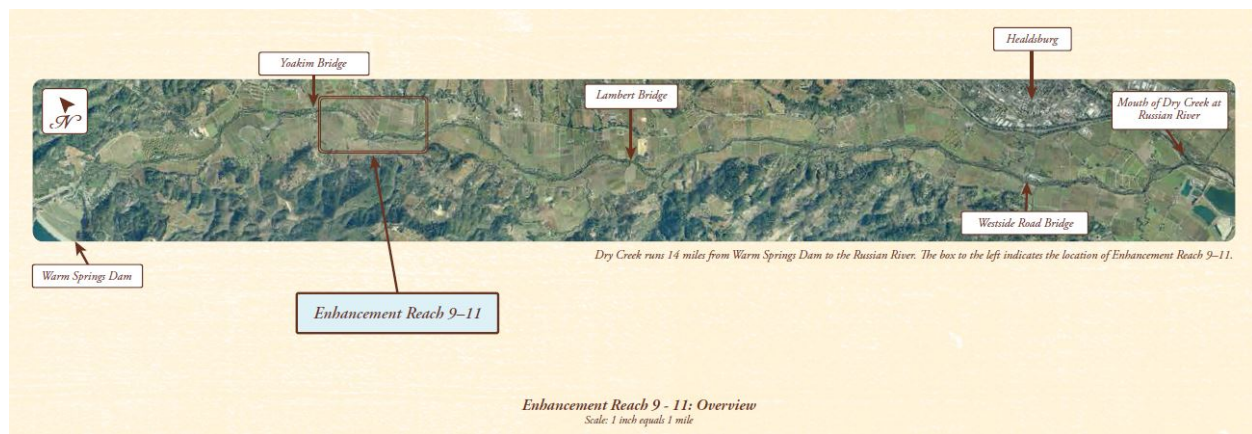


Figure ES-3. Showing location of enhancement reaches 9-11, which are part of the Mile 2 enhancement area.

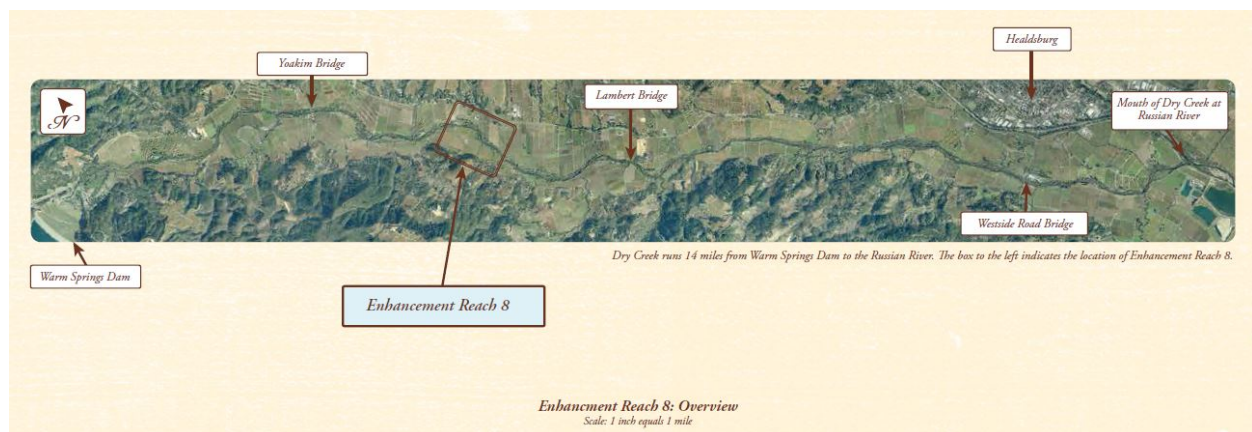


Figure ES-4. Showing location of enhancement reach 8, which is part of the Mile 2 enhancement area.

ES 2.2 Mile 3

The project sites being evaluated for Mile 3 habitat enhancement work are located in enhancement reaches 2, 4, and 4 (RM 1.0-2.0, RM 3.0-4.1, and RM 4.2-5.0 (**Figure ES-5**). Concept designs for the Mile 3 sites are included in Appendix 9.3 (10% Conceptual Design for Mile 3) (ESA 2014).

The proposed enhancements and anticipated construction and maintenance activities are similar as to those described for Mile 2.

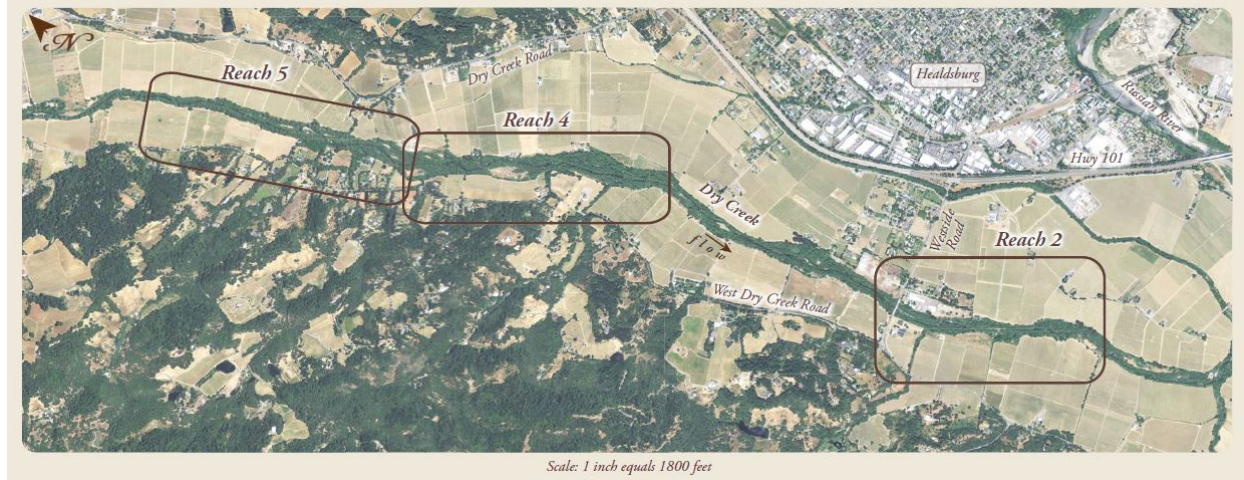


Figure ES-5. Showing location of enhancement reaches 2, 4, and 5, which make up the Mile 3 enhancement area.

ES 2.3 Miles 4-6

Any area within the 14-mile length from below Warm Springs Dam to the confluence of the Russian River and not already enhanced or providing high quality habitat are under consideration for Miles 4-6 of habitat work in Dry Creek. The proposed enhancements and anticipated construction and maintenance activities are anticipated to be similar as to those described for Mile 2.

ES 3 Environmental Impacts and Mitigation Measures

ES 3.1 Impact Assessment Methodology

This EIR includes project-level analysis for the Dry Creek Project, Miles 2-3 and program-level analysis for the Dry Creek Project, Miles 4–6. For program-level impact assessment. The locations of proposed program-level components have not yet been identified however, due to the general uniformity of the riparian zone in Dry Creek and the similarity in types of enhancements proposed for Miles 2–3 and 4–6, the potential impacts are combined for project-level and program-level analysis. Project components addressed at the program-level in this analysis will be subject to future environmental analysis at the project- (or site-specific) level.

The analysis of environmental impacts is based upon the environmental setting applicable to each resource category and the manner in which the implementation, operation, and maintenance of the Dry Creek Habitat Enhancement Project or alternatives would affect the environmental setting and related resource conditions. In

accordance with CEQA requirements and guidelines, the impact assessment methodology also considers the following three topics: (1) the regulatory setting, and whether the Dry Creek Habitat Enhancement Project would be consistent with adopted federal, State and Local regulations and guidelines, (2) growth-inducing impacts, and (3) cumulative impacts. Regulatory compliance issues are discussed in each resource category section. The EIR document is organized by resource categories, which are listed in the order in which they appear in **Chapter 3.0**:

- | | |
|--|--|
| 1. Aesthetics | 8. Hydrology and Water Quality |
| 2. Air Quality, Greenhouse Gas Emission, Energy and Sustainability | 9. Land Use, Planning and Agricultural Resources |
| 3. Biological Resources | 10. Noise |
| 4. Cultural Resources | 11. Public Services and Utility Service Systems |
| 5. Fisheries | 12. Recreation |
| 6. Geology, Soils and Mineral Resources | 13. Traffic and Transportation |
| 7. Hazards and Hazardous Materials | |

The Draft EIR addresses environmental issues that could result in potentially significant environmental effects from project implementation. Significance criteria have been developed for each environmental resource category analyzed in this Draft EIR and are defined at the beginning of each impact analysis section. Impacts associated with resources are summarized and categorized as either “less than significant,” “less than significant with mitigation,” “significant and unavoidable” or “no impact.” Impacts are also identified as applicable to construction, operation, and/or maintenance phases of the project.

ES 3.2 Mitigation Measures

Where applicable, the EIR describes feasible measures that could minimize significant adverse impacts (CEQA Guidelines Section 15226.4). Within each issue area, mitigation measures are recommended where environmental effects could be substantially minimized. The mitigation measures recommended are identified in the impact assessment sections of the EIR.

ES 3.3 Findings

An overview of environmental impacts by resource area is provided below based on the detailed impact finding and mitigation measures for the proposed project provided in **Chapter 3.0 Environmental Impacts and Mitigation Measures. Table ES-1**, at the end of this Executive Summary, provides a more detailed summary of all the

environmental impacts and mitigation measures identified for the Dry Creek Habitat Enhancement Project.

Less than Significant and Less than Significant with Mitigation

For the Dry Creek Habitat Enhancement Project, based on technical review and evaluation against the environmental and regulatory setting, the impacts to the following environmental resources were determined to be no impact, less than significant or less than significant with mitigation.

- | | |
|-------------------------------|---|
| 1. Aesthetics | 8. Hydrology and Water Quality |
| 2. Air Quality | 9. Transportation and Traffic |
| 3. Biological | 10. Hazards and Hazardous Materials |
| 4. Cultural | 11. Public Utilities and Services and Public Safety |
| 5. Fisheries | 12. Recreation |
| 6. Geology, Soils, Seismicity | |
| 7. Land Use and Agriculture | |

Beneficial

As summarized in **Table ES-1**, environmental impacts would be beneficial in the following areas:

1. Fish Habitat Enhancements. Dry Creek habitat enhancements would create both winter and summer rearing habitats for juvenile steelhead and coho salmon, with an emphasis on improving habitats for the survival of juvenile coho.

Significant and Unavoidable

As summarized in Table ES-1, environmental impacts would be significant and unavoidable, even with implementation of feasible mitigation measures, in the following area:

Construction noise. Project construction could result in noise levels at and near the construction areas that would fluctuate depending on the particular type, number, and duration of uses of various pieces of construction equipment. Construction-related material haul trips would raise ambient noise levels along haul routes, depending on the number of haul trips made and types of vehicles used. In addition, certain types of construction equipment generate impulsive noises (such as pile driving), which can be particularly disruptive. There is a potential for the noise levels during construction to be perceived as a nuisance for the closest residences to the project site. Although the noise generated during

construction would be temporary in nature and the proposed mitigation measures would reduce the impact to less-than-significant levels in many cases, this impact could still be significant and unavoidable given the potential for sensitive receptors for noise sources in the project area.

ES 4 Alternatives

This Draft EIR describes and evaluates a reasonable range of alternatives to the Dry Creek Habitat Enhancement Project, in accordance with CEQA Guidelines Section 15126(a). Particular emphasis was placed on developing feasible alternatives which would reduce impacts to water quality, biological resources, and recreational resources.

ES 4.1 No Project Alternative

The No Project Alternative assumes that the proposed project would not be constructed, which would result in the continued potential for the Water Agency's existing water supply operations to jeopardize the continued existence of and critical habitat for coho salmon and steelhead in Dry Creek. If the Dry Creek Project is not built, and the Water Agency continues its existing water supply operations, velocities in Dry Creek would remain too high for juvenile salmon in Dry Creek due to simplified habitats that do not provide velocity breaks or refugia. As such, the No Project Alternative would not meet the proposed project objective of enhancing winter and summer rearing habitats for juvenile steelhead and coho salmon while allowing the Water Agency to maintain its existing water supply functions. The No Project Alternative would also result in the Water Agency being out of compliance with the California and federal Endangered Species Acts by continuing to potentially jeopardize coho salmon and steelhead by not implementing the RPA for habitat enhancement in Dry Creek as identified in the Biological Opinion. Such non-compliance could result in the loss of the incidental take authority granted to the Water Agency by the Biological Opinion, potentially exposing the Water Agency to liability in the event its activities resulted in a "take" of listed species.

ES 4.2 Dry Creek Habitat Enhancement Location Alternatives

In order to meet the objectives of the Biological Opinion, the habitat enhancement sites need to be located along Dry Creek between its confluence with the Russian River and Warm Springs Dam. Numerous interest areas for habitat enhancement were identified along the 14 miles of Dry Creek below Warm Springs Dam that would provide habitat potential and a range of different habitat enhancement techniques. These interest areas include the proposed locations for Miles 2 and 3 (evaluated on a project level) and locations for Miles 4 through 6 (evaluated on a programmatic level), and future

alternative locations. All of the interest areas have similar environmental impacts as the proposed project sites.

Project locations for Miles 2 and 3 were selected based on habitat potential and if access to the properties was granted by landowners for site evaluation and design development as described above in Section 6.3 of this chapter. For Miles 4 through 6, a similar selection process will be conducted from the remaining interest areas that have not been enhanced to determine project locations and alternatives.

All of the interest areas have habitat potential and have similar environmental impacts. The only difference between the proposed project sites and project location alternative sites is that access to the properties was granted by landowners for site evaluation and design development for the proposed project sites.

ES.4.3 Summary of Comparison of Project Alternatives

ES 4.3.1 No Project Analysis

Under the No Project Alternative, the Water Agency's existing water supply operations would potentially jeopardize the continued existence of coho salmon and steelhead and their critical habitat in Dry Creek. In considering existing conditions under a "no project scenario," this could result in the Water Agency becoming out of compliance with the Biological Opinion. Such non-compliance could result in the loss of the incidental take authority granted to the Water Agency by the Biological Opinion, potentially exposing the Water Agency to liability in the event its activities resulted in a "take" of listed species. The No Project Alternative would not have the significant and unavoidable noise impact of the Proposed Project identified above in **Section 6.6**. However, the No Project Alternative would not have the beneficial impacts of the Proposed Project also identified above in **Section 6.6**.

Ability to Meet Project Objectives

As noted in **Section 6.5** of this chapter, the No Project Alternative would not achieve the project objectives. As such, the No Project Alternative would not meet the proposed project objective of enhancing winter and summer rearing habitats for juvenile steelhead and coho salmon. The No Project Alternative would also result in the Water Agency being out of compliance with the California and Federal Endangered Species Acts by continuing to potentially jeopardize coho salmon and steelhead by not implementing the RPA for habitat enhancement in Dry Creek as identified in the Biological Opinion. Such non-compliance could result in the loss of the incidental take authority granted to the Water Agency by the Biological Opinion, potentially exposing the Water Agency to liability in the event its activities resulted in a "take" of listed species.

Environmental Effects

Short-term Effects

Implementation of the No Project Alternative would avoid short-term construction-related impacts associated with of the creation of habitat enhancements.

Long-Term Effects

Implementation of the No Project Alternative would result in the continuation of current conditions within Dry Creek, which have been found to be detrimental to state and federally listed salmonids, and could result in the Water Agency being out of compliance with the mandates of the Biological Opinion and State consistency determination to implement habitat enhancement in Dry Creek in accordance with the Biological Opinion. Such non-compliance could result in the loss of the incidental take authority granted to the Water Agency by the Biological Opinion, potentially exposing the Water Agency to liability in the event its activities resulted in a “take” of listed species. Implementation of the No Project Alternative would not enhance winter and summer rearing habitats for juvenile steelhead and coho salmon. As such, implementation of the No Project Alternative would not meet project objectives related to the enhancement of winter and summer rearing habitats for juvenile steelhead and coho salmon within Dry Creek.

ES 4.3.2 Dry Creek Habitat Enhancement Location Alternatives Analyses

Ability to Meet Project Objectives

As noted in **Sections 6.3** and **6.5** of this chapter, the Dry Creek Habitat Enhancement Location Alternatives would achieve the project objectives like the proposed project, which are directed at improving salmonid habitat to create both winter and summer rearing habitats for juvenile steelhead and coho salmon, with an emphasis on improving habitats for the survival of juvenile coho salmon, while allowing the Water Agency to maintain its ability to deliver water to its customers. The only difference between the proposed project sites and the project location alternative sites is that access to the properties was not granted by landowners for site evaluation and design development for the location alternative sites. The Dry Creek Habitat Enhancement Location Alternatives would have similar beneficial and significant and unavoidable impacts as described above in Section 6.6 for the proposed Dry Creek Project. The Dry Creek Habitat Enhancement Location Alternatives would have the additional impact of forcing unwilling landowners to be involved with the habitat enhancement efforts.

Environmental Effects

Short-term Effects

Implementation of the Dry Creek Habitat Enhancement Location Alternatives would have similar short-term construction-related impacts associated with the creation of habitat enhancements identified for the proposed project associated with construction

and maintenance of the habitat enhancement features in the following areas: aesthetics, biological, cultural, fisheries, geology, hydrology, land use, and traffic. These impacts would be reduced to a less-than-significant level by mitigation measures listed in **Chapter 3.0**.

Long-Term Effects

Dry Creek Habitat Enhancement Location Alternatives would benefit fisheries, aquatic and other riparian species by increasing suitable areas and providing vegetative cover and winter and summer rearing areas. The Dry Creek Habitat Enhancement Location Alternatives would also be consistent with existing coho salmon recovery plans as well as the Russian River Biological Opinion.

ES 4.4 Environmentally Superior Project Alternative

The lead agency is not required by CEQA to adopt an environmentally superior alternative that will not feasibly attain project objectives or reduce environmental effects. In the process of selecting the environmentally superior alternative, CEQA requires that a lead agency demonstrate why a project or an alternative is selected.

The Dry Creek Project was selected as the environmentally superior alternative because it achieves the project objectives of enhancing habitat to create winter and summer rearing habitats for juvenile steelhead and coho salmon, with an emphasis on improving habitats for the survival of juvenile coho salmon while allowing the Water Agency to maintain its ability to deliver water to its customers.

In determining the environmentally superior project alternative, the Water Agency compared the environmental impacts of each alternative. Given the uniform nature of the riparian corridor along Dry Creek, the physical location of the habitat sites do not result in significantly different impacts to construct, operate, or maintain; however, as noted for the Conceptual Design Report, different sites have different potential habitat benefits. In addition, a critical component of the selected Water Agency's habitat sites are that they are only on properties with willing landowners where the habitat enhancements mesh well with the landowners vision for the use of their land. Therefore, the proposed project is the environmentally superior project because it best meets the project objectives and the enhancement sites are only proposed on properties with willing landowners.

The Dry Creek Habitat Enhancement Location Alternatives would achieve the project objectives of enhancing five miles of habitat to create winter and summer rearing habitats for juvenile steelhead and coho salmon, with an emphasis on improving habitats for the survival of juvenile coho salmon while allowing the Water Agency to maintain its ability to deliver water to its customers. In addition, the Dry Creek Habitat Enhancement Location Alternatives would comply with the Biological Opinion. However

the Dry Creek Habitat Enhancement Location Alternatives would not reduce environmental effects as impacts of construction, operation, and maintenance are similar to the proposed project, but they are at locations where no permission to access the properties was granted by landowners for site evaluation and design development. Therefore, the Dry Creek Habitat Enhancement Location Alternatives is not considered the environmentally superior project alternative.

A No Project Alternative would not achieve the objectives of enhancing five miles of habitat to create winter and summer rearing habitats for juvenile steelhead and coho salmon. In addition, the Reduced Project Alternative would not comply with the Biological Opinion. Therefore, a No Project Alternative is not considered environmentally superior.

ES 5 Impact Summary Table

Table ES-1, included at the end of this section, summarizes the environmental impacts associated with each of the Dry Creek Habitat Enhancement Project. For impacts determined to be significant, mitigation measures are presented and the impact significance after mitigation is shown.

ES 6 References

Inter-Fluve 2010. Final Current Conditions Report, Dry Creek from Warm Springs Dam to the Confluence with the Russian River. Prepared for the Sonoma County Water Agency. December.

Inter-Fluve 2012. Final Habitat Enhancement Feasibility Study Report, Dry Creek from Warm Springs Dam to the Confluence with the Russian River. Prepared for the Sonoma County Water Agency. July.

Inter-Fluve 2012. Final Dry Creek Fish Habitat Enhancement: Conceptual Design Report: Dry Creek: Warm Springs Dam to the Russian River Sonoma County, CA. Prepared for the Sonoma County Water Agency. July.

NMFS 2008. Biological Opinion for Water Supply, Flood Control Operations, and Channel Maintenance conducted by the U.S. Army Corps Of Engineers, the Sonoma County Water Agency, and the Mendocino County Russian River Flood Control and Water Conservation Improvement District in the Russian River watershed. Southwest Region. September 24.

**TABLE ES-1
SUMMARY OF IMPACT DETERMINATIONS AND MITIGATION MEASURES**

Impact	Mitigation Measures	Impact Determination
Combined Analysis for Miles 2–3 and Miles 4–6		
AESTHETICS		
3.1.1: Construction and maintenance of the Dry Creek Project could have a substantial adverse effect on a scenic vista.		LTS
3.1.2: Operation of the Dry Creek Project could have a substantial adverse effect on a scenic vista.	3.1.2: The Sonoma County Water Agency will present participating landowners with design drawings as they become available and will work closely with participating landowners to address concerns regarding aesthetic resources wherever feasible.	LTSM
3.1.3: Construction, operation and/or maintenance activities of the Dry Creek Project could have an adverse impact on scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.	Mitigation Measure 3.3.1a from Chapter 3.3, Biological Resources; Mitigation Measure 3.6.3 from Chapter 3.6 Geology, Soils, and Mineral Resources; and Mitigation Measure 3.1.2 from Chapter 3.1, Aesthetics.	LTSM
3.1.4: Construction, operation, and/or maintenance activities of the Dry Creek Project could have an adverse impact on the existing visual character or quality of the site and its surrounds.	Mitigation Measure 3.3.1a from Chapter 3.3, Biological Resources; Mitigation Measure 3.6.3 from Chapter 3.6 Geology, Soils, and Mineral Resources; and Mitigation Measure 3.1.2 from Chapter 3.1, Aesthetics.	LTSM
3.1.5: Construction and/or maintenance activities of the Dry Creek Project could create a new source of light or glare which could adversely affect day or nighttime views in the area.	None required.	NI
AIR QUALITY, GREENHOUSE GAS EMISSIONS, ENERGY, AND SUSTAINABILITY		
3.2.1: Construction, operation, and/or maintenance of the Dry Creek Project could potentially violate an air quality standard or contribute substantially to an existing or projected air quality violation.	Although this impact would be less than significant, implementation of Mitigation Measures 3.2.1a and 3.2.1b would reduce it further: 3.2.1a: The project specifications will require the contractor to comply with the dust control provisions of the Sonoma County Water Agency's Standard Contract Documents and the Northern Sonoma County Air Pollution Control District's Rule 430 that regulate fugitive dust emissions. Measures to reduce dust emissions may include, but are not limited to sprinkling unpaved construction areas with water; covering trucks hauling dirt; limiting dust generating activities during periods of high winds (greater than 15 miles per hour); replacing ground cover in disturbed areas as soon as possible; enclosing, covering, watering, or applying soil binders to exposed stock piles; removing earth tracked onto neighboring paved roads at least once daily; and limiting equipment speed to 10 miles per hour in unpaved areas.	LTS

AIR QUALITY, GREENHOUSE GAS EMISSION, ENERGY AND SUSTAINABILITY (cont.)		
3.2.1 (cont.)	3.2.1b: The project specifications will require that all construction vehicles and equipment emission levels meet current air quality standards and that idling time for all heavy equipment be minimized to reduce on- site emissions.	LTS
3.2.2: Construction, operation, and/or maintenance of the Dry Creek Project could potentially expose sensitive receptors to substantial pollutant concentrations.	None Required	LTS
3.2.3: Construction, operation, and/or maintenance of the Dry Creek Project could create objectionable odors affecting a substantial number of people.	None Required	LTS
3.2.4: Construction, operation, and/or maintenance of the Dry Creek Project could generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.	None Required	LTS
3.2.5: Construction, operation, and/or maintenance could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases, such as Sonoma County's Community Climate Action Plan.	Not Required	LTS

BIOLOGICAL RESOURCES

3.3.1: The construction, operation, and maintenance of the Dry Creek Project could have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by the CDFW, USFWS, or NMFS or on nesting birds.

- 3.3.1a: Habitat enhancement features will be placed and designed in a way that preserves trees with high wildlife habitat value where feasible. These may include snags, living trees with cavities, or other large, mature trees.
- 3.3.1b: The Water Agency shall conduct a pre-construction biological resources survey to identify special-status plants, amphibians, reptiles, and nesting birds present within 50 feet of the project footprint. The pre-construction survey shall:
- Be conducted by a qualified biologist no more than one week prior to commencement of construction activities or maintenance that could impact special-status plant or animal species. The biologist shall have familiarity with special-status species of the area and experience with conducting special-status species and nesting bird surveys.
 - If no special-status plants or animals, or nesting birds are encountered, no further mitigation would be required for at least two weeks, unless additional measures are required by regulatory permit conditions obtained for the proposed project.
 - Additional pre-construction surveys, specifically for nesting birds, shall be conducted such that no more than two weeks will have lapsed between the survey and construction or maintenance activities.
 - If a special-status plant or animal is encountered, the location shall be documented and avoidance and minimization shall be prepared by the qualified Water Agency biologist, or consulting biologist, in coordination with the Water Agency and appropriate resource agencies. Avoidance and minimization measures may include, but not be limited to, establishment of a no-work buffer around federally- or state-listed threatened or endangered plants or replanting of other special-status plant species during revegetation. Should foothill yellow-legged frog, California red-legged frog, or western pond turtle be found within the construction area, individuals will be relocated by a qualified biologist to an area of appropriate habitat outside of the construction area.
 - If a nesting bird is encountered, the location shall be documented and avoidance and minimization shall be prepared by the qualified Water Agency biologist, or consulting biologist in coordination with the Water Agency, and appropriate resource agencies. A no-work buffer shall be established around active bird nests in coordination with the CDFW. Nests will be monitored weekly during construction activities.

LTSM

BIOLOGICAL RESOURCES (cont.)		
3.3.1 (cont.)	<p>3.3.1c: Sites where construction activities result in exposed soil will be stabilized to prevent erosion. For each of these sites, the Water Agency will prepare and implement a revegetation plan to mitigate the loss of native riparian vegetation.</p> <ul style="list-style-type: none"> • Erosion control fabric, hydromulch, or other mechanisms will be applied as appropriate to provide protection to seeds, hold them in place, and help retain moisture. • Recontoured banks will be seeded and revegetated and erosion control fabric will be used to prevent erosion. • Plant species selected for revegetation will be based upon surveys of riparian habitat along Dry Creek upstream and downstream of the project site. • Planting requirements in the revegetation plan will be based upon species composition and density recommendations associated with the overall habitat enhancement design for the project. • If soil moisture is deficient, new vegetation will be supplied with supplemental water until vegetation is firmly established. • Revegetation shall be regularly monitored for survival until minimum survival/cover is achieved. • If invasive plant species colonize the area, action shall be taken to control their spread; options include hand and mechanical removal and replanting with native species. • The final revegetation plan will include details regarding planting, implementation, maintenance, and monitoring. 	LTSM

3.3.1 (cont.)	<p>3.3.1d: A worker environmental awareness training shall be included to inform construction personnel of their responsibilities regarding sensitive biological resources that are present within 50 feet of the project footprint, staging areas, and access roads; or 300 feet for nesting raptors.</p> <ul style="list-style-type: none">• The training shall be developed by a qualified biologist familiar with the sensitive biological resources that are known or have the potential to occur in the area.• The training shall be completed by all construction personnel before any work occurs at the proposed habitat enhancement sites, including construction equipment and vehicle mobilization. If new personnel are added to the proposed project, the Water Agency shall ensure that new personnel received training before they start working.• The training shall provide educational information on the special-status species that are known or have potential to occur in the area, how to identify the species, as well as other sensitive biological resources (e.g., sensitive natural communities, federal and state jurisdictional waters). The training shall also review the required mitigation measures to avoid impacts on the sensitive resources, and penalties for noncompliance with biological mitigation requirements.	LTSM
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BIOLOGICAL RESOURCES (cont.)		
3.3.2: Construction, operation, and maintenance could have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the CDFW or USFWS.	Mitigation Measures 3.3.1a, 3.3.1b, 3.3.1c, and 3.3.1d	LTSM
3.3.3: Construction, operation, and/or maintenance could have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.	Mitigation Measures 3.8.1a through 3.8.1d from Chapter 3.8, Hydrology and Water Quality and Mitigation Measure 3.6.8a from Chapter 3.6, Geology, Soils, and Mineral Resources	LTSM
3.3.4: Construction, operation, and/or maintenance of the Dry Creek Project could interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.	None Required	LTS
3.3.5: Construction and/or maintenance of the Dry Creek Project could have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or substantially reduce the number or restrict the range of an endangered, rare, or threatened species.	Mitigation Measures 3.3.1a, 3.3.1b, 3.3.1c, and 3.3.1d; Mitigation 3.5.1 from Chapter 3.5, Fisheries Resources	LTSM
3.3.6: Operation of the Dry Creek Project could have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or substantially reduce the number or restrict the range of an endangered, rare, or threatened species.	None Required	B
3.3.7: Construction, operation, and/or maintenance of the Dry Creek Project could conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	None Required	NI
3.3.8: Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved plan.	None Required	NI

CULTURAL RESOURCES

3.4-1: Construction and maintenance of the Dry Creek Habitat Enhancement Project, Miles 2-6, could cause a substantial adverse change in the significance of a historical resource or unique archaeological resource.

During construction- and maintenance-related ground-disturbing activities, items of historical or archaeological interest could be discovered, however implementation of Mitigation Measures 3.4.1a and 3.4.1b would reduce this potential impact to less than significant with mitigation.

LTSM

3.4.1a: A qualified archaeologist or representative from the Dry Creek Rancheria will be present during ground-disturbing activities at the site P-49-0006000.

3.4.1b: A tribal representative will be present during ground-disturbing activities throughout the project area.

In the event that previously unknown cultural materials are found during project construction or maintenance, the following mitigation measures would reduce the impacts to archaeological or historical resources to less-than-significant.

3.4.1c: The project specifications will require the contractor to comply with the Sonoma County Water Agency's Standard Contract Documents regarding the discovery of cultural resources. The Water Agency Construction Inspector and construction personnel will be notified of the possibility of encountering archaeological materials during project construction and maintenance. The project specifications will provide that if discovery is made of items of historical or archaeological interest, the contractor will immediately cease all work activities in the area (within approximately 100 feet) of discovery. Prehistoric archaeological materials may include, but are not limited to, dwelling sites, obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish remains; stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-period materials might include stone, concrete, or adobe footings and walls; filled wells or privies; and deposits of metal, glass, and/or ceramic refuse. After cessation of excavation the contractor will immediately contact the Water Agency. The contractor shall not resume work until authorization is received from both agencies.

1. In the event of unanticipated discovery of archaeological materials occurs during construction, the Water Agency shall retain the services of a qualified professional archaeologist to evaluate the significance of the items prior to resuming any activities that could impact the site.
2. In the case of an unanticipated archaeological discovery, if it is determined that the find is potentially eligible for listing in the California and/or National Registers, and the site cannot be avoided, the Water Agency shall provide a research design and excavation plan, prepared by a qualified archaeologist, outlining recovery of the resource, analysis, and reporting of the find. The research design and excavation plan shall be approved by the Water Agency. Implementation of the research design and excavation plan shall be conducted prior to work being resumed.

CULTURAL RESOURCES (cont.)		
3.4.2: The Dry Creek Habitat Enhancement Project, Miles 2-6, could disturb human remains, including those interred outside of formal cemeteries.	3.4.2: The project specifications will require the contractor to comply with Public Resources Code 5097.98 and Health and Human Safety Code 7050.5 as they pertain to the discovery of human remains. If potential human remains are encountered, the Contractor shall halt work in the vicinity of the find and contact the Water Agency construction inspector and the Sonoma County coroner in accordance with Public Resources Code Section 5097.98 and Health and Safety Code Section 7050.5. If the coroner determines the remains are Native American, the coroner will contact the Native American Heritage Commission (NAHC). As provided in Public Resources Code Section 5097.98, the NAHC will identify the person or persons believed to be most likely descended from the deceased Native American. The Most Likely Descendent (MLD) makes recommendations for means of treating the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98. Work shall cease in the immediate area until the recommendations of the appropriate MLD are concluded.	LTSM
3.4.3: Construction and maintenance of Dry Creek Habitat Enhancement Project, Miles 2-6, could adversely affect the distribution of culturally significant plants along Dry Creek.	3.4.3a: During construction and pre-construction activities in areas that contain basket sedge, the Water Agency and its contractors will remove, store, and replant basket sedge, <i>Carex barbarae</i> , at a 1:1 ratio to ensure its continued presence. 3.4.3b: Prior to finalizing revegetation plans on public lands, Water Agency staff will consult with local tribal interests and prioritize inclusion of high priority species on those lands as well as other project locations, where feasible.	LTSM
FISHERIES RESOURCES		
3.5.1: Construction, operation, and maintenance of the Dry Creek Project could adversely affect movement of adult or juvenile special-status fisheries species.	3.5.1: During dewatering activities, fish located within the project site would be removed and relocated to appropriate habitat downstream of the project site. Qualified fisheries biologists, using methods approved by the National Marine Fisheries Service and California Department of Fish and Wildlife, would perform the fish rescue and relocation.	LTSM
3.5.2: Construction, operation, and maintenance of the Dry Creek Project could adversely affect CCC coho salmon, CC Chinook salmon, or CCC steelhead spawning habitat usage and quality.	Construction and Maintenance: Mitigation Measure 3.5.1 Operation: None Required	LTSM B
3.5.3: Construction, operation, and maintenance of the Dry Creek Project could adversely affect CCC coho salmon, CC Chinook salmon, or CCC steelhead rearing habitat.	Construction and Maintenance: Mitigation Measure 3.5.1 Operation: None Required	LTSM B
3.5.4: Construction, operation, and maintenance of the Dry Creek Project could adversely affect water temperature during for CCC coho salmon, CC Chinook salmon, or CCC steelhead juveniles.	None Required	NI
3.5.5: Construction, operation, and maintenance of the Dry Creek Project could adversely affect local policies protecting biological resources or conflict with the provisions of an adopted HCP, Natural Communities Conservation Plan (NCCP) or other approved local, regional or state habitat conservation plan.	None Required	NI

GEOLOGY, SOILS, AND MINERAL RESOURCES		
3.6.1: Construction and maintenance of the Dry Creek Project could expose people or structures to adverse effects associated with fault rupture.	3.6.1: The Contractor shall prepare and implement a Site Safety Plan which shall include but not be limited to: <ul style="list-style-type: none"> • Documentation of an emergency communication system and protocols; • Information on available emergency first aid supplies; • Evacuation procedures and emergency escape route assignments; and • Description of emergency response training for workers. 	LTSM
3.6.2: Operation of the Dry Creek Project could expose people or structures to adverse effects associated with fault rupture.	None Required	NI
3.6.3: Construction and maintenance of the Dry Creek Project could expose people or structures to adverse effect associated with seismic shaking.	Mitigation Measure 3.6.1	LTSM
3.6.4: Operation of the Dry Creek Project could expose people or structures to adverse effect associated with seismic shaking.	None Required	NI
3.6.5: Construction and maintenance of the Dry Creek Project could expose people or structures to adverse effect associated with liquefaction.	Mitigation Measure 3.6.1	LTSM
3.6.6: Operation of the Dry Creek Project could expose people or structures to adverse effect associated with liquefaction.	None Required	NI
3.6.7: Construction, operation, and maintenance of the Dry Creek Project could expose people or structures to adverse effect associated with landslides.	None Required	LTS

3.6.8. Construction, operation, and/or maintenance of the Dry Creek Project could result in substantial soil erosion or loss of topsoil.	<p>Construction and Maintenance:</p> <p>Mitigation Measure 3.3.1c in Chapter 3.3, Biological Resources; Mitigation Measures 3.8.1a through 3.8.1d in Chapter 3.8, Hydrology and Water Quality; and Mitigation Measure 3.6.8a described below.</p> <p>3.6.8a: Sites where construction activities result in exposed soil will be stabilized to prevent erosion. For each of these sites, the Water Agency will prepare and implement a revegetation plan to mitigate the loss of native riparian vegetation.</p> <ul style="list-style-type: none"> • Erosion control fabric, hydromulch, or other mechanisms will be applied as appropriate to provide protection to seeds, hold them in place, and help retain moisture. • Recontoured banks will be seeded and revegetated and erosion control fabric will be used to prevent erosion. • Plant species selected for revegetation will be based upon surveys of riparian habitat along Dry Creek upstream and downstream of the project site. • Planting requirements in the revegetation plan will be based upon species composition and density recommendations associated with the overall habitat enhancement design for the project. • If soil moisture is deficient, new vegetation will be supplied with supplemental water until vegetation is firmly established. • Revegetation shall be regularly monitored for survival until minimum survival/cover is achieved. • If invasive plant species colonize the area, action shall be taken to control their spread; options include hand and mechanical removal and replanting with native species. • The final revegetation plan will include details regarding planting, implementation, maintenance, and monitoring. 	LTSM
3.6.8 (cont.)	<p>Operation:</p> <p>3.6.8b: The Water Agency will implement its Adaptive Management Plan and revise current and future enhancement feature designs as needed.</p>	LTSM
3.6.9: Construction, operation, and maintenance of the Dry Creek Project could be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse.	Mitigation Measures 3.6.1, 3.6.8a, and 3.6.8b	LTSM
3.6.10: Construction, operation, and maintenance of the Dry Creek Project could be located on expansive soil as defined in Table 18-1-B of the Uniform Building Code (1994 or more current edition), creating substantial risks to life or property.	None Required	LTS
3.6.11: Construction, operation, and maintenance of the Dry Creek Project could result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.	None Required	NI

HAZARDS AND HAZARDOUS MATERIALS		
<p>3.7.1: Construction and maintenance of the Dry Creek Project could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.</p>	<p>None Required</p>	<p>LTS</p>
<p>3.7.2: Construction and maintenance of the Dry Creek Project could create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.</p>	<p>Although this impact would be less than significant, implementation of Mitigation Measures 3.7.2 would reduce it further:</p> <p>3.7.2: To minimize the potential for accidental spills from equipment and to provide for a planned response in the event that an accidental spill does occur, the Sonoma County Water Agency will include the following construction best management practices in the project specifications:</p> <ul style="list-style-type: none"> • The contractor must comply with the Sonoma County Water Agency's Standard Contract Documents to protect the project area from being contaminated by the accidental release of any hazardous materials and/or wastes; • The contractor will prepare a Safety Plan in accordance with the Sonoma County Water Agency's Standard Contract Documents; • Spill containment and clean up equipment will be maintained onsite; • Construction personnel will be trained in proper material handling, clean up, and disposal procedures; • Disposal of all hazardous materials will be in compliance with all current hazardous waste disposal laws; • The construction contractor will contact the local fire agency and the Sonoma County Department of Environmental Health for any site-specific requirements regarding hazardous materials or hazardous waste containment or handling; • If hazardous materials are encountered during construction activities, the contractor will be required to halt construction immediately and notify the Water Agency's Construction Inspection Section; and • Disposal of all hazardous materials will be in compliance with all applicable hazardous waste disposal laws. 	<p>LTS</p>

<p>3.7.3: Construction and maintenance of the Dry Creek Project could create a significant hazard to the public or the environment if it is located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.</p>	<p>None Required</p> <p>Although this impact would be less than significant, implementation of Mitigation Measures 3.7.2 would reduce it further.</p>	<p>LTS</p>
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HYDROLOGY AND WATER QUALITY

<p>3.8.1. Construction of the Dry Creek Project could alter drainage patterns that could result in substantial erosion or sedimentation on- or off-site.</p>	<p>3.8.1a: Construction of all enhancement features, including backwater channels, alcoves, and side channels, will occur during the dry season, typically from June 15 to October 15, except in cases when permission is granted from permitting agencies to work beyond this time frame. Upon prediction or recognition of a storm during the work period, the work site would be prepared following appropriate best management practices (BMPs) such as those included in California Department of Transportation's Construction Site Best Management Practice (BMP) Field Manual and Troubleshooting Guide (Caltrans' BMP Guide) that specify construction rules to prevent excessive erosion.</p>	<p>LTSM</p>
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3.8.1 (cont.)

3.8.1b: If required by the NCRWQCB, the Water Agency will file a Notice of Intent prior to construction, direct the contractor to develop and implement a SWPPP. Typically, SWPPPs include the following elements:

- Source identification;
- Site map;
- Description of construction materials, practices, and equipment storage and maintenance;
- List of pollutants likely to contact stormwater;
- Estimate of the construction site area and percent impervious area;
- Erosion and sedimentation control practices, including soil stabilization, revegetation, and runoff control to limit increases in sediment in stormwater runoff, such as detention basins, straw bales, silt fences, check dams, geofabrics, drainage swales, and sandbag dikes;
- Proposed construction dewatering plans;
- List of provisions to eliminate or reduce discharge of materials to stormwater;
- Description of waste management practices;
- Spill prevention and control measures;
- Maintenance and training practices; and
- Sampling and analysis strategy and sampling schedule for discharges from construction activities.

3.8.1c: In locations where construction would take place in the creek and could result in excess sediment delivery to Dry Creek that may increase turbidity, the contractor will divert the stream around work zones and/or dewater active work zones during construction. Methods to divert water around the work zone could include temporary pipes and culverts, and lined open bypass channels. Methods to dewater the work zones could include using sheet piling to isolate a discrete portion of the active channel from which water is removed using high capacity pumps. Turbidity curtains will be used as appropriate to separate in-channel work areas from the main channel.

3.8.1d: Best Management Practices (BMPs) such as those included in the California Department of Transportation's Construction Site Best Management Practice (BMP) Field Manual and Troubleshooting Guide will be incorporated into project specifications to stabilize soil and prevent erosion in areas where construction activities result in exposed soil. These may include the following:

- Erosion control techniques such as silt fencing, desilting basins, sediment traps, check dams, fiber rolls, gravel bag berms, street sweeping and vacuuming, sandbag barriers, and straw bale barriers will be employed as appropriate.
- Soil exposed during construction activities will be reseeded and revegetated and erosion control fabric will be used to prevent erosion.
- Erosion control fabric, hydromulch, or other mechanisms will be applied as appropriate to provide protection to seeds, hold them in place, and help retain moisture.
- If soil moisture is deficient, new vegetation will be supplied with supplemental water until vegetation is firmly established.
- Revegetation shall be regularly monitored for survival until minimum survival/cover is achieved.
- The final revegetation plan will include details regarding planting, implementation, maintenance, and monitoring.

3.8.2. Operation and maintenance of the Dry Creek Project could alter drainage patterns that could result in substantial erosion or sedimentation on- or off-site.	None Required	LTS
3.8.3. Construction, operation, and/or maintenance of the Dry Creek Project could alter drainage patterns to substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.	None Required	LTS
3.8.4. Construction, operation, and/or maintenance of the Dry Creek Project could create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.	None Required	LTS
3.8.5: Construction, operation, and/or maintenance of the Dry Creek Project could place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.	None Required	B
3.8.6: Construction, operation, and/or maintenance of the Dry Creek Project could place structures within a 100-year flood hazard area that would impede or redirect flood flows.	None Required	LTS
3.8.7: Construction, operation, and/or maintenance of the Dry Creek Project could expose people or structures to a significant risk of loss, injury, or death involving flooding.	None Required	LTS
Impact 3.8.8: Construction, operation, and/or maintenance of the Dry Creek Project could contribute to inundation by seiche, tsunami, or mudflow.	None Required	NI
3.8.9: Construction, operation, and/or maintenance of backwater channels, alcoves, and side channels could violate water quality standards or waste discharge requirements or otherwise degrade water quality.	Mitigation Measure 3.8.1	LTSM
3.8.10: Construction, operation, and/or maintenance of channel habitat enhancement features could substantially affect groundwater supplies or recharge resulting in reduced aquifer volume or a lowering of the local groundwater table level.	None Required	LTS
LAND USE, PLANNING, AND AGRICULTURAL RESOURCES		
3.9.1: Construction and/or maintenance of the Dry Creek Project could physically divide an established community.	None Required	NI
3.9.2: Construction and/or maintenance of the Dry Creek Project, could conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.	None Required	LTS
3.9.3 Construction and/or maintenance of the Dry Creek Project could conflict with applicable habitat conservation plan or natural community conservation plan.	None Required	B

3.9.4 Construction and/or maintenance of the Dry Creek Project could convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.	None Required	LTS
3.9.5 Construction and/or maintenance of the Dry Creek Project could conflict with existing zoning for agricultural use or a Williamson Act contract.	<p>Mitigation Measures 3.1.1 and 3.1.2 from Chapter 3.1, Aesthetics; Mitigation Measure 3.2.1a from Chapter 3.2, Air Quality, Greenhouse Gas Emissions, Energy, and Sustainability; and Mitigation Measures 3.9.5a, b, and c below.</p> <p>3.9.5a: The Water Agency will coordinate construction activities with adjacent landowners and vineyard managers in order to avoid potential conflicts with road use and agricultural activities.</p> <p>3.9.5b: Except in cases of emergency, the Water Agency will coordinate with property owners to schedule maintenance and monitoring activities to minimize conflicts with existing land uses.</p> <p>3.9.5c: Where appropriate and feasible, the Water Agency will avoid locating habitat enhancements in areas with the potential to encroach on existing land use and agricultural resources.</p>	LTSM
3.9.6: Construction and/or maintenance of the Dry Creek Project could involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use.	Mitigation Measures 3.1.1 and 3.1.2 from Chapter 3.1, Aesthetics; Mitigation Measure 3.2.1a from Chapter 3.2, Air Quality, Greenhouse Gas Emissions, Energy, and Sustainability; and Mitigation Measures 3.9.5a, b, and c.	
NOISE		
3.10.1: Construction and maintenance of the Dry Creek Habitat Enhancement Project, Miles 2-6 would result in a substantial temporary or periodic increase in ambient noise levels.	<p>3.10.1a: Construction activities and potential maintenance activities will generally take place between the hours of 7:00 am – 6:00 pm, Monday through Friday. Weekend work and evening work is not anticipated; although may be necessary to complete work. If necessary, dewatering pumping may be allowed on a 24-hour basis in order to limit the time that diversion of stream flows is required. In such a case, prior notification of these activities will be given to residents.</p> <p>3.10.1b: Equipment and trucks used for construction will utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically attenuating shields or shrouds), wherever feasible.</p> <p>3.10.1c: Construction contractors will locate fixed construction equipment (such as compressors and generators) and construction staging areas as far as feasible from nearby sensitive receptors.</p>	SU
3.10.2: Construction and maintenance activities of the Dry Creek Habitat Enhancement Project, Miles 2-6 would generate ground-borne vibration.	None Required	LTS
PUBLIC SERVICES AND UTILITIES/SERVICE SYSTEMS		
3.11.1: Construction, operation, and maintenance activities of the Dry Creek Habitat Enhancement Project, Miles 2–6 could have insufficient water supplies available to serve the project from existing entitlements and resources, requiring new or expanded entitlements.	None Required	NI

RECREATION		
3.12.1: Construction and/or maintenance of habitat enhancements on Dry Creek could temporarily alter the ability for people to operate canoes, kayaks and rafts.	None Required	LTS
3.12.2: The operation of habitat enhancement features such as constructed backwaters, side channels, logs, boulders, and riffles would alter the stream channel and could affect the ability for people to operate canoes, kayaks and rafts.	None Required	LTS
3.12.3: The construction and maintenance of habitat enhancements on Dry Creek could block access to some swimming sites.	None Required	LTS
3.12.4: The construction of off-channel habitat enhancements along Dry Creek could result in the loss of beaches that are used by private landowners for recreation.	None Required	LTS
3.12.5: Construction of off-channel habitat enhancements along Dry Creek could result in the relocation of, or loss of, winery picnic areas.	None Required	LTS
TRAFFIC AND TRANSPORTATION		
3.13-1: Construction and/or maintenance of the Dry Creek Project could conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.	3.13.1: The contractor will prepare a Traffic Control Plan in coordination with the Water Agency to ensure safe and efficient traffic movement throughout the project area during project construction and major repair projects. The Traffic Control Plan will identify alternative emergency access routes, where feasible and necessary, to avoid areas most affected by construction-related traffic. The Contractor will provide alternative route information signage and other information to alert motorists, cyclists, and pedestrians of potential delays.	LTSM
3.13.2: Construction and/or maintenance of the Dry Creek Project could substantially impede access to local streets or adjacent uses, including access for emergency vehicles.	Mitigation Measure 3.13.1	LTSM
3.13.4: Construction and/or maintenance of the Dry Creek Project could cause substantial damage or wear of roadways by increased movement of heavy vehicles.	3.13.4: Private roadways utilized during construction and/or maintenance activities for the Dry Creek Project will be inspected for damage and returned to their previous condition per landowner agreements following completion of project-related activities at the site.	LTSM
CUMULATIVE		
Impact 4.6.1.1: The cumulative aesthetic impacts on scenic views from Dry Creek Road resulting from temporary construction-related activities (ground disturbance, grading, equipment and materials staging, and vegetation reestablishment), during construction and maintenance activities of the Dry Creek Project, in combination with Lake Sonoma Solar and Hale Winery and Tasting Room projects, would be less than significant.	None Required	LTS

Impact 4.6.1.2: The cumulative aesthetic impacts on scenic views from local roadways resulting from temporary construction-related activities associated with increased vehicle and truck traffic during construction and operation/maintenance activities from the implementation of the Dry Creek Project and Lake Sonoma Solar and Hale Winery and Tasting Room projects would be less than significant.	None Required	LTS
Impact 4.6.2.1: The cumulative air quality impacts related to concentrations of criteria pollutants, pollutants affecting sensitive receptors, objectionable odors, and greenhouse gas emissions associated with construction operation/and or maintenance activities resulting from the implementation of the Dry Creek Habitat Enhancement Project Miles 2-6, in combination with identified related projects would be less than significant.	None Required	LTS
Impact 4.6.3.1: The cumulative biological resource impacts on special-status plants, special-status animals, nesting birds, riparian habitat and associated wetlands (including federally protected wetlands), and terrestrial wildlife movement resulting from construction, operation and maintenance activities associated with the implementation of the Dry Creek Habitat Enhancement Project, Miles 2-6, in combination with identified related projects would be less than significant.	None Required	LTS
Impact 4.6.4.1: The cumulative impacts on cultural resources associated with construction and maintenance activities from the implementation of the Dry Creek Habitat Enhancement Project, Miles 2-6 in combination with the identified related projects would be less than significant.	None Required	LTS
Impact 4.6.5.1: The temporary cumulative fisheries impacts on restricting movement of adult or juvenile CCC coho salmon, CC Chinook salmon and CCC steelhead, upstream migration of adult salmonids, and on spawning habitat usage and quality and rearing habitat for CCC coho salmon, CC Chinook salmon and CCC steelhead in Dry Creek resulting from isolation of the creek and the use of bypass pumping during construction and maintenance activities associated with the implementation of the Dry Creek Project in combination with the identified related projects would be less than significant.	None Required	LTS
Impact 4.6.5.2: The cumulative fisheries impacts on CCC coho salmon, CC Chinook salmon, and CCC steelhead and their habitat in Dry Creek resulting from the creation of low velocity areas in Dry Creek associated with the implementation of the Dry Creek Habitat Enhancement Project, Miles 2-6 in combination with the Reach 15 and Demonstration projects would be Beneficial.	None Required	B
Impact 4.6.6.1: The cumulative impact related to geology, soils, and mineral resources materials associated with the construction, operation and maintenance activities from the implementation of Dry Creek Habitat Enhancement Project, Miles 2-6 in combination with the identified related projects would be less than significant.	None Required	LTS

Impact 4.6.7.1: The cumulative impacts related to hazards and hazardous materials from the construction and maintenance activities associated with the implementation of the Dry Creek Habitat Enhancement Project, Miles 2-6 in combination with the identified related projects would be less than significant.	None Required	LTS
Impact 4.6.8.1: The cumulative impacts on surface water quality, surface water hydrology, and groundwater supplies associated with the construction, operation and maintenance activities from the implementation of the Dry Creek Habitat Enhancement Project, Miles 2-6 in combination with the identified related projects would be less than significant.	None Required	LTS
Impact 4.6.9.1: The cumulative impacts related to land use, planning, and agricultural resources associated with the construction and maintenance activities from the implementation of the Dry Creek Habitat Enhancement Project, Miles 2-6 in combination with the identified related projects would be less than significant.	None Required	LTS
Impact 4.6.10.1: The cumulative impacts related to construction noise associated with construction and maintenance activities from the implementation of the Dry Creek Habitat Enhancement Project, Miles 2-6 in combination with the identified related projects would be significant and unavoidable.	Mitigation Measure: None feasible. Even with implementation of Mitigation Measures 3.10.1a through 3.10.1e, the cumulative impact would be significant and unavoidable.	SU
Impact 4.6.10.2: The cumulative impacts related to construction vibration associated with construction and maintenance activities from the implementation of the Dry Creek Habitat Enhancement Project, Miles 2-6 in combination with the identified related projects would be less than significant.	None Required	LTS
Impact 4.6.12.1: The cumulative impacts on recreational resources, including boating, swimming, beach access, and winery picnic areas associated with construction and/or maintenance from the implementation of the Dry Creek Project in combination with the identified related projects (Reach 15 and the Demonstration project), would be less than significant.	None Required	LTS

<p>Impact 4.6.13.1: The cumulative impacts related to construction-period traffic and transportation, including conflicting with circulation system performance measures, impeding access to local streets or adjacent uses, including access to emergency vehicles and increased traffic safety hazards due to increased traffic volumes from the implementation of the Dry Creek Project in combination with the identified related projects would be significant and unavoidable.</p>	<p>Mitigation Measure 4.6.13.1: The Water Agency shall coordinate with the appropriate planning agencies for projects implemented simultaneously within the Dry Creek Valley (e.g., Sonoma County, the U.S. Army Corps of Engineers) to develop and implement a Construction Traffic Coordination Plan. The purpose of the plan shall be to lessen the cumulative effects of the project and other local development project traffic delays and congestion. The plan shall address construction-, maintenance-, and operation-related traffic associated with all project sites in the vicinity of Dry Creek Habitat Enhancement Project, Miles 2-6 components (i.e., within one mile or would use the same roads) and whose construction, maintenance, or special event schedules overlap that of the project. However, the construction traffic coordination plan shall, at a minimum, include the following components:</p> <ul style="list-style-type: none"> • Identification of all projects located in the vicinity of Dry Creek Habitat Enhancement Project, Miles 2-6 components (within one mile or would use the same roads) and whose construction, maintenance, or special event schedules overlap that of the project. • Consideration for the types of vehicles and corresponding numbers and timing of trips associated with each said project. • An evaluation of roadways affected by construction activities and measures to minimize roadway and traffic disturbances (e.g., lane closures and detours). • Phasing of construction activities, as feasible and necessary to prevent degradation of levels of service on affected roadways. • A program that provides for continual coordination with the affected agencies to allow for adjustments and refinements to the plan once project construction is underway. 	Cumulatively SU
<p>Impact 4.6.13.2: The cumulative traffic and transportation impact on wear and tear of local roads associated with the construction phase of the Dry Creek Project in combination with the identified related projects would be less than significant.</p>	None Required	LTS

NOTE: Grey highlighted cells indicate significant and unavoidable impacts.

LTS = Less than Significant

LTSM = Less than Significant with Mitigation

B = Beneficial

SU = Significant and Unavoidable

NI = No Impact

CHAPTER 1 Introduction

The Sonoma County Water Agency (Water Agency), as Lead Agency, has prepared this Draft Environmental Impact Report (EIR) for the proposed Dry Creek Habitat Enhancement Project, Miles 2 - 6 (Dry Creek Project or proposed project), in accordance with the provisions of the California Environmental Quality Act (CEQA) of 1970, codified as California Public Resources Code Sections 21000 et. seq., the State CEQA Guidelines in the Code of Regulations, Title 14, Division 6, Chapter 3, and the Water Agency's Procedures for the Implementation of CEQA. The EIR is a public document for use by the Water Agency, other governmental agencies, and the public in identifying and analyzing the potential effects on the environment and mitigation measures to lessen or eliminate adverse impacts, and examining feasible alternatives to the proposed project.

1.1 Background and Overview of Proposed Project

The Water Agency was created in 1949 by the California Legislature as a special district to provide flood protection and water supply services. The Sonoma County Board of Supervisors acts as the Water Agency's Board of Directors. The Water Agency's powers and duties, as authorized by the California Legislature, include the production and supply of surface water and groundwater for beneficial uses, control of flood waters, generation of electricity, provision of recreational facilities (in connection with the Water Agency's facilities), and the treatment and disposal of wastewater.

From its outlet in Warm Springs Dam, Dry Creek meanders 14 miles to the Russian River. The creek is home to endangered coho salmon, and threatened Chinook salmon and steelhead (including steelhead raised at the Don Clausen Fish Hatchery). The creek also serves as a conduit for water that is released from Lake Sonoma by the U.S. Army Corps of Engineers for flood control purposes and by the Water Agency for water supply.

On November 15, 2011, the Water Agency's Board of Directors approved the Initial Study and Mitigated Negative Declaration for the Dry Creek Habitat Demonstration Project (Demonstration Project), which includes the implementation of the first mile of habitat enhancement projects along Dry Creek. In 2012, the Water Agency began construction of the Demonstration Project, located in the Lambert Bridge area (approximately midway between Warm Springs Dam and the Dry Creek confluence with

the Russian River). Construction of the Demonstration Project was completed in November of 2014. The purpose of the Demonstration Project is to demonstrate to regulators, landowners, and local decision-makers the feasibility of Dry Creek habitat enhancements on a smaller scale and, in particular, to determine how they could be constructed, what they may ultimately look like, and how effective they are before implementing the remaining five miles of habitat enhancements on Dry Creek. Those remaining five miles of habitat enhancements on Dry Creek are the focus of the currently proposed project.

The project sites for the remaining five miles of habitat enhancements are located within and adjacent to the Dry Creek channel and on private properties from approximately one-half mile downstream of Warm Springs Dam to the confluence with the Russian River in an unincorporated area of Sonoma County, California (Figure 1).

The Water Agency has identified feasible and sustainable enhancement techniques for implementation along more than two miles (miles 2 and 3) of Dry Creek at the project scale. These two miles of habitat construction would not be located all within a two-mile contiguous stretch of Dry Creek. Instead, the two miles of habitat area would be spread throughout the 14-mile length of Dry Creek between Warm Springs Dam and the Russian River. Miles 2 and 3 will be subject to project-level CEQA analysis because detailed information for specific sites and proposed designs is available for use in determining potential environmental impacts. Potential project sites totaling almost three will be analyzed at the project level in order to allow flexibility in choosing mile 2 and 3 project sites as Water Agency staff work with interested landowners to determine the extent of their participation. Sites evaluated at the project level for miles 2 and 3 but not enhanced as part of miles 2 and 3 may still be included in mile 4, 5, or 6 projects in the future.

Areas suitable for potential inclusion in miles 4, 5, and 6 of required habitat enhancement will be evaluated at a programmatic level in this EIR, where impacts in general can be identified for the types of projects being considered and the types of habitat that exist within the Dry Creek Valley, but specific sites or proposed project design details are not yet known. The type and extent of habitat modifications for miles 4, 5, and 6 is still being determined.

NMFS' Biological Opinion stresses the importance of off-channel habitats in low velocity areas with substantial cover and features such as log or rock weirs, deflectors, log jams, constructed alcoves, side channels, backwaters, and dam pools that can successfully increase the quantity and quality of summer and winter rearing habitat for coho salmon and steelhead.¹ The proposed enhancements are likely to include combinations of pool

¹ Biological Opinion, page 264.

and riffle enhancement, off-channel backwater and alcove enhancement and/or creation, side-channel enhancement and/or creation, enhancement and stabilization of streambanks, and other habitat features recommended by NMFS. For example, pools may be enhanced with large woody debris provide places for juvenile coho and steelhead to avoid predators, escape high water velocities, and find food.

Enhancements of riffles may include expanding existing riffles or constructing new riffles in appropriate locations, which may also enhance pools by slowing pool velocities. Streambank enhancements may address chronic erosion in critical locations and provide additional cover along the channel margins.

Construction activities will vary depending upon which structures are installed and where they are located, but typically these types of construction activities can include dewatering the construction area, grading, installation of large boulders as anchor material, installation of large wood logs, planting of vegetation, and installation of erosion control measures (e.g. fabric, straw, seeding). While it is not anticipated that the habitat enhancement structures will require regular maintenance work over the long term, temporary irrigation may be required to maintain newly-installed vegetation and periodic vegetation management may take place in certain locations to enhance fish habitat. Maintenance activities may also include repair to damaged structures or adjustments to structures if they are not functioning as intended.

1.2 Project Objectives, Purpose, and Need

The objective of the Dry Creek Project is to provide habitat in Dry Creek for threatened and endangered fish in order to comply with NMFS' Biological Opinion while allowing the Water Agency to maintain its ability to deliver water to its customers.

NMFS concluded in the Biological Opinion that the continued operations of Coyote Valley Dam and Warm Springs Dam by the U.S. Army Corps of Engineers and the Water Agency in a manner similar to recent historic practices, together with the Water Agency's stream channel maintenance activities and estuary management, are likely to jeopardize and adversely modify critical habitat for endangered coho salmon and threatened steelhead.

NMFS' Biological Opinion found that summer flows in the upper Russian River and Dry Creek are too high for optimal juvenile coho salmon and steelhead habitat. Current summer flows in Dry Creek range from 110 to 175 cubic feet per second (cfs), which makes it difficult for juvenile coho salmon and steelhead to thrive. NMFS' Biological Opinion recognizes that large reductions in the summertime flows in Dry Creek would impair the Water Agency's ability to deliver water to its customers. Therefore, the Biological Opinion requires habitat enhancement of six miles of Dry Creek to improve

summer rearing conditions for coho salmon and steelhead while allowing the Water Agency to maintain the existing flow range in Dry Creek of 110 to 175 cfs for water supply purposes. The six miles of habitat enhancement are to be distributed over the entire length of Dry Creek below Warm Springs Dam, implemented at a minimum of eight locations on the creek. It is intended that the enhancements for summer rearing will also provide winter rearing and refugia habitat. The habitat enhancements are to be implemented in phases to allow for evaluation of their effectiveness as the effort progresses.

One of the Water Agency's first steps toward meeting the requirements of the Biological Opinion was to conduct a habitat enhancement feasibility study on Dry Creek. This study, conducted for the Water Agency by Inter-Fluve, an environmental engineering firm specializing in the sustainable design and construction of river habitat restoration projects, helped to determine which areas of Dry Creek are candidates for habitat enhancement and evaluates the feasibility of designing projects that provide habitat enhancement while also accommodating high summertime flows and flood releases. Inter-Fluve also prepared a Dry Creek Current Conditions Inventory Report (Inter-Fluve 2010) which identifies numerous potential areas for habitat enhancement along Dry Creek.

The Water Agency is also pursuing other projects in order to comply with the requirements of the Russian River Biological Opinion. The Russian River Estuary Management Project (Estuary Management Project)² incorporates adaptive management of the Estuary with the primary objectives of enhancing rearing habitat for juvenile salmonids, particularly steelhead, and management of Estuary water levels to minimize flood hazard. Rearing habitat may be enhanced by reducing tidal influence on the Russian River Estuary during the lagoon management period to increase freshwater habitat available for rearing salmon and steelhead. Adaptive management requires: 1) monitoring of biological productivity, water quality, and physical processes in the Estuary in response to the changes in management actions that control water surface elevations in the estuary-lagoon system; and 2) refinement of management actions to achieve desired water levels to support biological productivity, while simultaneously providing flood management for properties adjacent to the Estuary. The Water Agency is also pursuing the Fish Habitat Flows and Water Rights Project (Fish Flow Project)³ in order to comply with the Russian River Biological Opinion. The Fish Flow Project proposes changes to the way the Water Agency would manage water supply releases from Lake Mendocino and Lake Sonoma in order to provide instream flows in the

² The Final EIR for the Russian River Estuary Management Project was certified and the project approved by the Water Agency's Board of Directors on August 16, 2011.

³ The Water Agency released the Notice of Preparation for the Fish Flow Project on September 29, 2010 and is currently preparing a Draft EIR.

Russian River and Dry Creek that would improve habitat for listed salmonids. Implementation of the flow changes proposed as part of the Fish Flow Project would require action to be taken by the State Water Resources Control Board (SWRCB) on the Water Agency's petition to change Decision 1610, the minimum instream flow requirements for the Russian River and Dry Creek set by the SWRCB in 1986.

1.3 Agency Use of This Document

This EIR has been developed to provide the public and responsible and trustee agencies reviewing the Dry Creek Project an analysis of the potential effects, both beneficial and adverse, on the local and regional environment associated with construction and operation of the Dry Creek Project.

Section 15124(d) of the CEQA Guidelines requires that an EIR contain a statement briefly describing the intended uses of the EIR. This Draft EIR has been prepared to analyze the potential environmental impacts of proposed management of the Russian River Estuary. This EIR will be used primarily by the Water Agency, as the lead agency, and other Responsible Agencies, to evaluate environmental impacts of the proposed project and make a decision of approval for the proposed project. Prior to a decision, the Water Agency will consider certification of the EIR. Upon completion and certification of this EIR, the Water Agency will use this document to make written findings and decisions, adopt a Statement of Overriding Considerations, if necessary, and file a Notice of Determination (NOD).

As the decision-making entity of the Lead Agency for the Dry Creek Habitat Enhancement Project, Miles 2-6 (Dry Creek Project), the Water Agency's Board of Directors will be responsible for considering certification of the EIR and approval of the proposed project. The Dry Creek Project should be consistent with (but not limited to): section 404 of the Clean Water Act, the federal Endangered Species Act, the California Endangered Species Act, North Coast Region Basin Plan and the Sonoma County General Plan. The Water Agency would also need to comply with the terms of any new permits associated with the Dry Creek Project. A list of the agencies that may have permit authority over portions of the Dry Creek Project is provided below:

FEDERAL

The U.S. Army Corps of Engineers (USACE) regulates activities in waters of the United States under Section 10 of the Rivers and Harbors Act of 1899, and Section 404 of the Clean Water Act ("Section 10" and "Section 404" permits).

The U.S. Fish and Wildlife Service (USFWS) administers the federal Endangered Species Act. The Fish and Wildlife Service also advises the USACE on Section 10 or Section 404 permits for projects that affect fish and wildlife.

The U.S. National Marine Fisheries Service (NMFS) administers the federal Endangered Species Act as they pertain to marine species. They also advise the USACE on Section 10 or Section 404 permits with regards to projects that may affect anadromous fish spawning or habitat.

The U.S. Environmental Protection Agency (EPA) oversees the USACE's analysis and issuance of permits for filling of wetlands under Section 404 permits, and also issues permits for point source discharges to waterways. The federal Clean Air Act (CAA) authorizes the EPA to regulate air emissions through the establishment of National Ambient Air Quality Standards (NAAQS).

STATE OF CALIFORNIA

The California Department of Fish and Wildlife (CDFW) prepares streambed alteration agreements for all projects involving work in streams. The CDFW is also responsible for protecting plant and wildlife populations, and is responsible for overseeing the California Endangered Species Act (CESA).

The North Coast Regional Water Quality Control Board (NCRWQCB), is responsible for approving projects that may affect the water quality of waterways in the project area, through the issuance of waste discharge requirements (WDRs) and National Pollutant Discharge Elimination System (NPDES) permits.

The Northern Sonoma County Air Pollution Control District (NSCAPCD), which was created by the California Air Resources Control Board (CARB), monitor air quality and have permit authority over certain types of facilities or activities.

LOCAL

The Sonoma County Permit and Resources Management Department (PRMD) issues permits in accordance with Sonoma County Ordinance 3836R to minimize roiling of water as a result of performing work in streams and rivers, and reviews projects for General Plan consistency, pursuant to Section 65402 of the California Government Code.

The Sonoma County Department of Transportation and Public Works (TPW) approves encroachment permits in TPW facilities such as county roadways and administers the Northern Sonoma County Air Pollution Control District (NSCAPCD).

1.3.1 Existing Permits

The Water Agency is currently in the process of completing the Dry Creek Habitat Enhancement Demonstration Project located within a one mile stretch of Dry Creek located between the confluence of Grape Creek on the upstream end and Crane Creek on the downstream end. As a result the Water Agency hold permits for habitat

enhancement activities from the North Coast Regional Water Quality Control Board (Clean Water Act Section 401 Water Quality Certification WDID No. 1B12001WNSO), the U. S. Army Corps of Engineers (Clean Water Act Section 404 Permit file no. 2012-00036N) and the California Department of Fish and Wildlife (Lake or Streambed Alteration Agreement No.1600-2012-0004-R3). The Water Agency currently conducts ongoing population monitoring and research on federally and state endangered coho salmon, and federally threatened Chinook salmon and steelhead trout in compliance with National Marine Fisheries Service ESA Section 10 Permit No. 14419 and California Department of Fish and Wildlife Scientific Collection Permit No.1728.

1.3.2 Reviewing Agencies

In addition to those agencies with permit authority over the proposed project, a copy of the Dry Creek Project Draft EIR will be mailed to federal, state, regional, and local agencies which are considered responsible or trustee agencies under CEQA, or which were determined to have an interest in the proposed project; and to public libraries. Copies of the Draft EIR will be sent to the following agencies for their consideration:

- U.S. Department of Agriculture, Natural Resources Conservation Service
- U.S. Geological Survey
- California Department of Boating and Waterways
- California Department of Health Services
- California Public Utilities Commission
- California Department of Transportation
- California Department of Water Resources
- California State Director of Agriculture
- Sonoma County Open Space District
- Sonoma County Department of Public Health
- Sonoma County Permit and Resource Management Department
- Sonoma County Department of Transportation and Public Works

A Notice of Availability for the Draft EIR will be mailed to individuals who had requested to be put on the proposed project mailing list and to property owners in the general project area.

1.4 CEQA Process

This document satisfies the requirements of the CEQA. The primary purpose of an EIR is to identify and publicly disclose environmental impacts that may result from implementation of a project and to identify feasible alternatives, mitigation measures, or revisions to the project that would reduce those impacts, to the degree feasible. CEQA requires a determination of impact significance for each impact discussed in an EIR

based on the significance criteria. This document has been prepared as a project-level EIR, as provided for by CEQA Guidelines Section 15161.

1.4.1 Notice of Preparation and Public Scoping

In accordance with CEQA Guidelines Section 15082, the Water Agency circulated a Notice of Preparation (NOP) to local, state, and federal agencies, and to other interested parties on May 5, 2014. The NOP was mailed to the State Clearinghouse and was available online on the Water Agency website. The NOP was circulated for a 38-day public review period, which ended on June 12, 2014⁴ to solicit both written and verbal comments on the EIR's scope and provide information on the public scoping meeting. Additionally, the NOP presented the background, purpose, description, and location of the proposed project, potential issues to be addressed in the EIR, and contact information for additional information regarding the project. The NOP was directly mailed to 650 parties.

During the NOP review period, the Water Agency held one scoping meeting on May 12 at the Warm Springs Dam Visitor Center near Geyserville to discuss the project and to solicit public input as to the scope and content of this EIR.

The purpose of the scoping meetings was to present the proposed project to the public through use of display maps and handouts describing project components and potential environmental impacts. Attendees were provided an opportunity to voice comments or concerns regarding potential effects of the proposed project. **Appendix 1** of this Draft EIR contains a copy of the NOP and the Scoping Report, which provides a summary of all verbal and written comments received, and copies of the written comments.

1.4.2 Draft EIR

This document constitutes the Draft EIR. The report contains a description of the Dry Creek Project elements, description of the environmental setting and baseline conditions, identification of impacts, and mitigation measures, where feasible, for impacts found to be significant, as well as an analysis of alternatives. This document is intended to provide the Water Agency with the information required to carry out its activities with respect to the proposed project. The Draft EIR addresses environmental issues that could result in potentially significant environmental effects from project implementation. Significance criteria have been developed for each environmental issue analyzed in this Draft EIR and are defined at the beginning of each impact analysis section. Impacts are categorized as follows:

1. Significant and unavoidable;

⁴ The public scoping period generally lasts for 30 days; the Water Agency determined that the scoping period should extend for 30 days following the scoping meeting that took place on May 12, 2014 but 38 days past the date the NOP was first posted.

2. Potentially significant, but can be mitigated to a less-than-significant level;
3. Less than significant (mitigation is not required under CEQA, but may be recommended);
4. No impact; or
5. Beneficial.

CEQA requires that a lead agency shall neither approve nor carry out a project as proposed unless the significant environmental effects have been reduced to an acceptable level, where possible (CEQA Guidelines Section 15091 and Section 15092). An acceptable level is defined as eliminating, avoiding, or substantially lessening the significant effects. If such a reduction is not possible, a lead agency must adopt mitigation measures and findings for potentially significant impacts that can be reduced to a less than significant level. For those impacts that remain significant and unavoidable, a lead agency must adopt findings regarding alternatives and a Statement of Overriding Considerations. As defined in CEQA Guidelines Section 15093, a Statement of Overriding Considerations balances the benefits of a project against its unavoidable environmental consequences.

The Dry Creek Project works in concert with the Estuary Management and Fish Flow Projects mentioned above to enhance habitat for listed fish species in the Russian River watershed. However, while the three projects must complement each other, each must also function as an independent project to improve habitat for listed fish species regardless of the outcomes of the other efforts. For example, if the SWRCB declines to issue an order on the Water Agency's petition to change minimum instream flow requirements specified in Decision 1610 as described in the Fish Flow Project, the Dry Creek Project must still enhance fish habitat in Dry Creek and the Estuary Management Project must still enhance rearing habitat for juvenile salmonids, particularly steelhead. Therefore, each project has undergone independent environmental review under CEQA which included extensive cumulative impacts analyses considering all projects intended to implement components of the Russian River Biological Opinion.

Scope of This EIR

The Water Agency identified in the NOP the potential areas of analysis that could be addressed in the EIR. Based on the NOP scoping process, the Water Agency determined that this EIR would address the following technical issue areas, which are listed in the order in which they appear in Chapter 4.0:

- | | |
|------------------------------|---|
| 1. Hydrology & Water Quality | 5. Geology, Geomorphology, Soils, & Mineral Resources |
| 2. Fisheries | 6. Land Use & Agricultural Resources |
| 3. Vegetation & Wildlife | 7. Cultural Resources |
| 4. Recreation | |

- | | |
|-----------------------------|--|
| 8. Aesthetics | 11. Air Quality & Greenhouse Gas Emissions |
| 9. Traffic & Transportation | 12. Hazards & Hazardous Materials |
| 10. Noise | 13. Public Services and Utilities |

Organization of the Draft EIR

This Draft EIR has been organized into the following chapters:

- ES. **Executive Summary.** This chapter summarizes the contents of the Draft EIR and provides a tabulation of the impacts and mitigation measures for the proposed project and alternatives.
1. **Introduction.** This chapter discusses the background and Project overview, Project objectives and purpose, a description of the CEQA process, the purpose of the EIR, and the intended use of the document.
 2. **Project Description.** This chapter provides a detailed description of the proposed project.
 3. **Environmental Setting, Impacts and Mitigation Measures.** This chapter discusses existing conditions and establishes the environmental baseline in addition to providing a comprehensive analysis and assessment of impacts and mitigation measures for the proposed project. This section is divided into main sections for each environmental issue area (e.g., Hydrology & Water Quality, Fisheries Resources, etc.) that contain the environmental settings, regulatory framework, significance thresholds, and impacts of the proposed project.
 4. **Cumulative Impacts.** This chapter describes the potential impacts of the proposed project when considered together with other related projects in the action area.
 5. **Other Statutory Requirements.** This chapter describes the potential for the proposed project to induce growth and discusses indirect secondary impacts associated with the proposed project. This chapter also provides a discussion of significant environmental effects that cannot be avoided and irreversible environmental changes.
 6. **Alternatives Analysis.** This chapter presents an overview of the alternatives development process and describes the alternatives to the proposed project that were considered.
 7. **Permits, Reviewing Agencies, and Legal Requirements.** This chapter describes the federal, state, and local agencies that may be responsible for review of the project and/or have permit authority over portions of the Dry Creek Project.
 8. **Glossary.** This chapter lists definitions and clarifications for acronyms, abbreviations, symbols, and terms used in the Draft EIR.

9. **List of Preparers.** This chapter identifies authors and consultants involved in preparing this Draft EIR, including persons and organizations consulted.
10. **Appendices.** The appendices contain supporting documents and technical data used in the preparation and documentation of the analysis included in the EIR.

Public Review

This Draft EIR will be available to local, state, and federal agencies and to interested organizations and individuals who may want to review and comment on the report. Notice of this Draft EIR will also be sent directly to every agency, person, or organization that commented on the NOP. Publication of this Draft EIR marks the beginning of a 60-day public review period, during which written comments will be accepted via regular mail, fax, and e-mail at the contact information listed below. During the review period, the Water Agency will hold a public hearing on the Draft EIR. Details regarding the public hearing will be posted on the Water Agency's website, www.sonomacountywater.org, in local newspapers, or by sending inquiries to:

Sonoma County Water Agency
Attention: David Cuneo
404 Aviation Boulevard
Santa Rosa, CA 95403

email: David.Cuneo@scwa.ca.gov

1.4.3 Final EIR

Written and oral comments received in response to the Draft EIR will be addressed in a Response to Comments document which, together with the Draft EIR, will constitute the Final EIR. As the CEQA Lead Agency, the Water Agency's Board of Directors will consider certification of the EIR as complete under CEQA (CEQA Guidelines Section 15090). Once the EIR has been certified, the Water Agency may proceed to consider project approval. Prior to approving the project, the Water Agency must make written findings with respect to each significant environmental effect identified in the EIR in accordance with Section 15091 of CEQA Guidelines. The Water Agency would be required to adopt Findings of Fact, and for impacts determined to be significant and unavoidable, adopt a Statement of Overriding Considerations.

1.5 References

Inter-Fluve. Draft Current Conditions Inventory Report – Dry Creek: Warm Springs Dam to Russian River, Sonoma County, CA. March 2010.

CHAPTER 2 Project Description

2.1 Introduction

This Draft Environmental Impact Report (EIR) evaluates the potential environmental impacts of the Dry Creek Habitat Enhancement Project, Miles 2-6 (Dry Creek Project or proposed project), proposed by the Sonoma County Water Agency (Water Agency) in response to the mandates in the National Marine Fisheries Service's Russian River Biological Opinion (Russian River Biological Opinion), to improve summer rearing and winter refuge habitat for juvenile steelhead and coho salmon.

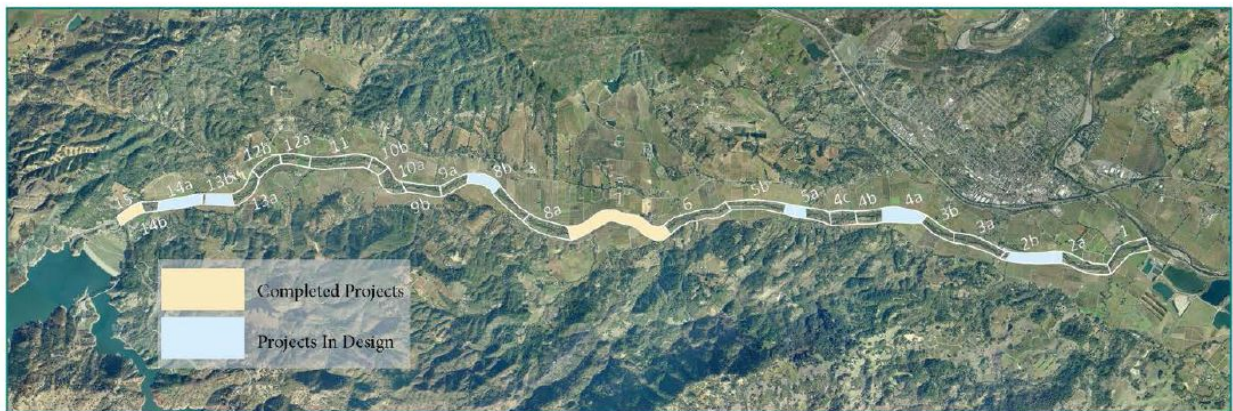
2.1.1 Dry Creek Habitat Enhancements

The Russian River Biological Opinion (described in detail in Chapter 1.0, Introduction) mandates the Water Agency and United States Army Corps of Engineers (USACE) to implement a series of actions [identified as Reasonable and Prudent Alternatives (RPAs)] to modify existing water supply and flood control activities to mitigate or remove the effects of ongoing Water Agency and USACE operations on endangered coho salmon and threatened Chinook salmon and steelhead in the region. One of these actions is Dry Creek habitat enhancements to improve conditions for listed salmonid species. The Russian River Biological Opinion requires the enhancement of at least six miles of Dry Creek to provide excellent quality habitats for rearing coho salmon when releases from Warm Springs Dam are in the 110 to 175 cubic feet per second range. The enhancements would create both winter and summer rearing habitats for juvenile steelhead and coho salmon, with an emphasis on improving habitats for the survival of juvenile coho salmon.

The Russian River Biological Opinion requires the Water Agency to enhance salmonid rearing habitat in Dry Creek using a five-phase approach to construction:

1. Two years of conceptual project design and planning (2009-2010);
2. Two years for project review, permitting, and pre-monitoring (2011-2012);
3. Two years of initial construction of at least one mile of modified stream channel (2013-2014).
4. Two years of construction (years 8 and 9 covered by the Russian River Biological Opinion) of an additional two miles of modified stream channel (2016-2017).
5. Two years of construction (years 11 and 12 covered by the Russian River Biological Opinion) of an additional three miles of modified stream channel (2019-2020).

The Water Agency began construction in 2012 for Item 3 from the above list with the first phase of the Dry Creek Habitat Enhancement Demonstration Project (Demonstration Project). Demonstration Project construction activities continued in 2013 and were completed in November of 2014. In 2013, the USACE also completed construction of a Dry Creek Habitat Enhancement Project (Reach 15) in a section of Dry Creek immediately below Warm Springs Dam. Together, the Water Agency’s Demonstration Project and the USACE’s Reach 15 Project make up just over the first mile of modified stream channel work to improve habitat for listed salmonid species in Dry Creek. **Figure 2.1** shows the location of the existing completed habitat enhancement projects and the areas of Dry Creek that are the focus of Miles 2-3 enhancements.



Complete design phase, permitting, landowner agreements, begin construction	Milestone 1 1 mile of habitat in Dry Creek completed and work on miles 2 & 3 begins	Milestone 2 Complete Enhancement of miles 2 & 3	Decision Point Evaluate success of the enhancement projects	Milestone 3 Enhance 3 additional miles of habitat in Dry Creek for a total of 6 miles
2012	2014	2017	2018	2020

Figure 2.1. Showing completed enhancement reaches in Dry Creek and focus areas for Miles 2-3 enhancements.

Miles 2-6 of habitat enhancement in Dry Creek consist of Item 4 above (construction of 2 additional miles of habitat enhancements by 2017) and Item 5 (construction of 3 additional miles of habitat enhancements by 2020) and is the subject of the Dry Creek Project evaluated in this document. Miles 2 and 3 habitat components, which are to be constructed by the end of 2017, are evaluated on a project-specific basis in this EIR because specific locations of potential sites for habitat projects that make up the work for these miles have been identified. Miles 4-6, which do not yet have specific potential site locations identified, will be evaluated on a programmatic basis in this EIR. Where impacts for Miles 2-3 and Miles 4-6 are similar in nature, the impact analysis has been combined.

2.1.2 General Enhancement Approaches

Fish habitat enhancements emphasize natural stream characteristics or those which evolve through a given stream's geomorphology. By using enhancement practices that emulate natural geomorphic effects, the benefits provided to juvenile coho and steelhead will be optimized by increasing the amount of high quality rearing habitat. Because these approaches occur within a dynamic system, habitat enhancements are not expected to be static through time. Instead, projects designed for a dynamic system are expected to change over time but to still maintain a similar habitat function. The planned adaptive management approach will assist with maintain habitat function even as physical characteristics of the project area change over time. Design concepts have been developed based on the understanding of physical processes in each segment of Dry Creek. The Dry Creek Fish Habitat Enhancement Feasibility Report (Inter-Fluve 2013) laid out the different processes occurring in the upper, middle and lower 'segments' of Dry Creek, each of which contain several of the 'inventory reaches' first delineated in the Current Conditions Report (Inter-Fluve 2010).

Channel processes and dynamics vary along the length of Dry Creek, which suggest tailoring the enhancement approach in each segment to match the prevailing fluvial processes at each location. In general, the approaches may fall in a range defined by strongly process-reliant at one end, and direct habitat construction at the other end. Accordingly, Lower Dry Creek has been split into three segments based on dominant physical processes and other shared characteristics: 1) upstream of Pena Creek (RM¹ 11 to 13.7), 2) Pena Creek to the grade control sills (RM 3 to 11), and 3) from the grade control sills to the Russian River confluence (RM 0 to 3). **Figure 2.2** shows reach designations and the RM locations along Dry Creek. Generally, enhancement projects will be identified to include a series of main channel and off-channel enhancements which will provide continuity of juvenile coho and steelhead habitats through a given project reach. The prevailing physical functions and implications for developing fish habitat of the desired character within each Dry Creek segment (upper, middle, lower) include the following:

¹ RM – River Mile. The distance along the creek as measured upstream from its point of connection with a downstream body of water. For Dry Creek, it is the number of miles upstream of the Dry Creek confluence with the Russian River.

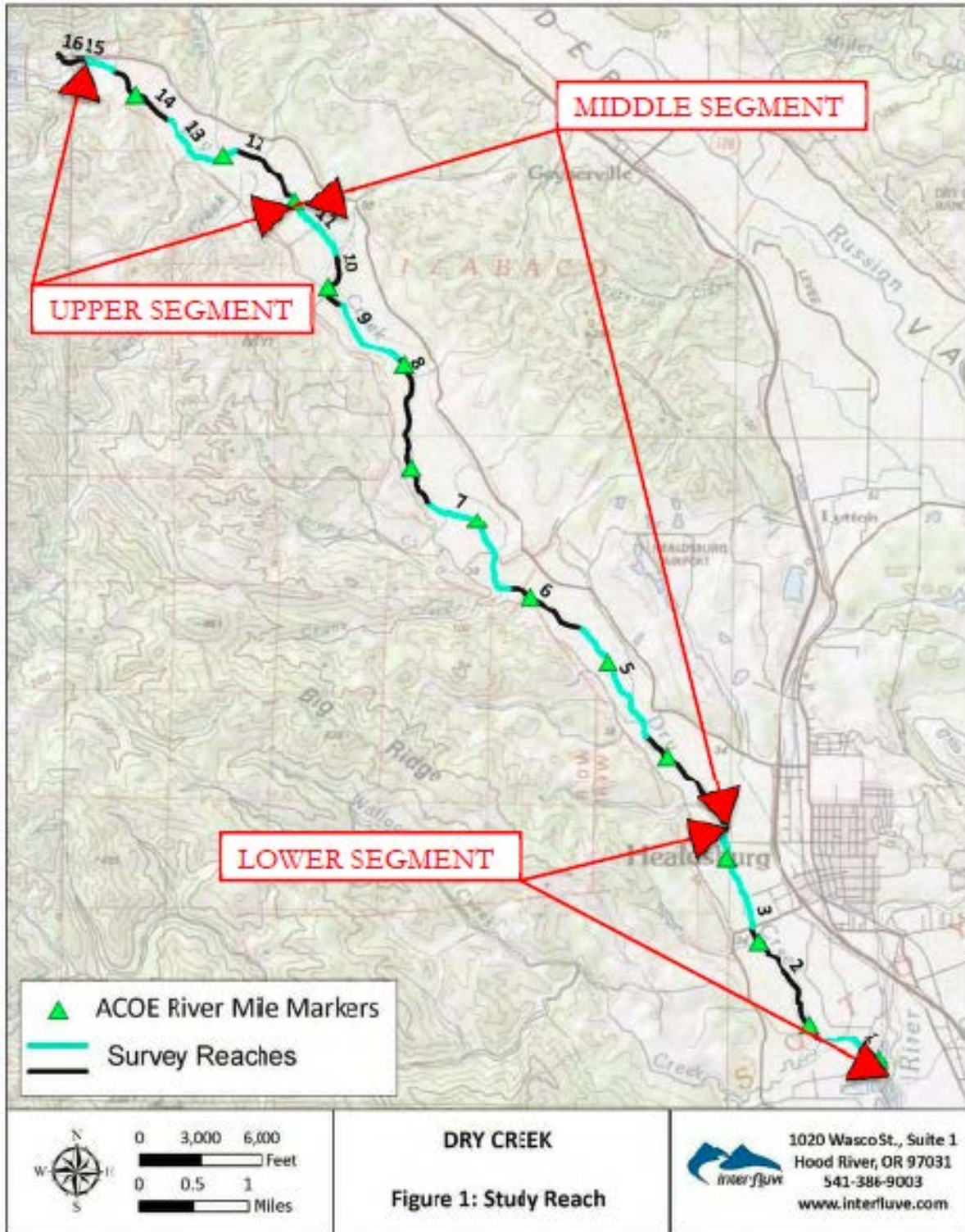


Figure 2.2. Showing reach and RM locations along Dry Creek.

Upper Segment: Upstream of Pena Creek (RM 12 upstream to Warm Springs Dam), construction of habitat was assessed to be feasible with low risk of the constructed habitat being compromised due to nuisance sediment deposition or other factors. Conversely, relying on channel processes to create the habitat was deemed to have low feasibility due to the lack of sediment supply and highly regulated hydrology. Generally, enhancement through direct habitat construction can be considered as having low risk of failure in this segment relative to other segments.

Middle Segment: The middle segment stretching from RM 3 - 11 has greater sediment supply than the upstream reach due to the unregulated tributaries which enter Dry Creek below WSD. This increases the risk for nuisance sedimentation impacts to potential directly-constructed off-channel habitat. This risk can be mitigated through appropriate site selection and other considerations. In this segment, off-channel enhancements may shift in character due to channel processes, again dependent on the characteristics of each site. Conversely, several large off-channel opportunities may lend themselves to a more dynamic, process-focused approach, or combined approach. In summary, the preferred enhancement approach to each site is more variable in this segment than the other two segments, and careful consideration of the attributes of each proposed location will determine the corresponding advisable enhancement strategy.

Lower Segment: In the downstream segment (RM 0-3), there is high risk that a direct habitat construction approach would be compromised by sedimentation due to the backwater influence of the Russian River. Conversely, enhancement that relies on a modified process-driven approach likely provides the best option in this segment. Based on observations of existing intact rearing habitats, it is possible that fluvial processes may be sufficiently intact to create target habitats over time provided the stage is set for habitat development to occur.

2.1.3 Enhancement Tools

Conceptual designs created for the enhancement subreaches emphasize natural stream characteristics, or those which evolve through a given stream's geomorphology. By using enhancement practices that emulate natural geomorphic effects, the benefits provided to juvenile coho and steelhead will be optimized by increasing the amount of high quality rearing habitat. Because these approaches occur within a dynamic system, they should not be expected to be static through time. However, they should provide approximately similar quantities of habitat through time within the project reach, and the planned adaptive management approach will assist with this. The following paragraphs describe the primary enhancement approaches applied to the conceptual designs included in Appendix 9.4 (Conceptual Design Report) for more detail on these approaches (Inter-Fluve 2012).

2.1.3.1 Backwater Channels and Alcoves

Backwater channels, alcoves and ponds (**Figure 2.3 and Figure 2.4**) are areas off to the side of the stream that in summer connect to the main stream only at their downstream end. During this time, water backs into these areas, and has very low or no current. In addition to still water, logs that protrude into or float on the water, floating and submerged vegetation, and surrounding tall vegetation make these areas very attractive to juvenile fish. They use these areas to search for food, rest and to avoid predators. During winter periods, these areas will continue to have quiet water despite occasional high flows moving through them. In Dry Creek, this type of habitat will be primarily constructed in wider areas of the creek. This type of habitat provides the greatest opportunity to meet the target velocity criteria specified in the Russian River Biological Opinion.

Construction of these areas will include excavation to achieve desired grades relative to the summer water surface elevation and include placement of logs at appropriate locations, planting of aquatic vegetation and management of surrounding vegetation. The bottom grades for these areas have been set at 4 feet below the summer water surface elevations. Based on repeat observations of backwater habitats in Dry Creek and assessment of the response of these habitats to high flow events, and monitoring of constructed side channels on other streams, Inter-Fluve (2012) developed guidelines to inform design of this habitat type on Dry Creek. The primary challenges to the longevity of constructed backwater habitats are nuisance sedimentation and downstream changes in the main channel affecting the hydraulic control for the backwater habitat. Of the backwater channels reviewed on Dry Creek to date, those whose upstream ends were located a moderate distance from the active channel and/or with a section of hydraulically rough floodplain between the upstream channel and the habitat were substantially less affected. These considerations will promote the longevity of the constructed habitat. Nevertheless, some degree of sedimentation in these areas will be unavoidable, and this issue will be tracked through the adaptive management program. Over the length of Dry Creek, there will be variability between the constructed backwater channels in terms of sedimentation and adjustment to flood flow. These responses can be expected to vary over the 25-year horizon assigned to the project.

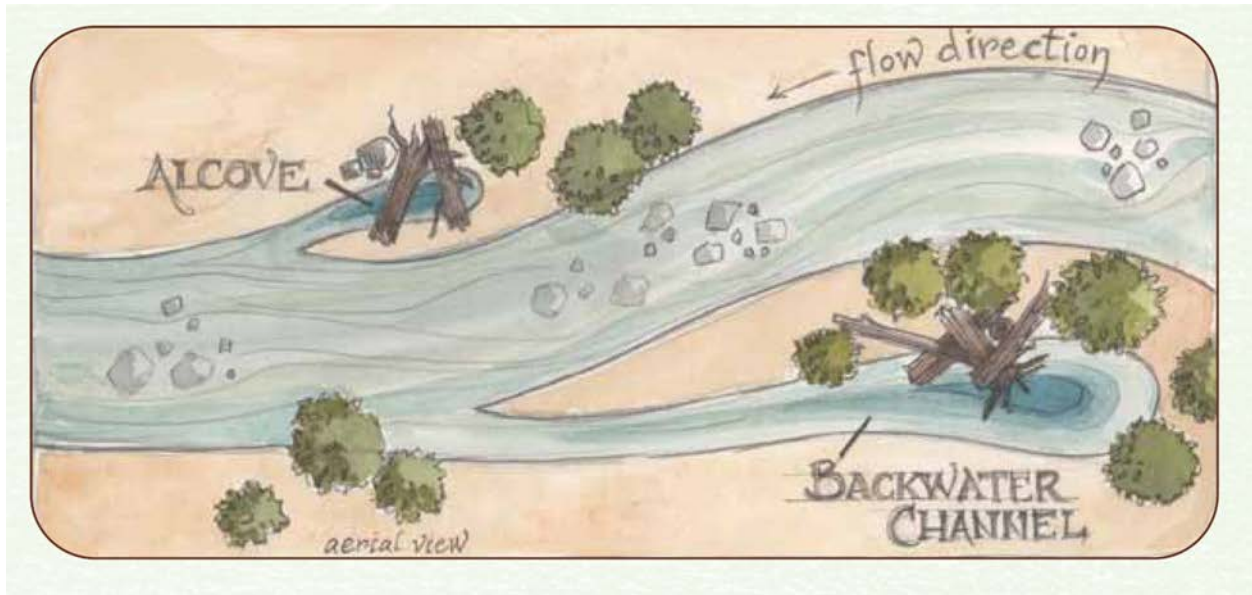


Figure 2.3. Conceptual depiction of backwater channel and alcove.

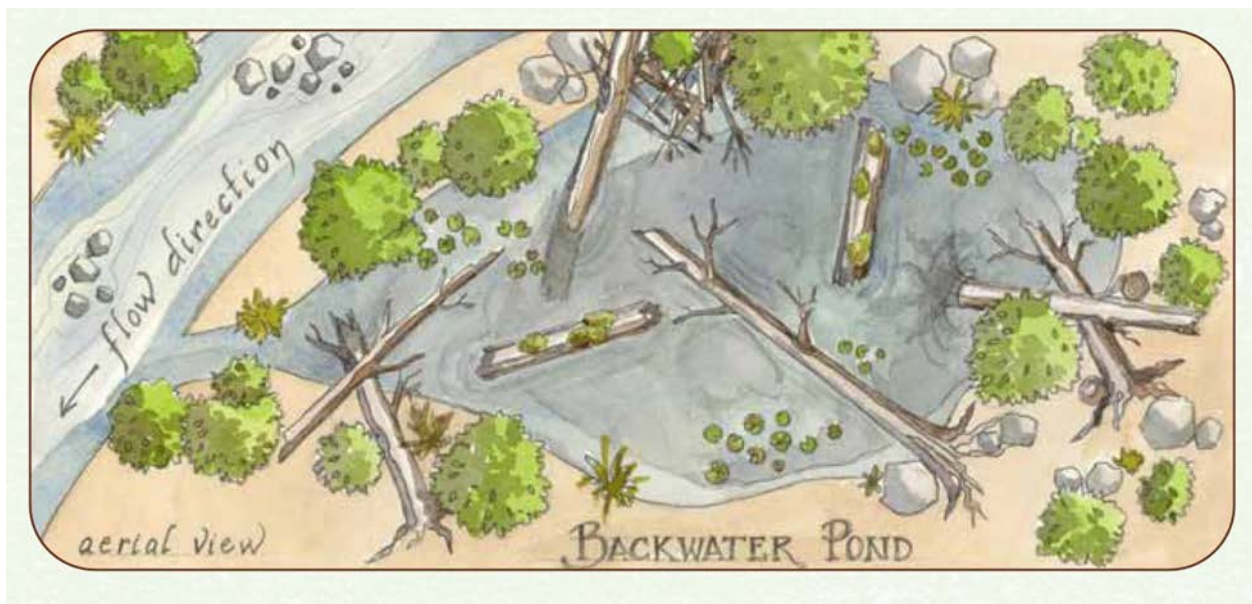


Figure 2.4. Conceptual depiction of backwater pond feature.

2.1.3.2 Side Channels

Side channels run parallel to connect with both ends to the main stem of the creek, including during the summer (**Figure 2.5**). The flow of the stream is split between the two channels. This serves to reduce the stream current, which in combination with pools and logs in the water, make these areas attractive to coho salmon and steelhead trout. Salmonids use these areas to search for food, rest and avoid predators. In Dry Creek, this type of habitat will also be primarily constructed in wider areas of the creek. In some

of these areas, old abandoned channels may be excavated to provide enhanced side channels. Construction of these areas will require excavation to form the channel, riffles and pools, placement of logs at appropriate locations, and management of the surrounding vegetation.

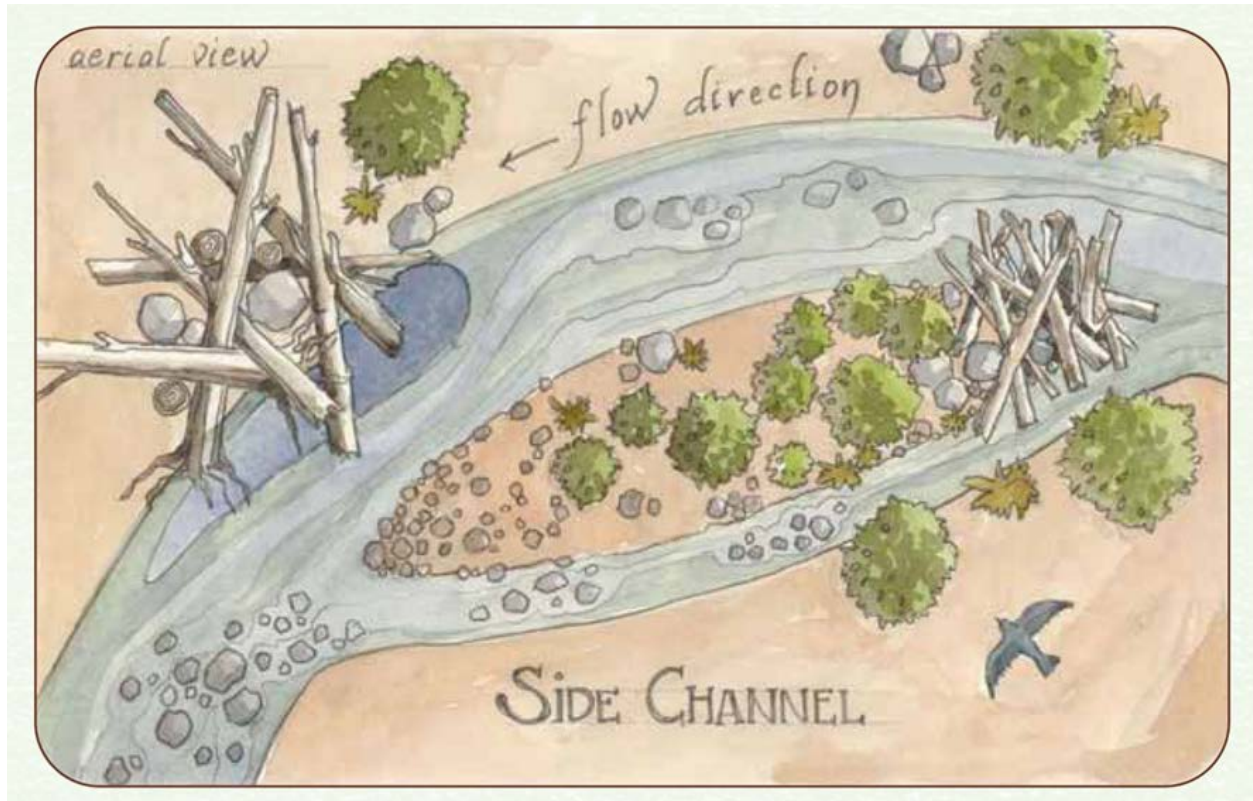


Figure 2.5. Conceptual depiction of side channel.

2.1.3.3 Log Jams

A log jam is an accumulation of logs that may be constructed in an area where it would be beneficial to initiate or stabilize a turn or fork in the channel (**Figure 2.6**). The log jam serves to anchor the stream's location by being an immobile object along one or both banks, acting similar to a bridge abutment or a natural bedrock outcrop. Deep pools may form next to log jams through the interaction of the logs and flowing water, creating excellent fish habitat. To create a log jam, an area is excavated and then logs are stacked and knit together with boulders and "snags" (trunks of dead trees that remain standing vertical to the horizon). This combination stabilizes the log jam during floods. Similar to the descriptions above for large woody debris in backwater and pool habitats, large woody debris in log jams will be ballasted through a range of techniques to enhance its longevity in the reach.

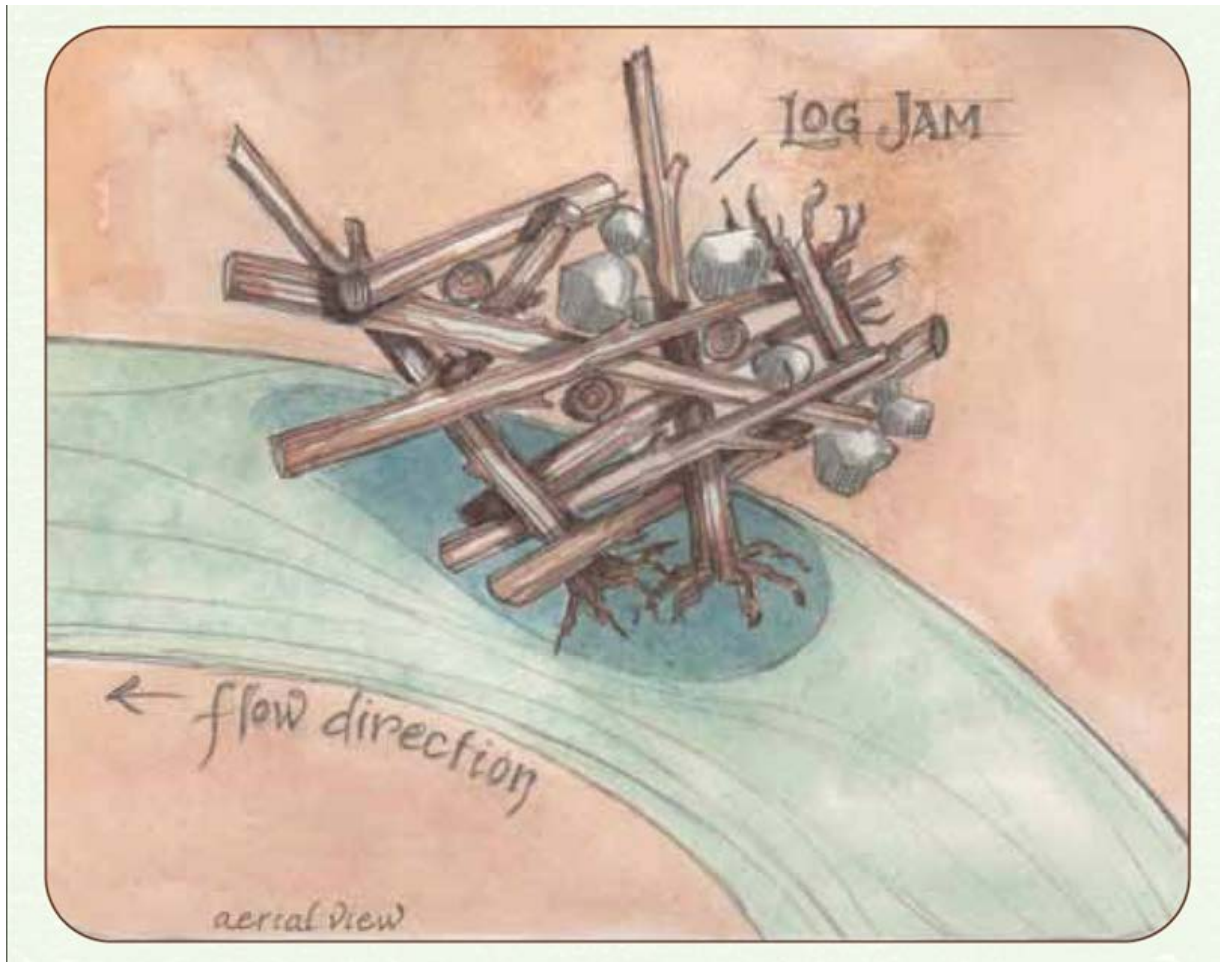


Figure 2.6. Conceptual depiction of a log jam.

2.1.3.4 Riffle Construction and Pool Enhancement

Riffles are areas where the streambed is steeper and the current is swift (**Figure 2.7**). Riffles play a key role in controlling the elevation of the streambed and releasing the stream's energy so that the current flowing through adjoining pools is slower during the summer period. They are also important for food production. Riffle habitat was found to be relatively lacking during the 2009 habitat inventory, which leads to long flatwater and pool habitat units with swifter than desired velocities and that lack complexity (Inter-Fluve 2010). Riffle habitat is lacking because Dry Creek has evolved to a condition where it is very efficient at transporting the sediment that is supplied to the stream downstream of WSD (Inter-Fluve 2012).

Pools are deeper areas of the stream which in a healthy stream provide key habitat for young fish because currents are slow, the flow patterns are diverse, and fish can hide beneath logs that project into the water. (Figure 8). Proposed pool improvements in the enhancement areas will act to increase the complexity and diversity of habitat for young fish, and create areas that have sheltered currents that young fish prefer. This will be

accomplished with selected grading of existing pool features and the installation of large woody debris along the pool margins. Additionally, as described above, pool velocities will be reduced due to riffle construction. Construction of riffles is proposed to provide key grade control for backwater habitats and to improve the quality of the adjoining pools for fish. The riffles are designed to backwater the adjacent upstream pool in the summer operational discharge range, which will flatten the water surface through the pool and lead to reduced stream velocity. Although the riffles will reduce stream velocity through the existing pools, the primary locations in these habitats where the target velocity criteria specified in the Russian River Biological Opinion will be met will be in shelter habitats associated with large woody debris (LWD) and along the channel margins. Riffles are constructed with a well-mixed layer of small boulders, cobbles, gravel and sand across the stream, and entail excavation of portions of the existing streambed to prepare suitable subgrade conditions.

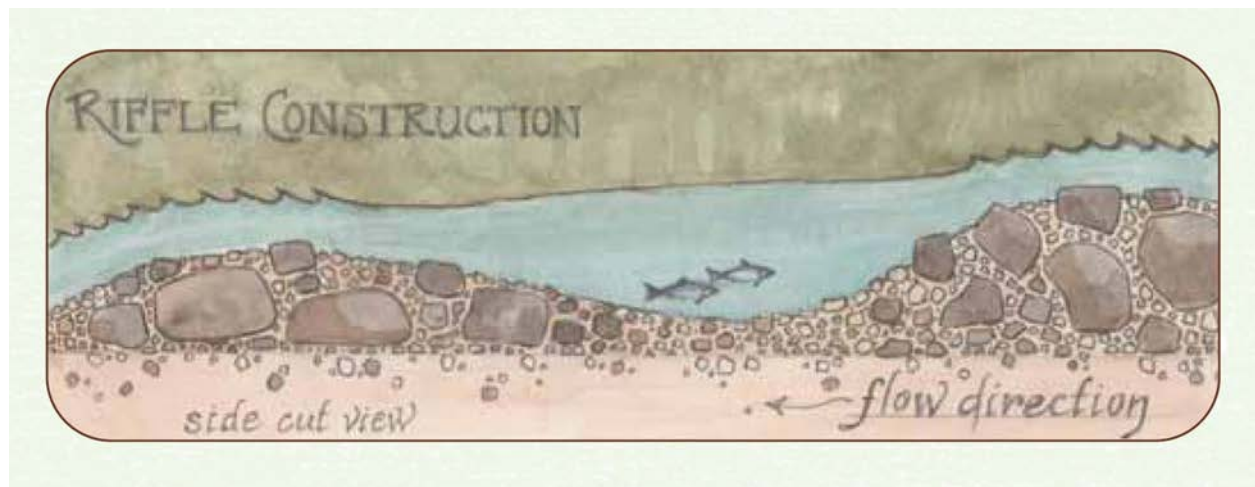


Figure 2.7. Conceptual depiction of riffle construction.

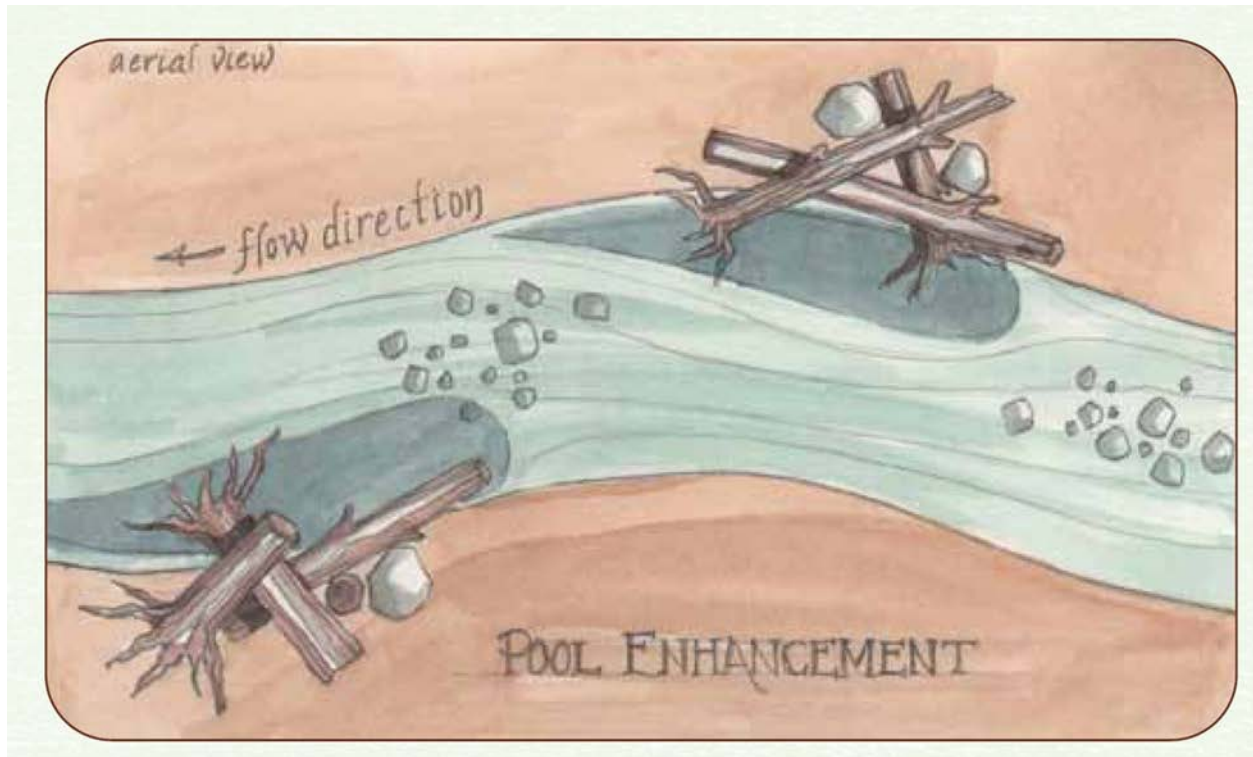


Figure 2.8. Conceptual depiction of pool enhancement.

2.1.3.5 Winter Refuge Habitat

Winter refuge zones are areas where fish can escape high velocities in the main stream channel during elevated winter flows (**Figure 2.9**). Winter refuge habitats are floodplain areas that become inundated during frequent winter flow events. Juvenile fish have been shown to use inundated floodplain habitats and benefit from seasonal access to terrestrial food sources, such as insects that live in the soil, and terrestrial vegetation. Winter refuge habitats are created by lowering certain portions of the floodplain in order to increase the frequency of inundation. LWD will be placed in winter refuge habitats in order to provide additional cover, and enhance the flood refuge for juvenile salmonids. In addition to lowering floodplain areas to create winter refuge habitat, constructed backwater channels will provide winter refuge over a large range of flows.

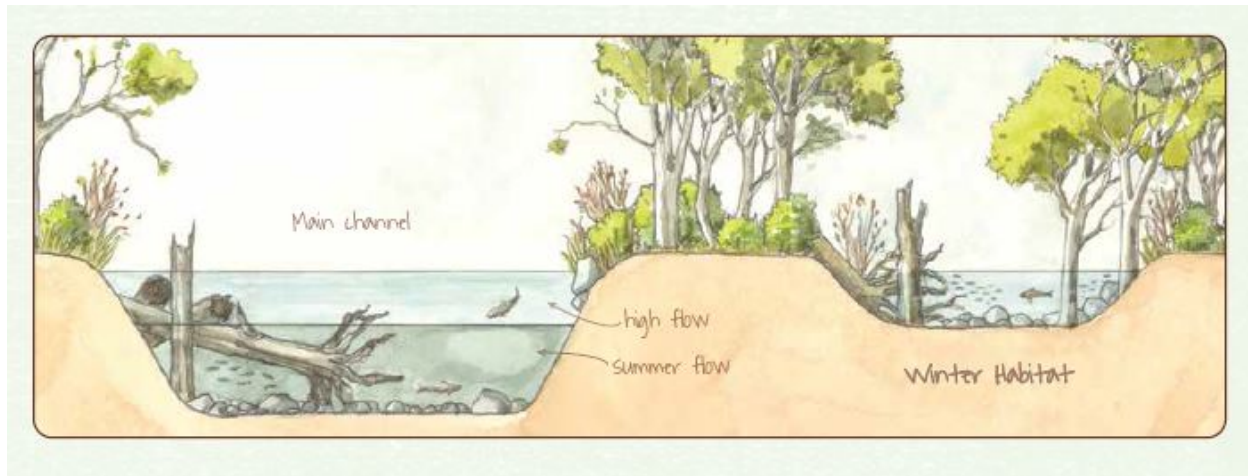
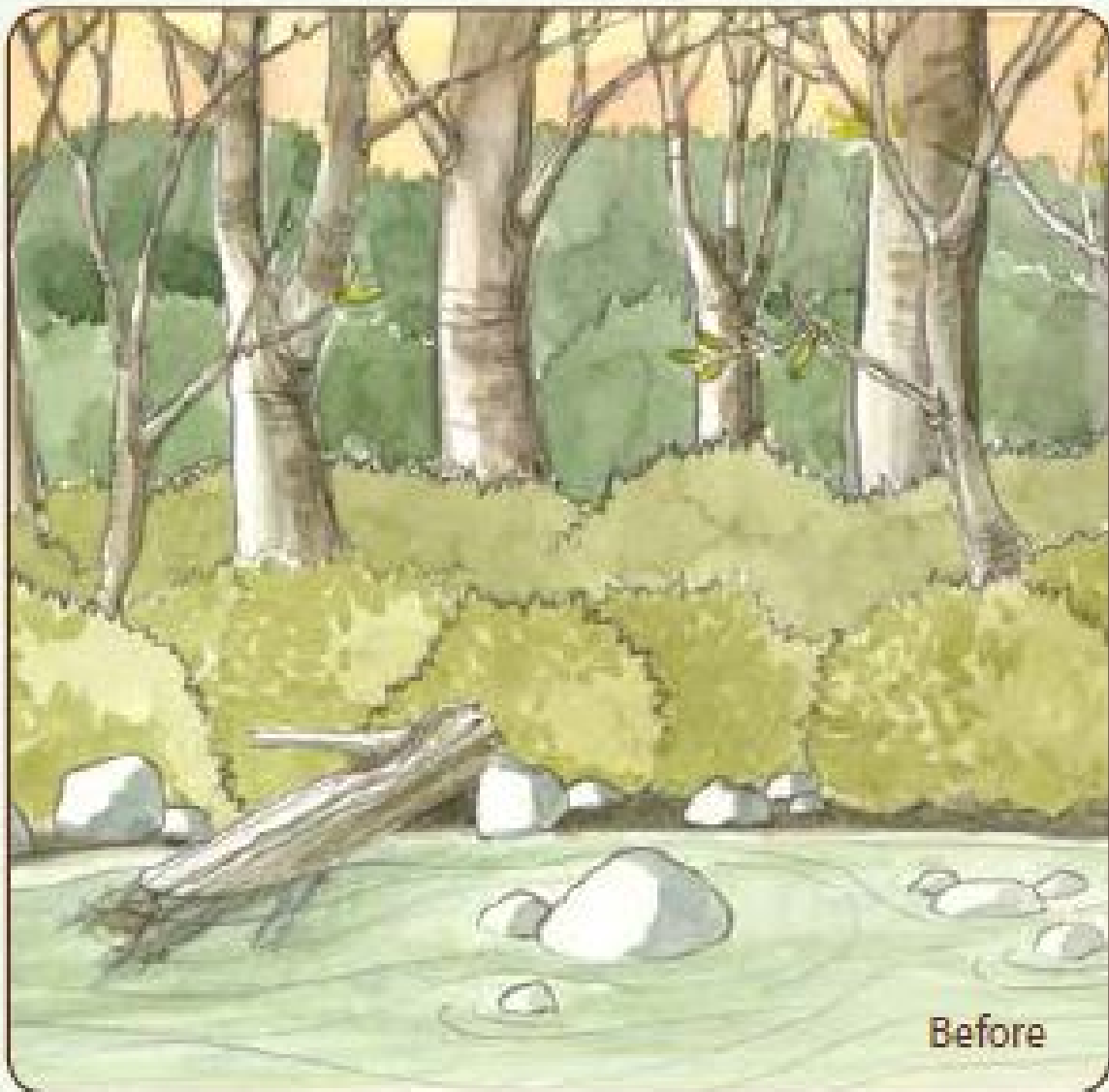


Figure 2.9. Conceptual depiction of winter refuge habitat.

2.1.3.6 Vegetation Management

Dry Creek has extensive vegetative growth along the channel, which includes many non-native or invasive weed species. In some areas, overly dense stands of vegetation impair stream function by channelizing the flow of the creek and acting like a levee, which forces energy into the creek bed, and results in pools that are too long, with water that moves too swiftly (**Figure 2.10**). In general, the vegetation within the project area does not display the range of different successional classes indicative of a dynamic, properly functioning riparian system. Plant communities within intact riparian systems typically consist of a variety of vegetation communities that represent a range of different age classes and structural types. This pattern is largely a function of active floodplain evolution which is currently suppressed in the project reach. Riparian vegetation management will include selective thinning of existing vegetation, removal of invasive weeds, and in some cases, replanting of native vegetation (**Figure 2.11**).



Overly dense stands of invasive species impair stream function.

Figure 2.10. Conceptual depiction of riparian vegetation before treatment.



Following thinning and removal of invasives, native vegetation takes hold.

Figure 2.11. Conceptual depiction of riparian vegetation after treatment.

2.1.3.7 Streambank Construction

Streambank construction techniques (**Figure 2.12** and **Figure 2.13**) may be applied at select locations to prevent the creek from migrating into high terraces, where graded slopes are steeper than 3 horizontal to 1 vertical, or where the main channel planform is adjusted. The technique used in a given location will depend on shear stresses acting on the bank, substrate, slope, and other factors. Potential streambank construction areas will be evaluated in greater detail once project reaches are selected.



Figure 2.12. Example streambank construction.

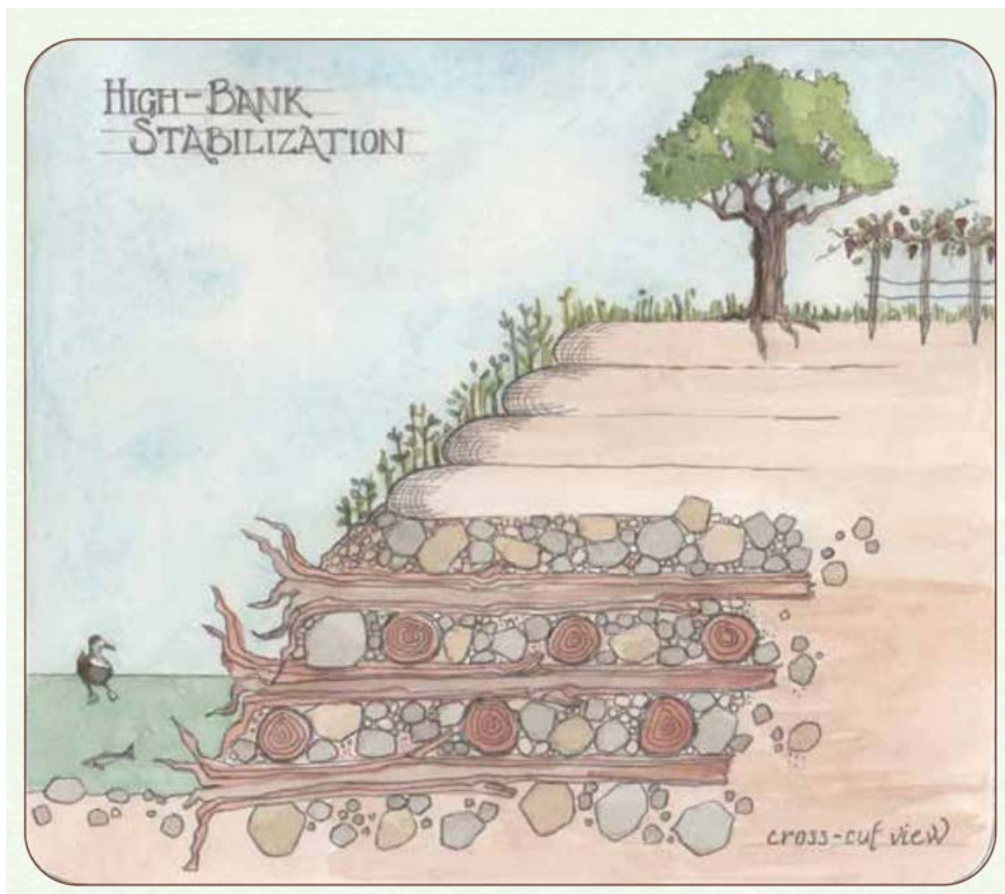


Figure 2.13. Example streambank construction.

2.1.3.8 Dynamic Process-Based Floodplain Enhancement

In the lower segment of Dry Creek, highly dynamic channel processes are present due to the supply of water and sediment from unregulated tributaries, and the influence of the Russian River which creates a backwater profile upstream into Dry Creek during floods. In this section of Dry Creek, the construction of late successional habitats will not provide lasting habitat benefits due to the risk of sedimentation or other impacts on enhancements. A different approach was developed to utilize construction techniques designed to set the stage for the enhancement to be dynamic and continue to provide habitat benefits over time. In the lower two miles of Dry Creek, lateral floodplain surfaces and bars are perched high above the main channel. This approach would reconnect floodplain processes by shaving down lateral bars and excavating terraces to “reset” the connectivity between the channel and its floodplain which are not currently accessed frequently during storm events. Excavation, grading, and construction of logjams in strategic locations provide the basis for a diverse suite of habitats to evolve and change over time.

The floodplain enhancement approach is based on the function of natural floodplain systems and relies on both heavy construction techniques and natural processes to drive the evolution of habitats over time. In naturally functioning channels, lateral, or off-channel, habitats may be short lived habitat types in floodplain systems. Alcoves and backwater channels may be destroyed and recreated as channels migrate across their floodplains, but the quantities or availability of off-channel and main channel habitat remains relatively stable. Although these habitats are constantly being created and destroyed over time, they typically offer high quality habitat and are responsible for a significant portion of juvenile coho productivity in many river systems. Juvenile coho utilize these lateral habitats to seek out terrestrial and aquatic food sources, find refuge from the main channel, and avoid predators. Dynamic process-based floodplain restoration in the lower segment will utilize a combination of floodplain grading, logjam construction, and excavation of off-channel habitats. Substantial excavation of the floodplain will serve to increase the frequency of inundation and create large areas of “Pilot Winter Refuge Habitat.” Pilot habitat in dynamic areas refers to the construction of the basic habitat structure with the understanding that dynamic processes will continue to act upon and change the habitat area. Additionally, the excavation of “Pilot Off-Channel Habitat” will provide immediate summer habitat function that will continue to mature and improve over time. Logjams will be installed in strategic locations in order to encourage planform development in response to flood flows and sediment supply. Over time, pilot off-channel habitat will become main channel habitat, and vice-versa. Reconnecting the channel to its floodplain will allow for main channel and floodplain habitats to be dynamic over time.

2.1.4 Habitat Enhancement Miles 2-6

As noted previously, the Water Agency is required under the Russian River Biological Opinion to enhance habitat in Dry Creek to provide up to six miles of high quality salmonid habitat within the fourteen mile section of Dry Creek from Warm Springs Dam down to Dry Creek's confluence with the Russian River. The Russian River Biological Opinion specifies that these habitat enhancements are not to be concentrated in a contiguous six miles of stream, but rather they are to be distributed across eight or more sites including sites in the upper, middle, and lower portions of Dry Creek. The Water Agency and the USACE have already begun implementing projects that make up the first mile of habitat enhancement projects in Dry Creek (Water Agency's Demonstration Project in the middle reach and USACE's Reach 15 Project in the upper reach).

The remaining five miles (Miles 2-6) of habitat enhancements are the subject of the proposed project in this EIR. The Water Agency will build upon the initial evaluation of potential habitat enhancement opportunities identified in Inter-Fluve's Fish Habitat Enhancement Feasibility Study Report (2011 Feasibility Study) and Dry Creek Fish Habitat Enhancement Conceptual Design Report (2012 Conceptual Design Report) to refine potential designs and identify landowners who are willing to be project partners for these habitat projects.

Dry Creek was separated in the 2011 Feasibility Study into an upper segment (Warm Springs Dam to Pena Creek), middle segment (Pena Creek to River Mile 3), and lower segment (River Mile 3 to Russian River confluence). The 2012 Conceptual Design Report presented conceptual designs for groups of off-channel and mainstem habitat enhancements throughout each of these segments, and provided information to enable project evaluation, prioritization, selection, and planning for implementation of enhancements.

Prioritization of enhancement subreaches for implementation includes two main phases: project ranking and project selection. In order to summarize potential habitat benefits to assist with project ranking, three evaluation metrics were assessed for each of the enhancement subreaches. These metrics are based on: 1) potential summer coho rearing habitat, 2) incremental winter rearing and refugia habitat, and 3) total potential enhanced habitat. Following application of these metrics, the enhancement subreaches were further organized into Tier 1 and Tier 2 areas within each study reach segment (lower, middle and upper), with Tier 1 sites considered to have potential project sites that would provide higher habitat value areas than the Tier 2 project sites.

Project selection represents the second phase of project prioritization. In this phase, the results of the ranking phase were evaluated alongside other critical factors such as access, cost, and overall distribution along Dry Creek.

In order to focus potential project sites for Miles 2-3, the Water Agency started with the highest ranking of the Tier 1 sites identified in the 2012 Conceptual Design Report and began outreach to landowners to determine which landowners would allow access for more detailed site evaluation both for project design as well as for this report. The Water Agency was able to obtain permission from landowners to evaluate several Tier 1 sections upstream of Lambert Bridge totaling 2.8 miles and several Tier 1 sections downstream of Lambert Bridge totaling 2.9 miles. The sites upstream of Lambert Bridge (one in the upper segment and two in the middle segment of Dry Creek) have been designated for consideration as Mile 2 sites and those downstream of Lambert Bridge (two in the middle segment and one in the lower segment of Dry Creek) have been designated for consideration as Mile 3 sites. While 2.8 miles of habitat projects are being evaluated for the Mile 2 section and 2.9 miles of habitat projects for the Mile 3 section, ultimately it is anticipated that the ultimate project constructed would be closer to a mile for each of these sections. Any areas evaluated and not selected as part of Miles 2 or 3 could remain as potential sites, along with any other section of Dry Creek, for habitat enhancement work towards Miles 4-6.

2.1.4.1 Mile 2

The project sites being evaluated for Mile 2 habitat enhancement work are located in enhancement reach areas 8, 9 through 11, and 14 (RM 8.2-8.9, RM 9.2-10.5, and RM 12.4-13.2 (**Figures 2.14** through **2.16**)). Concept designs for the Mile 2 sites are included in Appendix 9.2 (10% Conceptual Design for Mile 2) (Inter-Fluve 2014).

The proposed enhancements include combinations of pool and riffle enhancement, off-channel backwater and alcove enhancement and/or creation, side-channel enhancement and/or creation, and enhancement and stabilization of streambanks. Pools may be enhanced with large woody debris which provide places for juvenile coho and steelhead to avoid predators, escape high water velocities, and find food. Enhancements of riffles may include expanding existing riffles or constructing new riffles in appropriate locations, which may also enhance pools by slowing pool velocities. Streambank enhancements may address chronic erosion in critical locations and provide additional cover along the channel margins.

Construction activities will vary depending upon which structures are installed and where they are located, but typically these types of construction activities can include dewatering the construction area, grading, installation of large boulders as anchor material, installation of large wood logs, planting of vegetation, and installation of erosion control measures (e.g. fabric, straw, seeding). Some construction activities may consist of working in the active flow of Dry Creek, such as large boulder placement where dewatering the section of creek to place boulders would be more disruptive to the environment. Construction activities will likely require staging areas outside of the

footprint of the habitat work, as well as requiring the creation of access routes through the riparian corridor in order to access the habitat work site.

While it is not anticipated that the habitat enhancement structures will require regular maintenance work over the long term, temporary irrigation may be required to maintain newly-installed vegetation and periodic vegetation management may take place in certain locations to enhance fish habitat. Maintenance activities may also include repair to damaged structures or adjustments to structures if they are not functioning as intended.

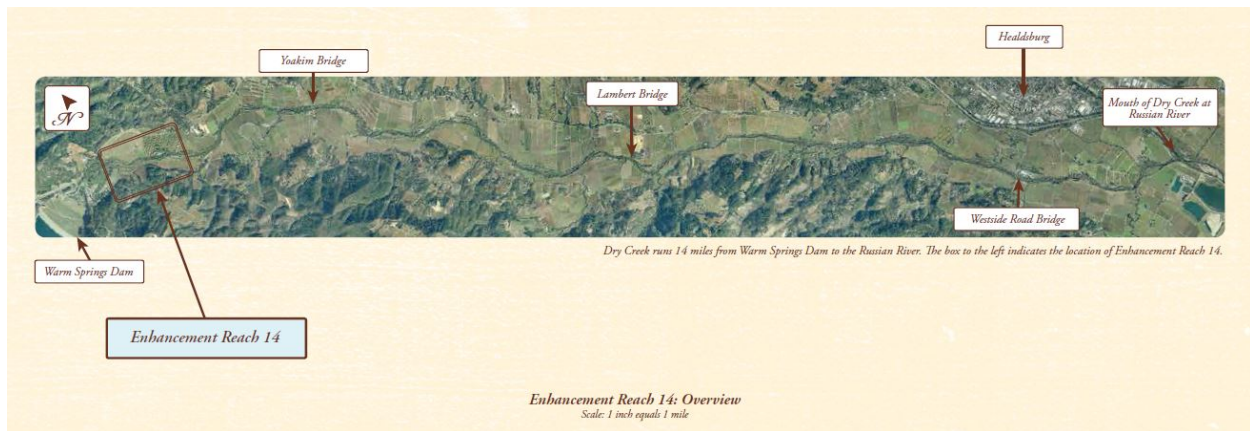


Figure 2.14. Showing location of enhancement reach 14, which is part of the Mile 2 enhancement area.

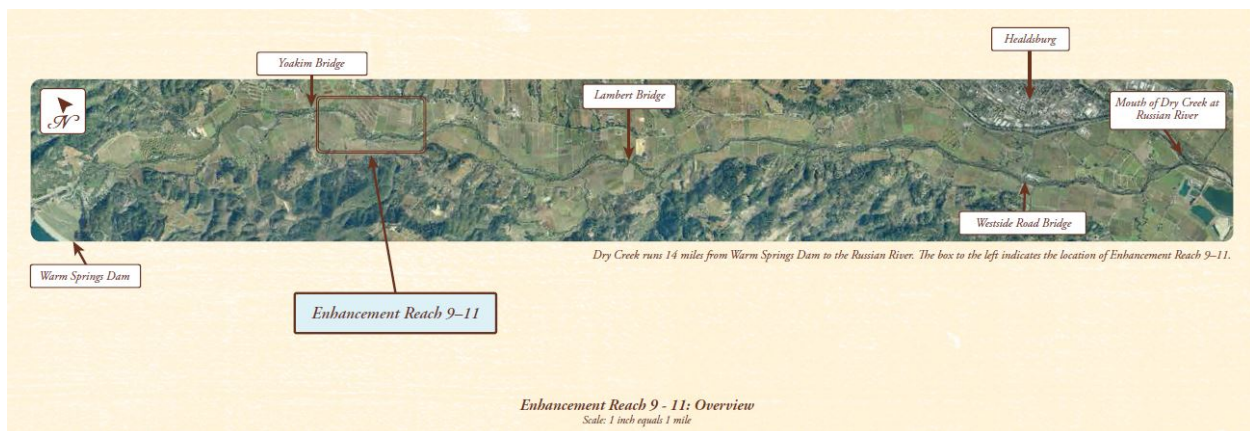


Figure 2.15. Showing location of enhancement reaches 9-11, which are part of the Mile 2 enhancement area.

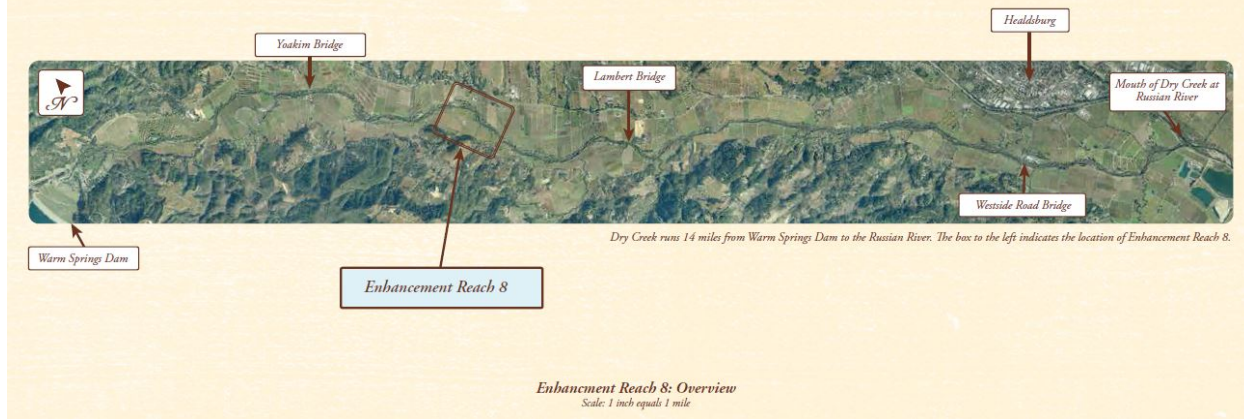


Figure 2.16. Showing location of enhancement reach 8, which is part of the Mile 2 enhancement area.

2.1.4.2 Mile 3

The project sites being evaluated for Mile 3 habitat enhancement work are located in enhancement reaches 2, 4, and 4 (RM 1.0-2.0, RM 3.0-4.1, and RM 4.2-5.0 (**Figure 2.17**). Concept designs for the Mile 3 sites are included in Appendix 9.3 (10% Conceptual Design for Mile 3) (ESA 2014).

The proposed enhancements and anticipated construction and maintenance activities are similar as to those described for Mile 2.

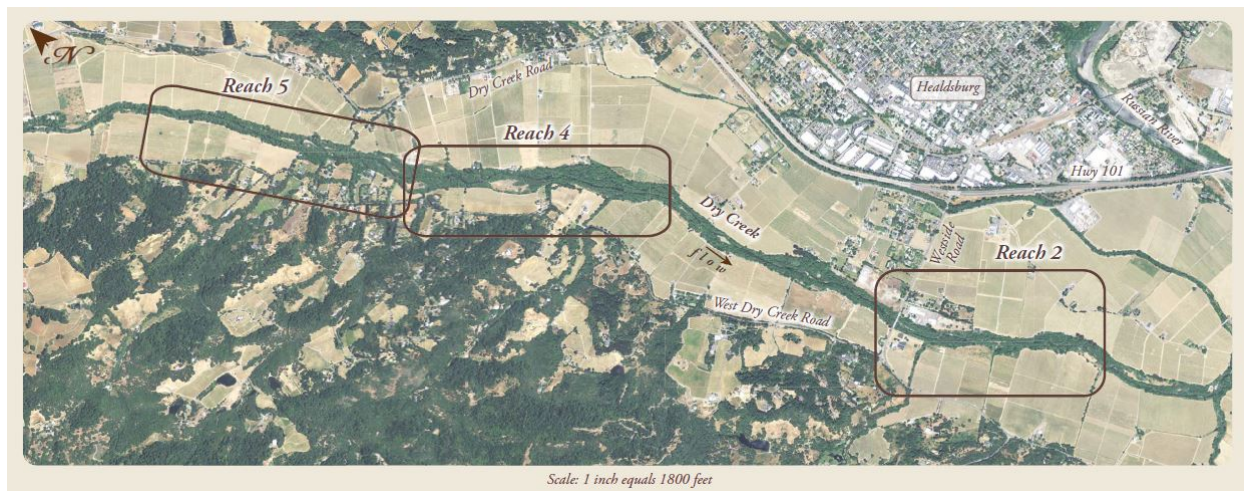


Figure 2.17. Showing location of enhancement reaches 2, 4, and 5, which make up the Mile 3 enhancement area.

2.1.4.3 Miles 4-6

Any area within the 14-mile length from below Warm Springs Dam to the confluence of the Russian River and not already enhanced or providing high quality habitat are under

consideration for Miles 4-6 of habitat work in Dry Creek. The proposed enhancements and anticipated construction and maintenance activities are anticipated to be similar as to those described for Mile 2.

2.1.5 Monitoring and Maintenance Miles 2-6

The Water Agency would be responsible for monitoring and maintaining the project components throughout the expected lifespan of the proposed habitat features (15-25 years). Monitoring could consist of activities such as fish surveys, stream profile and cross-section measurements, vegetation surveys, wildlife surveys, and photo documentation of structures. Failing structures, or structures that are not performing as intended (not inundated properly, inundated too much, buried, having too high of velocities) may require additional maintenance work in future years after the initial construction to restore or enhance the originally intended functions. Vegetation management is expected to occur annually for the first few years after implementation and then on a three- to five-year recurring basis in order to maintain the desired vegetation species and densities in the project area.

2.2 References

Inter-Fluve 2010. Final Current Conditions Report, Dry Creek from Warm Springs Dam to the Confluence with the Russian River. Prepared for the Sonoma County Water Agency. December.

Inter-Fluve 2012. Final Habitat Enhancement Feasibility Study Report, Dry Creek from Warm Springs Dam to the Confluence with the Russian River. Prepared for the Sonoma County Water Agency. July.

Inter-Fluve 2012. Final Dry Creek Fish Habitat Enhancement: Conceptual Design Report: Dry Creek: Warm Springs Dam to the Russian River Sonoma County, CA. Prepared for the Sonoma County Water Agency. July.

Inter-Fluve 2014. Dry Creek Habitat Enhancement Reach 14 Concept Designs. Reach 9-11 Concept Designs. Reach 8 Concept Designs. Prepared for the Sonoma County Water Agency. July, 2014.

ESA 2014. Dry Creek Habitat Enhancement Mile 3 Reaches 2, 4, and 5 Concept Designs. Prepared for the Sonoma County Water Agency. July, 2014.

CHAPTER 3.1 Aesthetics

3.1.1 Introduction

This chapter describes the existing conditions relating to aesthetic resources within the Dry Creek Habitat Enhancement Project, Miles 2-6 (Dry Creek Project or proposed project) area. Section 3.1.2, “Environmental Setting” describes the regional and project area environmental setting, and evaluates potential impacts to aesthetic, also referred to as visual, resources as a result of the proposed project. Section 3.1.3, “Regulatory Framework” details the federal, state, and local laws related to aesthetic resources. Potential impacts to these resources resulting from the proposed project are analyzed in Section 3.1.4, “Impacts and Mitigation Measures” in accordance with the California Environmental Quality Act (CEQA) significance criteria (CEQA Guidelines, Appendix G) and mitigation measures are proposed that could reduce, eliminate, or avoid such impacts.

Other impacts related to visual quality are addressed in sections as follows: impacts to vegetation are addressed in **Chapter 3.3, Biological Resources**; impacts to existing land uses are addressed in **Chapter 3.9, Land Use, Planning, and Agricultural Resources**; and impacts to recreation are addressed in **Chapter 3.12, Recreation**.

3.1.2 Environmental Setting

The visual setting for the Dry Creek Project includes Dry Creek and the surrounding viewsheds,¹ consisting of the Coast Range to the west, the Mayacamas Mountains to the east, and Lake Sonoma’s earthen dam and spillway to the north. The project area extends approximately a half mile downstream from Warm Springs Dam to the confluence with the Russian River. Current visible activities in the area include vineyard operations, including the use of large trucks to transport grapes; tourism associated with tasting rooms, including special events such as the annual Passport to Dry Creek event; as well as periodic maintenance of the roadways and facilities at Lake Sonoma. At the time of circulation of the Notice of Preparation for the proposed project, the current visible activities also included construction of habitat enhancement features as part of the Dry Creek Habitat Enhancement Demonstration Project (Demonstration Project)

¹ A viewshed is a line of sight of an observer, looking toward an object of significance to the community (e.g., ridgeline, river, historic building, etc.), or as the route that directs the viewers’ attention. A viewshed shall be defined as the area within view from a defined observation point. A scenic highway corridor shall be defined as the area outside a highway right-of-way that is generally visible to motorists traveling on the highway.

located immediately upstream and downstream of Lambert Bridge. Populations exposed to the viewsheds mentioned above include residents, winery visitors, cyclists, and visitors passing through the valley en route to Lake Sonoma for recreational opportunities including camping, boating, fishing, hunting and sightseeing. Recreation related to the wine industry, cycling, and Lake Sonoma draws many visitors to the Dry Creek Valley. The region is highly valued by residents and visitors for its unique mosaic of vineyards and architecturally distinct wineries, intense agriculture on the valley floor and contrasting wooded hillsides, as well as the networks of scenic rural roads which are a popular destination for cyclists (PRMD, 2008).

The Open Space and Resource Conservation Element of *Sonoma County General Plan 2020* (2008) identifies two designated scenic resources in the area: scenic landscape units and scenic highway corridors. Those designated scenic resources within the project area are discussed below.

Designated Scenic Landscape Units

Landscape units are based on combinations of physical and cultural features that result in similar visual quality. A landscape unit is a geographically distinct portion of an area that has a particular visual character or set of topographic features. These units are strictly aesthetic delineations based on multiple factors including land use and degree of urbanization, position in the landscape, topography, and vegetation, among others. Preservation of these scenic resources is important to the quality of life of Sonoma County residents, and to the tourist and agricultural economies. Three major landscape units designated in *Sonoma County General Plan 2020* occur within or near the project area and are described below (PRMD, 2008):

Alexander and Dry Creek Valleys

Protection of the scenic beauty of these agricultural valleys is not only important from an aesthetic standpoint, but also from an economic one as agricultural marketing is closely tied to the areas' scenic images. The hills along Highway 101 and above the valley floors are particularly sensitive.

Hills East of Windsor

These hills provide a scenic backdrop to the Santa Rosa Plain. North of Windsor the area extends into the plain and adjoins the low, rolling hills that form part of the Windsor/Healdsburg community separator.

Sonoma Valley / Mayacamas Mountains

The Sonoma Valley / Mayacamas Mountains scenic landscape unit includes the mountains that separate Sonoma and Napa counties and provide a backdrop to the valleys and agricultural lands and urban and rural communities to the west and east.

The Mayacamas Mountains are aesthetically sensitive due to their small size and unobstructed views from roads and adjoining urban areas.

Designated Scenic Highways and Corridors

Scenic corridors are lands comprised of scenic and natural features visible from designated highway rights-of-way. Boundaries of a scenic corridor are determined by the visible landscape as defined by topography, vegetation, viewing distance, or jurisdictional lines. Duration of exposure is proportionate to the distance traveled, speed, and the extent of the scenic corridor.

Sonoma County roadways may be designated as “scenic” by the California Department of Transportation (Caltrans) or the County of Sonoma. Within the project area, there are no Caltrans designated scenic highways, but *Sonoma County General Plan 2020* identifies Dry Creek Road, Stewart Point-Skaggs Springs Road, Dutcher Creek Road, Canyon Road, Westside Road, and Highway 101 as scenic (PRMD, 2008).

Community Separators

A characteristic that distinguishes Sonoma County from many parts of the San Francisco Bay Area is the existence of separate, identifiable cities and communities. Open space between the various communities in Sonoma County is maintained in order to prevent corridor-style urbanization. Some of these lands may not necessarily be highly scenic, but their continued rural quality provides visual relief from a uniform landscape of urban and suburban development and maintains city and community identity. The Community Separators nearest to the project area is the Windsor/Healdsburg Community Separator, which includes approximately 1,200 acres along the Highway 101 corridor (PRMD, 2008).

Factors in Assessing Aesthetic Resources

Factors important in describing the aesthetic resources of an area include visual character, visual quality, and visual sensitivity. These factors together describe both the aesthetic appeal of an area, and communicate how much value is placed upon a landscape or scene by the general public. Scenic areas include designated and eligible scenic highways, protected open spaces and parks, and designated viewsheds.

Visual Character

Visual character is the unique combination of landscape features that combine to make a view, including native landforms, water, and vegetation patterns, as well as built features such as buildings, roads, and other structures. Landscape and built features combine to form unique perspectives with varying degrees of visual quality (FHWA 2015). In the Dry Creek Project area there are three primary types of characteristic views as can be seen in Figures 3.1.1 through 3.1.12:

1. Views of Dry Creek Valley's intensive agriculture, interspersed with distinct vineyards and rural residences, surrounded by the wooded mountains adjacent to the valley floor with frequent, but often distant, views of the riparian corridor.
2. Views of Dry Creek itself from Yoakim Bridge and Westside Bridge.²
3. Views from at least two wineries with picnic areas adjacent to Dry Creek, including Martorana Family Winery and Truett-Hurst Winery.

Because viewers are residents and tourists who are attracted to the setting, there is high viewer sensitivity to changes in the region's visual character. Overall, the region's visual character is of high quality, with vivid and unified views.

Visual Quality

Visual quality relates to the characteristics of a landscape that make it distinct and memorable and considers landforms, water, vegetation, and cultural modifications (physical change to a landscape caused by human activity). Visual quality is rated low, moderate, or high, based on the arrangement of landscape and cultural attributes (Jones, Sorey, and Scott, 2007). Dry Creek Valley is highly valued for its visual character, including the valley floor dominated by wine grapes and winery facilities and the surrounding forested hillsides. Dry Creek itself is not visible from most of the valley, with the exception of bridge crossings and a few private access points, however the tall trees of the riparian corridor are visible from much of the valley and surrounding hillsides.

Viewer Sensitivity

Visual sensitivity refers to the sensitivity of viewers to changes and is a factor of viewer exposure and viewer awareness.

Viewer Exposure

Viewer exposure is a component of visual sensitivity and is a measure of the proximity, extent, and duration from which viewers see a particular landscape. Proximity refers to the distance between a viewer and a scene or object. Generally, the further away a viewer is, the less the exposure. Extent refers to the number of people that view the scene or object. Duration is the amount of time the view is actually visible (FHWA 2015).

Viewer exposure would be moderate in the Dry Creek valley because most viewers fall into one of two categories: they either live along Dry Creek (few viewers but long

² Lambert Bridge was excluded from this list because no work is proposed in areas directly adjacent to Lambert Bridge as part of the proposed project. Habitat enhancement occurred in areas immediately upstream and downstream of Lambert Bridge as part of the Dry Creek Habitat Enhancement Demonstration Project, which was completed in 2014.

duration) or visit the area for recreation such as wine tasting or cycling (many viewers but short duration).

Viewer Awareness

Viewer awareness may be described in terms of the level of attention, focus, and protection. Attention considers how routine the scene is to a viewer or how unique a scene is to a viewer. The more unique a scene, the more aware the viewer will be to the scene and any changes within it. Focus refers to the notion that a viewer will be more sensitive to details within a scene if there is a focal point in the scene, such as one large tree rather than scattered trees throughout an area. Protection refers to the expectations of the viewer that the resources are protected; often, the aesthetics of a protected area matter more to viewers than that of unprotected resources (FHWA 2015).

Other Factors that Affect Sensitivity

The importance of a scene to a viewer is also a function of the viewer's distance to the scene. In this context, distances are split into foreground, middleground, and background and the sensitivity of the viewer generally decreases with decreasing distance to the scene.

Viewer sensitivity can also be affected by movement of the viewer. When a viewer is traveling in a car, particularly when watching the road ahead, scenes are constantly changing and exposure to any one scene decreases as speed increases (FHWA 2015).

Project Area Setting

The proposed project components would be constructed along five miles of Dry Creek from approximately one-half mile downstream of the Warm Springs Dam to the confluence with the Russian River. Most of the proposed project sites are located on private properties that are visible only to surrounding landowners, but may be visible from at least two wineries adjacent to Dry Creek (Martorana Family Winery and Truett-Hurst Winery). Some proposed project components could also be seen by visitors and residents as they drive or bicycle on Dry Creek Road, West Dry Creek Road, or Westside Road or across bridges in the project area, Westside Road Bridge, and Yoakim Bridge³. Figures 3.1.1 through 3.1.4 show reaches of Dry Creek that are typical in terms of vegetation and existing visual quality for the area. Figures 3.1.5 and 3.1.6 show a backwater pond feature in the Demonstration Project area immediately after completion of construction and approximately 18 months later, once vegetation started to obscure the features. Figures 3.1.7 through 3.1.10 show views of Dry Creek from the

³ Lambert Bridge is excluded from this list because it is located within the Demonstration Project area which is not included as part of the proposed project as construction of habitat enhancements has already taken place.

bridges in the project area. Figures 3.1.11 and 3.1.12 show views from Martorana Family Winery and Truett-Hurst Winery.



Figure 3.1.1. Typical view of Dry Creek from Dry Creek Road. Riparian vegetation along Dry Creek visible along the back edge of the vineyard, March 16, 2015.



Figure 3.1.2. Typical view of existing high-flow channels adjacent to Dry Creek being targeted for habitat enhancement. Photo from Reach 2 area, August 26, 2014.



Figure 3.1.3. Typical view of summer flow in Dry Creek and adjacent vegetation. Photo taken looking downstream of Westside Road Bridge, May 6, 2013.



Figure 3.1.4. Typical understory view in riparian vegetation zone adjacent to Dry Creek, April 29, 2013.



Figure 3.1.5. View of completed backwater pond habitat feature immediately after construction. Dry Creek Habitat Enhancement Demonstration Project, October 17, 2013.



Figure 3.1.6. View of completed backwater pond habitat feature approximately 18 months after construction. Dry Creek Habitat Enhancement Demonstration Project, May 1, 2015.



Figure 3.1.7. View of Dry Creek from Yoakim Bridge looking upstream. July 7, 2015.

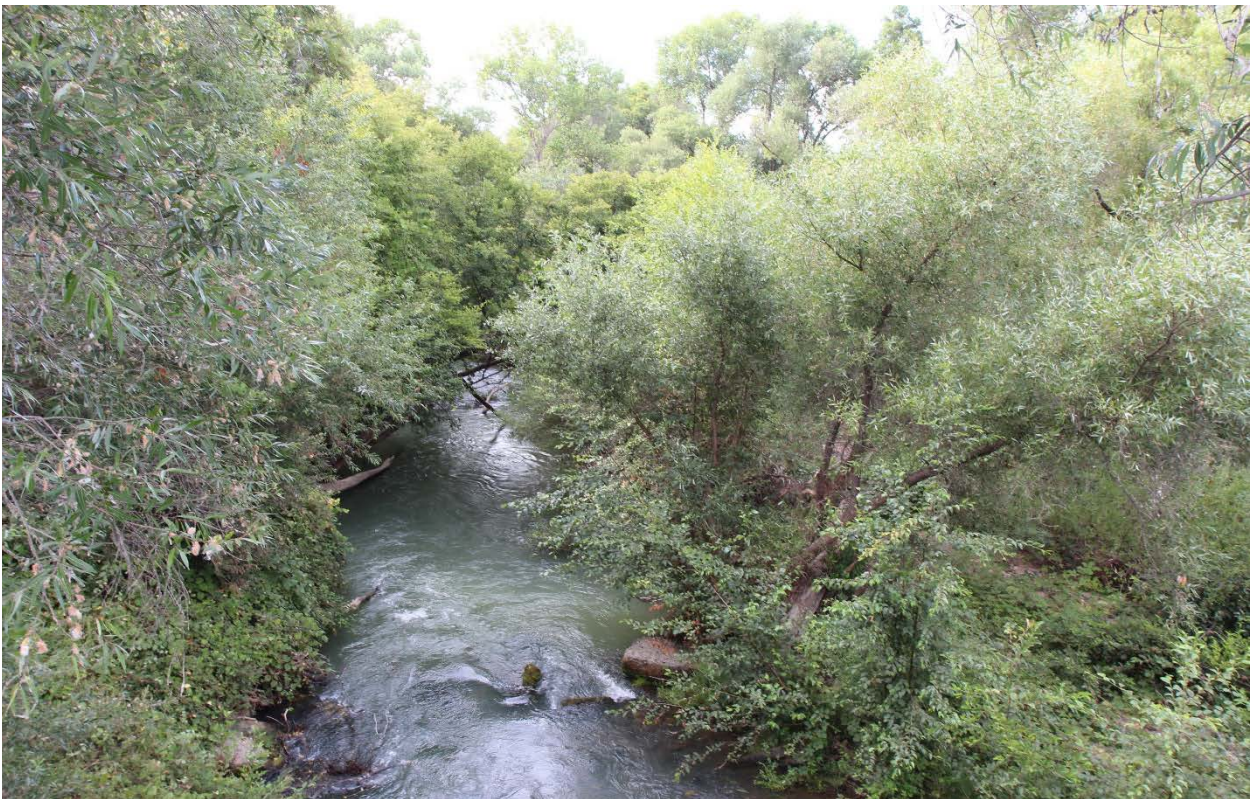


Figure 3.1.8. View of Dry Creek from Yoakim Bridge looking downstream. July 7, 2015.



Figure 3.1.9. View of Dry Creek from Westside Bridge looking upstream. July 7, 2015.



Figure 3.1.10. View of Dry Creek from Westside Bridge looking downstream. July 7, 2015.



Figure 3.1.11. View towards Dry Creek from Martorana Family Winery. A Mile 2 habitat enhancement site is proposed approximately 1,600 feet upstream. July 7, 2015.



Figure 3.1.12. View towards Dry Creek (looking downstream) from Truett-Hurst Winery. A Mile 2 habitat enhancement site is proposed in the distant meadow pictured above. Dry Creek is visible at the right edge of the photo. July 7, 2015.

3.1.3 Regulatory Framework

State Regulations

Caltrans administers the State Scenic Highways Program, established through the State Legislature in 1963 under Senate Bill 1467, to preserve and protect scenic highway corridors from projects that would diminish the aesthetic value of lands adjacent to highways (Sections 260 *et seq.* of the California Streets and Highways Code). Scenic highway corridors are defined as the land generally adjacent to and visible by motorists from a scenic highway, and are generally comprised of scenic and natural features. Scenic corridor boundaries are defined by topography, vegetation, and/or jurisdictional lines. The State Scenic Highway System includes a list of highways that are either eligible for designation as scenic highways or have been so designated. These highways are identified in Section 263 of the California Streets and Highways Code (Caltrans 2008).

The State Scenic Highway Advisory Committee defines characteristics of scenic highways to include: landforms; the dominant physical characteristics of the natural corridor, such as gently rolling hills or rugged cliffs; streams; geologic formations and distant ridges; vegetation; distinctive vegetation within view, such as row crops, orchards, chaparral, or woodlands; structures (buildings may be included in scenic corridors and may add to scenic quality); and panoramas (scenic overlooks with panoramic views of urban, rural, or natural areas should be included when present).

Local Regulations

Sonoma County General Plan

The *Sonoma County General Plan 2020* (PRMD 2008) includes Land Use, Agricultural Resources, and Open Space and Resource Conservation elements that identify goals, objectives and policies for preserving aesthetic resources. Please refer to Section 3.1.5, “General Plans and Consistency” below for a detailed discussion of goals, policies, and objectives related to aesthetic resources.

3.1.4 Environmental Impacts and Mitigation Measures

This section describes the impact analysis relating to aesthetic resources for the proposed project. It describes the methods used to determine the impacts of the project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany each impact discussion, where applicable.

Significance Criteria

Based on Appendix G of the CEQA Guidelines, project implementation would have significant impacts and environmental consequences on aesthetic resources if it would result in any of the following:

1. Have an adverse effect on a scenic vista;
2. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
3. Substantially degrade the existing visual character or quality of the site and its surroundings; or
4. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

Approach to Analysis

This EIR includes project-level analysis for the Dry Creek Project, Miles 2-3 and program-level analysis for the Dry Creek Project, Miles 4–6. For program-level impact assessment, general visual quality impacts were identified by reviewing the visual impacts associated with the construction, operation, and maintenance of habitat enhancements and assuming that similar visual impacts could be expected with new habitat enhancements. For project-level impact assessment, viewshed analysis was used to analyze specific visual quality impacts of habitat enhancements that were identified as resulting in a less than significant impact. Viewshed analysis involved determining where a proposed enhancement would be visible from, while assessing what the project area would look like after project construction.

The locations of proposed program-level components have not yet been identified however, due to the general uniformity of the riparian zone in Dry Creek and the similarity in types of enhancements proposed for Miles 2–3 and 4–6, the potential impacts are combined for project-level and program-level analysis.

Project implementation includes construction, operation, and maintenance of the proposed project. Activities associated with construction and maintenance were often evaluated together. The majority of the ground disturbance would take place during the construction phase of the proposed project and it is anticipated that maintenance activities would primarily consist of vegetation management. However, there is a possibility that maintenance activities would also include activities similar to construction, such as repair to damaged structures or adjustments to structures if they are not functioning properly. Therefore, maintenance activities are considered alongside construction activities in terms of their potential for impact in much of the analysis below.

Impacts and Mitigation Measures

The following section presents a detailed discussion of potential impacts associated within aesthetic resources resulting from the Dry Creek Project. Both program-level and project-level project components are analyzed. Impacts are summarized and categorized as either “less than significant,” “less than significant with mitigation,” or “significant and unavoidable.” Impacts are also identified as applicable to construction, operation, and/or maintenance phases of the project.

Impact 3.1.1: Construction and maintenance of the Dry Creek Project could have a substantial adverse effect on a scenic vista. (Less than Significant)

Combined Analysis for Miles 2–3 and Miles 4–6

As described in Section 3.1.2, “Environmental Setting,” the project area is characterized in *Sonoma County General Plan 2020* as a scenic landscape unit, and contains the following scenic corridors: Dry Creek Road, Stewart Point-Skaggs Springs Road, Dutcher Creek Road, Canyon Road, Westside Road, and Highway 101. Potentially affected scenic vistas include views from Dry Creek Road, West Dry Creek Road, Westside Road Bridge, and Yoakim Bridge Road, and from wineries or other visitor-serving areas adjacent to the riparian corridor. As stated in **Chapter 3.12 Recreation**, project activities may also be visible from at least two wineries, Truett-Hurst Winery and Martorana Family Winery, which have visitor-serving areas adjacent to Dry Creek. At these locations, many visitors come to these wineries for views of the creek. There are few other opportunities for the public to view the creek because the majority of the land adjacent to the riparian corridor is under private ownership. There are approximately 36 sites adjacent to the active channel on private land that appear to be used recreationally by landowners from which construction activity of the proposed project could potentially be visible.

Construction and heavy-duty maintenance activities could be visible from scenic corridors in the valley. While much of the construction and maintenance-related activity, such as the operation of heavy-duty equipment and hauling of materials, would be confined to the active high flow area of Dry Creek or areas directly adjacent to the creek, staging of construction equipment and materials could take place in fields or access roads adjacent to project sites and heavy-duty vehicles would use roadways in the valley to transport equipment and materials (see **Chapter 3.13, Transportation and Traffic**).

As discussed in Section 3.1.2, “Environmental Setting”, factors that affect the level of potential visual impacts include proximity, extent and duration.

Proximity refers to the distance to the object or scene in question. The construction and maintenance activities visible from the main area roadways, including Dry Creek Road,

West Dry Creek Road, and Westside Road, would largely be visible from a considerable distance and would, therefore, be considered “background” in the landscape of those driving through the area. The distance of Dry Creek itself from Dry Creek Road ranges from approximately 1,000 to 3,000 feet in the project area. West Dry Creek Road is generally distant from Dry Creek (up to 2,000 feet away) except in approximately ten locations where the road approaches Dry Creek and comes within 200 to 300 feet of the creek. Westside Road crosses Dry Creek at the Westside Road Bridge and heads southward paralleling Dry Creek at a distance of approximately 2,000 to 3,500 feet until the confluence with the Russian River. Area bridges would bring motorists and cyclists up to and over Dry Creek. Therefore, motorists and cyclists would be far from construction areas except in locations where West Dry Creek Road bends toward Dry Creek and at Yoakim Bridge Road and Westside Road Bridge.⁴ While visibility of construction and maintenance activities would be limited from project area roadways, these activities would be most visible from residences or wineries directly adjacent to habitat enhancement sites. Most properties that would be adjacent to habitat enhancement sites are actively participating in the proposed project because landowners and business owners have volunteered to take part. Non-participating adjacent properties would typically be shielded from most views of construction activities by the often dense and tall riparian vegetation that provides a visual barrier between properties and from one side of the creek to the other.

Extent refers to the number of people that view the scene or object in question. As listed in Table 3.13-3 in **Chapter 3.13, Traffic and Transportation**, weekday daily traffic counts on Dry Creek Road range from 1,320⁵ vehicle trips at the northern end of the project area to 5,315 vehicle trips at the southern end of the project area. West Dry Creek Road may experience 287 vehicle trips at the northern end of the project area and 749 vehicle trips at Lambert Bridge Road.⁶

Duration of exposure to views of construction and maintenance activities would vary depending on whether the viewer is visiting the valley temporarily or lives in the valley. Most visitors to the area spend up to a day at Lake Sonoma and Warm Springs Dam or at wineries in the Dry Creek Valley and depart that same day; it may be assumed that most visitors would experience a short duration of exposure but the number of visitor exposures would be fairly high. Residents spend significantly more time in the valley; thus it may be assumed that residents, although fewer in number than visitors, would experience a higher duration of exposure.

⁴ Lambert Bridge Road is excluded from this impact analysis because that portion of Dry Creek was included in the Demonstration Project (Mile1), which was completed in 2014.

⁵ Vehicle trips represent total vehicle trips, a sum of north-bound and south-bound traffic numbers included in Table 3.13-3 in Chapter 3.13, Traffic and Transportation.

⁶ No data was available for West Dry Creek Road at the southern end of the project area.

As discussed in Section 3.1.2, “Environmental Setting,” another factor affecting potential visual impacts is the movement of the viewer. Many of the visitors and residents who would pass by a construction site would be driving at approximately the speeds posted throughout the project area which range from 25 miles per hour (mph) to 50 mph ; cyclists would be traveling at significantly slower speeds. Driving or cycling along a roadway reduces the amount of time an observer is exposed to a scene and also reduces a driver’s ability to focus on aspects other than what is ahead on the roadway (FHWA 2015). Therefore, driving and cycling along a roadway reduces the viewers’ sensitivity to visible construction and maintenance activities.

Additionally, farming operations involving heavy machinery and large trucks are a common site in the Dry Creek Valley. Therefore, from afar, construction and maintenance activities would not appear to be particularly unique in the Dry Creek Valley.

This impact would be less than significant for most viewers for the following reasons: 1) construction and maintenance activities would only be visible from a distance for most viewers; 2) the majority of viewers would be driving and cycling past habitat enhancement sites; 3) most landowners who would be close in proximity and have a view of these activities have volunteered to participate; and 4) construction and maintenance activities would be temporary and periodic, respectively. For these reasons, this impact would be less than significant.

Impact Significance: Less than Significant.

Impact 3.1.2: Operation of the Dry Creek Project could have a substantial adverse effect on a scenic vista. (Less than Significant with Mitigation)

Combined Analysis for Miles 2–3 and Miles 4–6

Immediately following construction, project sites would include temporarily exposed soils, logs, rocks, and other natural materials that could be visible to residents living directly adjacent to project sites or visitors to wineries located directly adjacent to project sites. As stated in **Mitigation Measure 3.3.1a** from **Chapter 3.3, Biological Resources** and **Mitigation Measure 3.6.3** from **Chapter 3.6 Geology, Soils, and Mineral Resources**, all areas with exposed soil would be replanted with native vegetation after construction or major maintenance activities are completed. Revegetation would help constructed features blend in with the surrounding natural features. Therefore, after vegetation has established at habitat enhancement sites, operation of these sites would not be visually distinct from other portions of Dry Creek. Additionally, high winter flows will deposit natural material from upstream into the various project sites, further blending constructed features with existing creek features. Therefore, this potential impact would

be less-than-significant with the implementation of **Mitigation Measure 3.3.1a** from **Chapter 3.3, Biological Resources** and **Mitigation Measure 3.6.3** from **Chapter 3.6 Geology, Soils, and Mineral Resources** regarding revegetation. This potential impact would be further reduced with implementation of **Mitigation Measure 3.1.2** below which would encourage landowner participation during the design of the proposed project to address concerns regarding aesthetics.

Mitigation Measure 3.1.2: The Sonoma County Water Agency will present participating landowners with design drawings as they become available and will work closely with participating landowners to address concerns regarding aesthetic resources wherever feasible.

Impact Significance: Less than Significant with Mitigation.

Impact 3.1.3: Construction, operation and/or maintenance activities of the Dry Creek Project could have an adverse impact on scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway. (Less than Significant with Mitigation)

Combined Analysis for Miles 2–3 and Miles 4–6

As described in Section 3.1.2, “Environmental Setting”, the Dry Creek Valley is characterized in *Sonoma County General Plan 2020* as a scenic landscape unit, and contains the following scenic corridors: Dry Creek Road, Stewart Point-Skaggs Springs Road, Dutcher Creek Road, Canyon Road, Westside Road, and Highway 101. However, there are no Caltrans-designated scenic highways in the area. Potentially affected scenic vistas include views from Dry Creek Road, West Dry Creek Road, Westside Road Bridge, and Yoakim Bridge.

Construction and Maintenance

Construction activities would involve tree removal in order to prepare the site for excavation and grading. However, large trees would be preserved wherever possible and exposed areas would be revegetated with native trees, shrubs, grasses, and forbs as described in **Mitigation Measure 3.3.1a** from **Chapter 3.3, Biological Resources**, **Mitigation Measure 3.6.3** from **Chapter 3.6 Geology, Soils, and Mineral Resources**, and **Mitigation Measure 3.1.1b** described above.. Operation of the proposed project would not result in the loss of trees. Most maintenance activities would not involve tree removal; however, some maintenance activities, such as vegetation management or emergency repairs, could include tree removal with the overall goal of maintaining a structurally diverse riparian corridor for wildlife habitat.

Rock outcroppings are areas where bedrock or other superficial deposits are exposed. Construction activities and some maintenance activities could disturb rock outcroppings, especially within the bed of Dry Creek, which could potentially be visible

from bridges in the project area. Rock outcroppings have been observed at bridge crossings along Dry Creek.

While several historic buildings are located in the Dry Creek Valley, as described in Chapter 3.4, **Cultural Resources**, no historic buildings are located in areas proposed for habitat enhancement features. Therefore, the proposed project would not have an adverse impact on historic buildings.

Operation

It is anticipated that immediately following construction, project sites would include temporarily-exposed soils, logs, rocks, and other natural materials and potentially visible from scenic corridors in Dry Creek Valley. The disturbed areas, however, would be located largely within the bed and banks of Dry Creek or directly adjacent to the creek and would consist of natural materials consistent with materials found in the surrounding landscape. Because all proposed project plans that disturb existing vegetation include revegetation with native species as described in **Mitigation Measure 3.3.1a** from Chapter 3.3, **Biological Resources** and **Mitigation Measure 3.6.3** from Chapter 3.6 **Geology, Soils, and Mineral Resources**, constructed features and disturbed areas would blend in with the surrounding natural areas once vegetation is established. Additionally, high winter flows will deposit natural material from upstream into the various project sites, further blending constructed features with existing creek features. As stated above, under **Mitigation Measure 3.1.2** described above, participating landowners would actively participate in project design which would provide a process for addressing any landowner concerns regarding aesthetics of the project. Therefore, operation of the Dry Creek Project would not have an adverse impact on scenic resources.

Implementation of **Mitigation Measure 3.3.1a** from Chapter 3.3, **Biological Resources** and **Mitigation Measure 3.6.3** from Chapter 3.6 **Geology, Soils, and Mineral Resources** regarding revegetation as well as **Mitigation Measure 3.1.2** described above would ensure that potential impacts to scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings, would be reduced to less-than-significant.

Impact Significance: Less than Significant with Mitigation.

Impact 3.1.4: Construction, operation, and/or maintenance activities of the Dry Creek Project could have an adverse impact on the existing visual character or quality of the site and its surrounds. (Less than Significant with Mitigation)

Combined Analysis for Miles 2–3 and Miles 4–6

As discussed in 3.1.2, “Environmental Setting,” visual character is the unique combination of landscape features that combine to make a view, including native

landforms, water, and vegetation patterns, as well as built features such as buildings, roads, and other structures. Dry Creek Valley is highly valued for its visual character, including the valley floor dominated by wine grapes and winery facilities and the surrounding forested hillsides. Dry Creek itself is not visible from most of the valley, with the exception of bridge crossings and a few private access points, however the tall trees of the riparian corridor are visible from much of the valley and surrounding hillsides.

Construction and major maintenance activities would include the use of heavy equipment and could be visible from roadways in the project area, including Dry Creek Road, West Dry Creek Road, Yoakim Bridge and Westside Road Bridge as well as adjacent properties. As stated in **Section 3.12, Recreation**, project activities may also be visible from at least two wineries, Truett-Hurst Winery and Martorana Family Winery, which have visitor serving areas adjacent to Dry Creek. Private landowners located adjacent to habitat enhancement sites may also be able to see construction and maintenance activities. As discussed under Impact 3.1.1 above, most views of these activities would take place at a distance while viewers are traveling on project area roadways, therefore the level of exposure would be low for most people. Private landowners directly adjacent to the creek, on the other hand, would be the closest in proximity and would experience the longest exposure to construction and major maintenance activities. However, the majority of these landowners would be voluntarily participating and neighboring landowners not participating typically would have mature riparian vegetation serving as a visual barrier to these activities. Therefore, impacts to visual character during construction and maintenance of the Dry Creek Project would be less than significant.

Immediately following construction, project sites would include temporarily exposed soils, logs, rocks, and other natural materials that could be visible to from project area bridges, residents living directly adjacent to project sites, or visitors to wineries located directly adjacent to project sites. As stated in **Mitigation Measure 3.3.1a** from **Chapter 3.3, Biological Resources** and **Mitigation Measure 3.6.3** from **Chapter 3.6 Geology, Soils, and Mineral Resources**, all areas with exposed soil would be replanted with native vegetation after construction or major maintenance activities are completed. Revegetation would help constructed features blend in with the surrounding natural features. Therefore, after vegetation has established at habitat enhancement sites, operation of these sites would not be visually distinct from other portions of Dry Creek. Additionally, high winter flows will deposit natural material from upstream into the various project sites, further blending constructed features with existing creek features. Implementation of **Mitigation Measures 3.1.2** described above would further reduce this impact by minimizing vegetation removal and encouraging landowner participation during project design. Therefore, impacts to visual character during operation of the Dry Creek Project would be less than significant with implementation of **Mitigation Measure**

3.3.1a from **Chapter 3.3, Biological Resources** and **Mitigation Measure 3.6.3** from **Chapter 3.6 Geology, Soils, and Mineral Resources** regarding revegetation as well as **Mitigation Measure 3.1.2** described above.

Impact Significance: Less than Significant with Mitigation.

Impact 3.1.5: Construction, operation and maintenance activities of the Dry Creek Project could create a new source of light or glare which could adversely affect day or nighttime views in the area. (No Impact)

Combined Analysis for Miles 2–3 and Miles 4–6

No lighting is expected to be required during the construction, operation or maintenance phases of the project and therefore the proposed project would not create new sources of light or permanent glare.

Impact Significance: No Impact.

3.1.5 General Plan and Consistency

Sonoma County General Plan 2020

Open Space and Resource Conservation Element

The Open Space and Resource Conservation Element (2008) provides goals and policies for the conservation of natural resources including water, forests, soils, rivers, harbors, fisheries, wildlife, minerals, and other natural resources. It supports the county's economic base by promoting the production and the use of the county's resources. It guides land use decisions that contribute to the long term maintenance of resource production.

GOAL OSRC-2: *Retain the largely open, scenic character of important Scenic Landscape Units.*

Objective OSRC-2.1: *Retain a rural, scenic character in Scenic Landscape Units with very low intensities of development. Avoid their inclusion within spheres of influence for public service providers.*

Objective OSRC-2.2: *Protect the ridges and crests of prominent hills in Scenic Landscape Units from the silhouetting of structures against the skyline.*

Objective OSRC-2.3: *Protect hills and ridges in Scenic Landscape Units from cuts and fills.*

Policy OSRC-2a: *Avoid amendments to increase residential density in Scenic Landscape Units in excess of one unit per ten acres. The land use plan may designate a lower density or larger minimum lot size.*

Policy OSRC-2b: *Avoid commercial or industrial uses in Scenic Landscape Units other than those which are permitted by the agricultural or resource land use categories.*

Policy OSRC-2c: *Apply the Scenic Resources combining district consistent with this element to all lands located within Scenic Landscape Units.*

Policy OSRC-2d: *Unless there are existing design guidelines that have been adopted for the affected area, require that new structures within Scenic Landscape Units meet the following criteria:*

- (1) Site and design structures to take maximum advantage of existing topography and vegetation in order to substantially screen them from view from designated public roads.*
- (2) Minimize cuts and fills on hills and ridges.*
- (3) Minimize the removal of trees and other mature vegetation; avoid removal of specimen trees, tree groupings, and windbreaks.*
- (4) Where existing topography and vegetation would not screen structures from view from designated public roads, install landscaping consisting of native vegetation in natural groupings that fits with the character of the area in order to substantially screen structures from view. Screening with native, fire retardant plants may be required.*
- (5) Design structures to use building materials and color schemes that blend with the natural landscape and vegetation.*
- (6) On hills and ridges, avoid structures that project above the silhouette of the hill or ridge against the sky as viewed from public roads; and substantially screen driveways from view where practical.*
- (7) To the extent feasible, cluster structures on each parcel within existing built areas and near existing natural features such as tree groupings.*
- (8) Exempt agricultural accessory structures from this policy if their use does not require a use permit in the Development Code. If*

compliance with these standards would make a parcel unbuildable, site structures where minimum visual impacts would result.

- (9) Exempt telecommunication facilities if they meet the siting and design criteria of the Scenic Resources (SR) Zoning District.*

Policy OSRC-2h: *For development on parcels located both within Scenic Landscape Units and adjacent to Scenic Corridors, apply the more restrictive siting and setback policies to preserve visual quality.*

GOAL OSRC-3: *Identify and preserve roadside landscapes which have a high visual quality as they contribute to the living environment of local residents and to the county's tourism economy.*

Objective OSRC-3.2: *Provide guidelines so future land uses, development and roadway construction are compatible with the preservation of scenic values along designated scenic highway corridors.*

Policy OSRC-3a: *Apply the Scenic Resources combining district to those portions of properties within scenic corridor setbacks.*

Policy OSRC-3b: *For development on parcels located both within Scenic Landscape Units and adjacent to scenic corridors, apply the more restrictive siting and setback policies to preserve visual quality.*

Policy OSRC-3c: *Establish a rural scenic corridor setback of 30 percent of the depth of the lot to a maximum of 200 feet from the centerline of the road unless a different setback is provided in the planning area policies of the Land Use Element. Prohibit development within the setback with the following exceptions:*

- (1) Maintenance, restoration, reconstruction, or minor expansion of existing structures.*
- (2) Telecommunication facilities that meet the applicable criteria established in the Development Codes.*
- (3) Other new structures if they are subject to design review and

 - 1. They are associated with existing structures,*
 - 2. there is no other reasonable location for the structure,*
 - 3. the location within the setback is necessary for the use, or*
 - 4. existing vegetation and topography screen the use.**
- (4) Compliance with the setback would render the parcel unbuildable.*

Policy OSRC-3e: *In conjunction with Section 2.5 Policy for Urban Design, incorporate design criteria for Scenic Corridors in urban areas.*

Policy OSRC-3h: *Design public works projects to minimize tree damage and removal along scenic corridors. Where trees must be removed, design replanting programs so as to accommodate ultimate planned highway improvements. Require revegetation following grading and road cuts.*

GOAL OSRC-4: *Preserve and maintain views of the night time skies and visual character of urban, rural and natural areas, while allowing for night-time lighting levels appropriate to the use and location.*

Objective OSRC-4.1: *Maintain night-time lighting levels at the minimum necessary to provide for security and safety of the use and users to preserve night time skies and the night time character of urban, rural and natural areas.*

Objective OSRC-4.2: *Ensure that night-time lighting levels for new development are designed to minimize light spillage offsite or upward into the sky.*

The following policies shall be used to achieve these objectives:

Policy OSRC-4a: *Require that all new development projects, County projects, and signage utilize light fixtures which shield the light source so that light is cast downward and which are no more than the minimum height and power necessary to adequately light the proposed use.*

Policy OSRC-4b: *Prohibit continuous all night exterior lighting in rural areas, unless it is demonstrated to the decision-making body that such lighting is necessary for security or operational purposes.*

Policy OSRC-4c: *Discourage light levels which are in excess of industry and state standards.*

GOAL OSRC-5: *Retain and enhance the unique character of each of the County's Unincorporated Communities, while accommodating projected growth and housing needs.*

Objective OSRC-5.1: *Develop Urban Design Guidelines on a community by community basis to achieve the following: compatibility with and*

connections to surrounding development; community interaction and pedestrian activity; attractive public views; safe and comfortable infrastructure and streetscape improvements for bikes and pedestrians; increased public safety.

Objective OSRC-5.2: *Establish community character as a primary criterion for review of projects in Urban Service Areas.*

Policy OSRC-5a: *Develop Urban Design Guidelines appropriate for each Urban Service Area in unincorporated Sonoma County that reflect the character of the community.*

Policy OSRC-5b: *Use the following general urban design principles until Urban Design Guidelines specific to each Urban Service Area are adopted.*

- (1) Promotion of pedestrian use.*
- (2) Compatibility with adjacent development.*
- (3) Incorporation of important historical and natural resources.*
- (4) Complementary parking out of view of the streetscape.*
- (5) Opportunities for social interaction with other community members.*
- (6) Promotion of visible access to buildings and use areas.*
- (7) Appropriate lighting levels.*

GOAL OSRC-6: *Preserve the unique rural and natural character of Sonoma County for residents, businesses, visitors and future generations.*

Objective OSRC-6.1: *Develop Rural Character Design Guidelines to achieve the following: Preservation of existing site features contributing to rural character, siting of buildings and development features to blend in with the surrounding landscape, and allowance for non-urban design features in rural areas.*

Objective OSRC-6.2: *Establish Rural Character as a primary criterion for review of discretionary projects, but not including administrative design review for single family homes on existing lots, outside of Urban Service Areas.*

The following policies shall be used to achieve these objectives:

Policy OSRC-6a: *Develop design guidelines for discretionary projects in rural areas, but not including administrative design review for single family homes on existing lots, that protect and*

reflect the rural character of Sonoma County. Use the following general design principles until these Design Guidelines are adopted, while assuring that Design Guidelines for agricultural support facilities on agricultural lands are consistent with Policy AR-9h of the Agricultural Resources Element.

- (1) New structures blend into the surrounding landscape, rather than stand out.*
- (2) Landscaping is included and is designed to blend in with the character of the area.*
- (3) Paved areas are minimized and allow for informal parking areas.*
- (4) Adequate space is provided for natural site amenities.*
- (5) Exterior lighting and signage is minimized.*

Consistency

The proposed project is consistent with policies related to aesthetic resources in *Sonoma County General Plan 2020*. For example, the project works to protect and enhance resources in a Scenic Landscape Unit. On the other hand, construction of proposed habitat enhancements along Dry Creek requires the removal of riparian vegetation at project sites, which seems to conflict with Policy OSRC-2d(3) listed above. However, those areas cleared of vegetation will be replanted with native trees, shrubs, grasses, and forbs with the intention of improving the long-term health, habitat value, and aesthetics of the riparian forest. It is anticipated that temporary impacts to aesthetic resources would be less-than-significant with implementation of **Mitigation Measure 3.3.1a** from **Chapter 3.3, Biological Resources** and **Mitigation Measure 3.6.3** from **Chapter 3.6 Geology, Soils, and Mineral Resources** regarding revegetation as well as **Mitigation Measures 3.1-1a and 1b** described above and, therefore, no conflicts with goals, objectives, and policies of *Sonoma County General Plan 2020* relating to aesthetic resources would result from the proposed project.

3.1.6 References

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- [PRMD] Sonoma County Permit and Resource Management Department, 2008 *Sonoma County General Plan 2020*, Open Space and Resource Conservation Element, adopted September 23, 2008, amended September 10, 2013. Accessed August 14, 2014.
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Chapter 3.2 Air Quality, Greenhouse Gas Emissions, Energy, and Sustainability

3.2.1 Introduction

This chapter describes the existing conditions relating to air quality, greenhouse gas emissions and climate change, energy, and sustainability within the Dry Creek Habitat Enhancement Project, Miles 2-6 (Dry Creek Project or proposed project) area. Section 3.6.2, “Environmental Setting” describes the regional and project area environmental setting. Section 3.6.3, “Regulatory Framework” details the federal, state, and local laws related to air quality, greenhouse gas emissions and climate change, energy, and sustainability. Potential impacts to these resources resulting from the proposed project are analyzed in Section 3.6.4, “Impacts and Mitigation Measures” in accordance with the California Environmental Quality Act (CEQA) significance criteria (CEQA Guidelines, Appendix G) and mitigation measures are proposed that could reduce, eliminate, or avoid such impacts.

Other impacts related to air quality and greenhouse gas emissions include those associated with traffic and vehicle-use discussed in **Chapter 3.13, Traffic and Transportation**.

3.2.2 Environmental Setting

Air Quality

The primary factors that determine air quality impacts are the locations of air pollutant sources and the amounts of pollutants emitted. Other important factors, which are discussed below, include regional geography, existing air quality, attainment status, climate and meteorology, and sensitive receptors.

Regional Geography

For the purposes of air quality, the Dry Creek Project area includes Dry Creek and its associated riparian corridor as well as the Dry Creek Valley from Warm Springs Dam to the confluence with the Russian River. This location is within the North Coast Air Basin (NCAB), which encompasses Del Norte, Humboldt, Trinity, and Mendocino counties as well as the northern portion of Sonoma County. The NCAB is comprised of three air districts, the North Coast Unified Air Quality Management District (NCUAQMD), the

Mendocino County Air Quality Management District, and the Northern Sonoma County Air Pollution Control District (Northern Sonoma County APCD) (NCUAQMD 2015). The Dry Creek Project Area is under the jurisdiction of the Northern Sonoma County APCD, which comprises the northern portion of Sonoma County, the portion of the county that falls within the NCAB. **Figure 3.2-1** below shows the boundaries of the districts and air basins within Sonoma County.

Air Pollution Potential

Air quality is affected by the location, quantity, source, and the duration of pollutant emissions, and by meteorological conditions that influence movement and dispersal of pollutants. The degree of air pollution is dependent on the ability of the atmosphere to disperse the contaminated air. Atmospheric conditions, such as wind speed and direction, and topographic and climatologic factors also greatly determine the amount of pollution that concentrates in an area.

Wind circulation, inversion, air stability, solar radiation, and topography all play a role in air pollution by reducing the amount of pollutants dispersed by and allowed to concentrate in the atmosphere. Higher wind speeds allow for more circulation and greater dispersion of pollutants, while lower wind speeds result in more stable air and allow for greater concentrations of pollutants. Inversions tend to cap the mixing of air to each layer and increase air stability, consequently limiting the amount of air circulation. The more stable the air, the slower the mixing, resulting in an increased probability for air pollutants to build up and exceed ambient air quality standards. The stability of the atmosphere is highly dependent upon the vertical distribution of temperature with height. Solar radiation increases the potential for higher ozone (O₃) levels. In the presence of ultraviolet sunlight and warm temperatures, reactive organic gases and nitrogen oxides (NO_x) react to form secondary photochemical pollutants, including ozone. Surrounding topography, such as mountains, hills and valleys, affects wind patterns and wind speeds that play a role in the dispersal and concentration of air pollutants (BAAQMD 2014).

The proposed project is located along Dry Creek, surrounded on three sides by hills up to 1,229 feet in elevation. Despite being located approximately 18 miles from the coast, the valley is still climatically influenced by the ocean much of the time. Wind speeds in the region are lowest in winter and increase slightly during the summer months, ranging from a mean wind speed of approximately one mile per hour (mph) in January to approximately four mph in August. Natural ventilation is most effective at or above five miles per hour, therefore, while natural ventilation in the area is most effective during

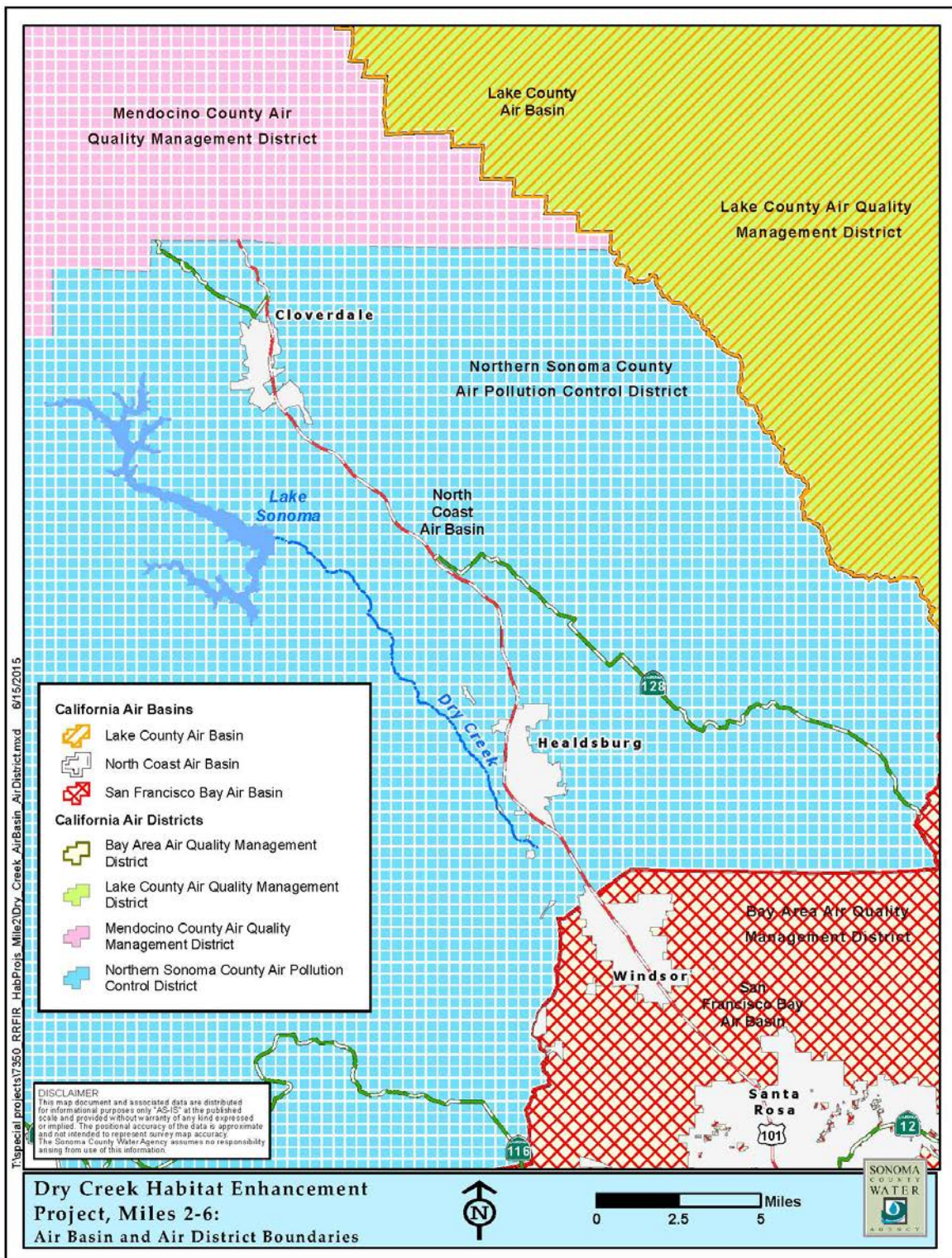


Figure 3.2-1. Air Basins and Air Districts in the Dry Creek Project Area. summer months, it may not always be enough to completely ventilate the area (Pacific Energy Center 2014).

Sources of Air Pollution

Sources of air pollution in Sonoma County fall into three categories: stationary, mobile, and biogenics.¹

Stationary Sources

A stationary source of air pollution consists of a single emission source with an identified emission point, such as a stack at a facility. Facilities may have several emission point sources located on-site and may be referred to overall as a stationary source. Stationary sources typically include industrial facilities such as refineries or quarries.

Stationary sources not identified individually are called area sources. Area sources include numerous smaller point sources that individually do not emit significant amounts of pollutants, such as gas stations or dry cleaners, but cumulatively affect air quality. Other examples include the use of paints, varnishes, consumer products, and residential heating (BAAQMD 2014). Major area sources in Sonoma County include solvent evaporation and combustion of fuels. Area sources are often a source of toxic air contaminants (TACs). Dry cleaners and gasoline stations are a major source of TACs in Sonoma County but are mostly located outside of the boundaries of the Northern Sonoma County APCD in the cities of Santa Rosa, Petaluma, Rohnert Park, Sebastopol, Sonoma, and Windsor (PRMD 2008).

Mobile Sources

Mobile sources of air pollutants consist of on-road motor vehicles and other mobile sources. On-road motor vehicles include cars, trucks, buses, and motorcycles. Motor vehicles are the single largest source of ozone precursor² emissions in Sonoma County. Other mobile sources include boats, ships, trains, aircraft, garden, farm and construction equipment (PRMD 2008).

Biogenic Sources

Biogenic sources are natural sources of air pollutants such as plants and trees. The California Air Resources Board (ARB) estimates emissions of biogenic volatile organic compounds (BVOCs) from vegetation in natural areas, crops, and urban vegetation. A better understanding of biogenic sources of emissions will allow ARB to better differentiate them from anthropogenic sources (ARB 2013).

¹ Biogenic emissions come from natural sources such as plants and trees.

² Ozone precursors are pollutants that react in the presence of sunlight to form ozone.

Types of Pollutants

Criteria Air Pollutants

Criteria air pollutants include ozone (O₃), particulate matter (PM₁₀ and PM_{2.5}), carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and lead. The ARB and the U.S. Environmental Protection Agency (EPA) focus on these criteria air pollutants as indicators of ambient air quality because they are the most prevalent air pollutants known to be harmful to human health. Standards have been set for these pollutants to protect public health and welfare. Criteria air pollutants are described in more detail below.

Ozone

Ozone, also called smog, is not emitted directly into the environment, but is formed in the atmosphere by complex chemical reactions between reactive organic gases (ROG) and NO_x in the presence of sunlight. Warm, windless, sunny days result in the highest ozone levels. The main sources of NO_x and ROG, also referred to as ozone precursors, are combustion processes such as motor vehicle engines. Other sources include evaporation of solvents, paints, and fuels, and biogenic sources. Ozone levels usually build up during the day and peak during the afternoon. Short-term exposure can irritate the eyes and cause constriction of the airways causing shortness of breath and aggravating existing respiratory diseases such as asthma, bronchitis, and emphysema. Chronic exposure to high levels can permanently damage lung tissue. Ozone can also damage plants and trees, and even materials such as rubber and fabrics (BAAQMD 2014).

Particulate Matter

Particulate matter (PM₁₀ and PM_{2.5})³ refers to a wide range of solid or liquid particles in the atmosphere that come from a variety of stationary, mobile, and natural sources. Power production, cement manufacturing, combustion, fireplaces, diesel trucks, and forest fires are all sources of particulate emissions. Particulate matter includes dust, smoke, aerosols, and metallic oxides. Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM₁₀. A subgroup of PM₁₀ with an aerodynamic diameter of 2.5 micrometers or less is referred to as PM_{2.5}. Some particulate matter, such as pollen, occurs naturally.

Extended exposure to particulate matter can increase the risk of chronic respiratory disease. Respirable particulate matter (PM₁₀ and PM_{2.5}) is of particular concern because it bypasses the body's natural filtration system more easily than larger particles and can lodge deep in the lungs. Additionally, PM_{2.5} can contain substances that are particularly harmful to human health. Motor vehicles, wood burning in fireplaces and stoves are

³ Particulate Matter: 10 microns or less diameter (PM₁₀), and 2.5 microns (one-millionth of a meter) or less diameter (PM_{2.5}).

generally major sources of particulates. People with heart or lung diseases, children and older adults are the most likely to be affected by particle pollution exposure (BAAQMD 2014).

However, construction and demolition, mineral excavation and processing, agricultural activities, paved road dust, unpaved road dust, residential wood burning, and electric utilities released the majority of particulate matter detected in the Northern Sonoma County APCD in 2012 (ARB: Almanac Emission Projection Data 2013).

Carbon Monoxide

Carbon monoxide (CO) comes from motor vehicles as well as the burning of wood for fuel and heat in residential homes. State and federal controls on new motor vehicles and voluntary efforts to reduce wood burning have been implemented to prevent CO from reaching adverse levels.

Carbon monoxide is an odorless, invisible gas that affects the health of people exposed to high concentrations. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for babies, children, pregnant women, and people with cardiovascular diseases, chronic lung disease or anemia. Even healthy people exposed to high CO concentrations can experience headaches, dizziness, fatigue, unconsciousness, and even death (BAAQMD 2013).

Oxides of Nitrogen

Nitrogen oxides produce O₃ during photochemical reactions in the atmosphere. Nitric oxide (NO) and nitrogen dioxide (NO₂) are the primary compounds produced. Nitrogen oxides (NO_x) can produce a brown haze that is visible in the atmosphere. These compounds can increase the risk of acute and chronic respiratory disease (BAAQMD 2013).

Lead

Lead is a metal found both naturally in the environment and in manufactured products. Mobile and industrial sources have historically been the major sources of lead emissions but mobile source emissions have been greatly reduced as a result of the phase-out of leaded gasoline. Currently, metal processing is the primary source of lead emissions but recycling facilities are another source. Lead exposure affects the nervous system, kidney function, immune system, reproductive and developmental systems as well as the cardiovascular system (BAAQMD 2014).

Toxic Air Contaminants

TACs are a defined set of airborne pollutants that may pose a present or potential hazard to human health. A wide range of sources, from industrial plants to motor vehicles, emit TACs. The health effects associated with TACs are diverse and generally are assessed locally, rather than regionally. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis, genetic damage; or short-term acute effects such as eye watering, respiratory irritation (a cough), running nose, throat pain, and headaches (BAAQMD 2014).

Sensitive Receptors

For the purpose of air quality and public health and safety, sensitive receptors are commonly defined as land uses where sensitive receptor population groups (i.e., children, the elderly, and the acutely and chronically ill) are likely located. These sensitive receptor population groups would be most susceptible to disturbance from dust and air pollutant concentrations, or other disruptions associated with proposed project construction, operation, and maintenance activities. Sensitive receptor land uses include day care centers, libraries, schools, hospitals, medical centers, residential care centers, residences, retirement and convalescent homes, as well as recreational areas such as parks and churches (PRMD 2008). Residential areas are considered sensitive to poor air quality because people usually stay home for extensive durations resulting in greater exposure to ambient air quality. Recreational uses are also considered sensitive because the greater exposure to ambient air quality conditions and associated vigorous exercise places a high demand on the human respiratory system.

The closest residences average approximately 170 to 675 feet (ft) east and west of Dry Creek. The closest recreational area is located at Warm Springs Dam and Lake Sonoma, at the northern end of the project area.

Existing Air Quality

California's ambient air monitoring network includes over 250 sites where air pollution levels are monitored. There are generally more monitoring sites in areas with reduced air quality and greater population. Ambient concentration data are collected for a wide variety of pollutants, including ozone, PM_{2.5}, PM₁₀, and several toxic compounds. Each monitoring site, however, only monitors for pollutants that are elevated in that area (ARB: Annual Monitoring Network Report 2014). **Table 3.1-1** shows Sonoma County average daily emissions. Emissions for both southern and northern Sonoma County are included for comparison purposes. Emissions in southern Sonoma County are higher for most pollutants due to a higher amount of urbanization, with the exception of ammonia (NH₃) emissions, which are linked to agricultural practices such as fertilizer application and animal husbandry. The project area is located within northern Sonoma County and the North Coast Air Basin.

Table 3.2-1. Sonoma County 2012 Average Daily Emissions (tons/day, annual average)

	VOC	NOx	SOx	PM _{2.5}	PM ₁₀	DPM	NH ₃
Sonoma County, North Coast Air Basin	7	4	0	1	4	0	8
Sonoma County, San Francisco Bay Area Air Basin	18	16	0	4	10	0	4

Source: ARB Almanac 2013 – Appendix B: County Level Emissions and Air Quality by Air Basin

The Northern Sonoma County APCD operates a network of monitoring stations which monitor ambient concentrations of ozone and PM₁₀. Those reporting data for PM₁₀ in 2013 include: Cloverdale (100 S. Washington Street), approximately six miles from the northern extent of the project area; Guerneville (Church and 1st Streets), nearly ten miles from the southern extent of the project area; and Healdsburg (133 Matheson Street), less than one mile from Dry Creek at the Westside Road Bridge. The station at the Healdsburg Municipal Airport, located less than one mile from the project area, reported ozone concentrations in 2013 (ARB: Annual Monitoring Network Report 2014). Existing levels of ozone and PM₁₀ in the project area can generally be inferred from ambient air quality measurements conducted by Northern Sonoma County APCD at its two closest stations, located at 133 Matheson Street and at the Healdsburg Municipal Airport. **Table 3.2-2** shows existing levels of ozone and PM₁₀ from 2012 to 2014 in the project area and compared measured levels to state and national standards. The data are compared with the California Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS). As indicated in the table, there has been one exceedance of a state standards between 2012 and 2014; the highest 24 hour average for PM₁₀ exceeded state standards during one day in 2013.

Table 3.2-2. Existing Ambient Air Quality Summary (2012-2014) for the Dry Creek Project area

Pollutant	Standard	2012	2013	2014
Ozone (ppm)				
Highest 1 Hour Average		0.073	0.069	0.070
Days over 1 Hour State Standard	0.090	0	0	0
Highest 8 Hour Average		0.063	0.063	0.064
Days over 8 Hour National Standard	0.075	0	0	0
Days over 8 Hour State Standard	0.070	0	0	0
Particulate Matter (PM₁₀) (micrograms/m³)				
Highest 24 Hour Average		38.0	55.0	45.6

Days over State Standard	50	0	1	0
Days over National Standard	150	0	0	0
Annual Average		*	*	14.4
Exceed State Standard?	20	No	Yes	No
*insufficient data Source: (California Air Resources Board 2014)				

Attainment Status

The Sonoma County portion of the NCAB is considered in attainment⁴ or unclassified for all of the State and federal standards (NCUAQMD 2015). Under the California Clean Air Act (CCAA), areas not in compliance with a State or federal standard must prepare an air pollution reduction plan. Since the northern Sonoma County portion of the NCAB is in attainment status for all criteria pollutants, it is not required to have an air pollution reduction plan.

Climate Change, Greenhouse Gas Emissions, Energy, and Sustainability

Some gases in the atmosphere affect the Earth’s heat balance by absorbing infrared radiation. These gases can prevent the escape of heat in much the same way as glass in a greenhouse. This is often referred to as the “greenhouse effect,” and it is responsible for maintaining a habitable climate. On Earth, the gases believed to be most responsible for climate change are water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (SF₆). Enhancement of the greenhouse effect can occur when concentrations of these gases exceed the natural concentrations in the atmosphere. Of these greenhouse gases (GHG), CO₂ and CH₄ are emitted in the greatest quantities from human activities.⁵ Emissions of CO₂ are largely by-products of fossil fuel combustion for energy and transportation, whereas CH₄ primarily results from off-gassing associated with agricultural practices and landfills (Cubasch, et al. 2013). Agricultural soil management is the largest contributor to N₂O emissions (EPA 2015c). SF₆ is a GHG commonly used in the utility industry as an insulating gas in transformers and other electronic equipment. SF₆, while comprising a small fraction of the total GHGs emitted annually world-wide, is a very potent GHG with 23,900 times the climate change potential as

⁴ A region is considered an “attainment area” or “in attainment” if it meets or exceeds an air quality standard. An area is considered a “nonattainment area” or “in nonattainment” if it doesn’t meet an air quality standard. An area may be in attainment for some criteria pollutants and in nonattainment for others simultaneously.

⁵ In the U.S., 2013 GHG emissions consisted of 82 percent CO₂, 10 percent CH₄, 5 percent N₂O, and 3 percent other (EPA 2015c).

CO₂.⁶ There is widespread international scientific agreement that human-caused increases in GHGs has and will continue to contribute to climate change, although there is much uncertainty concerning the magnitude and rate of the warming (Cubasch, et al. 2013).

Globally, climate change has the potential to impact numerous environmental resources through potential, though uncertain, impacts related to future air temperatures and precipitation patterns. The projected effects of climate change on weather and climate are likely to vary regionally, but according to a report published by the Intergovernmental Panel on Climate Change (IPCC), primary effects are expected to include the following:

1. Higher maximum temperatures and more hot days over nearly all land areas;
2. Higher minimum temperatures, fewer cold days and frost days over nearly all land areas;
3. Reduced diurnal temperature range over most land areas;
4. Increase of heat index over land areas; and
5. More intense precipitation events.

In addition, there are several secondary effects that are projected to result from climate change, including global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity. While the possible outcomes and the feedback mechanisms involved are not fully understood, and much research remains to be done, the potential for substantial environmental, social, and economic consequences over the long term are likely very high (Cubasch, et al. 2013).

Climate Change in California

Some of the potential resulting effects in California of climate change may include sea level rise and increased storm surge; coastal inundation; failure of levees and other infrastructure; prolonged heat and drought; severe storms, flooding, and landslides; increased heat emergencies; more frequent and intense wildfires; lower water quality; and infectious disease outbreaks (California Natural Resources Agency 2014).

Local Climate Change Projections

The Water Agency partnered with USGS to study the influence of climate change on the hydrology of the Russian River and, in particular, to develop downscaled climate futures for the Russian River and Sonoma County. Results of this study predict warmer temperatures overall; longer, drier summers; increased variability (and reduced reliability) in rainfall, which could indicate either an increase or a decrease in total

⁶ Climate change potential is the potential of a gas or aerosol to trap heat in the atmosphere. CO₂ is assigned a climate change potential of 1.

rainfall; increased soil moisture deficit; and reduced groundwater recharge (US Geological Survey 2012).

A local consortium, the North Bay Climate Adaption Initiative (NBCAI), has incorporated the results of this USGS study to develop projections for Sonoma County climate and hydrology given a set of four potential scenarios:

1. high GHG emissions with more precipitation;
2. high GHG emissions with less precipitation;
3. mitigated GHG emissions with more precipitation; and
4. mitigated GHG emissions with less precipitation.

According to *Climate Ready Sonoma County: Climate Hazards and Vulnerabilities* (2015), in all four scenarios, Sonoma County will likely experience, among other hazards:

1. More extreme heat events
 - Longer and more frequent droughts
 - Greater frequency and intensity of wildfires
 - Fewer winter nights that freeze
2. More variable rain
 - Bigger, more variable floods
3. Sea level rise
 - Higher sea level and storm surge

Sonoma County GHG Emissions Inventory

According to the *Sonoma County Greenhouse Gas Report for 2011* total GHG emissions for Sonoma County peaked in 2008 and declined steadily from 2009 to 2011. In 2011, Sonoma County emission estimates totaled 4,200,000 tons CO₂ equivalents (CO₂e). This reduction in GHG emissions was driven, in part, by the availability of cleaner electricity sources (Hancock and Dolginow 2012).

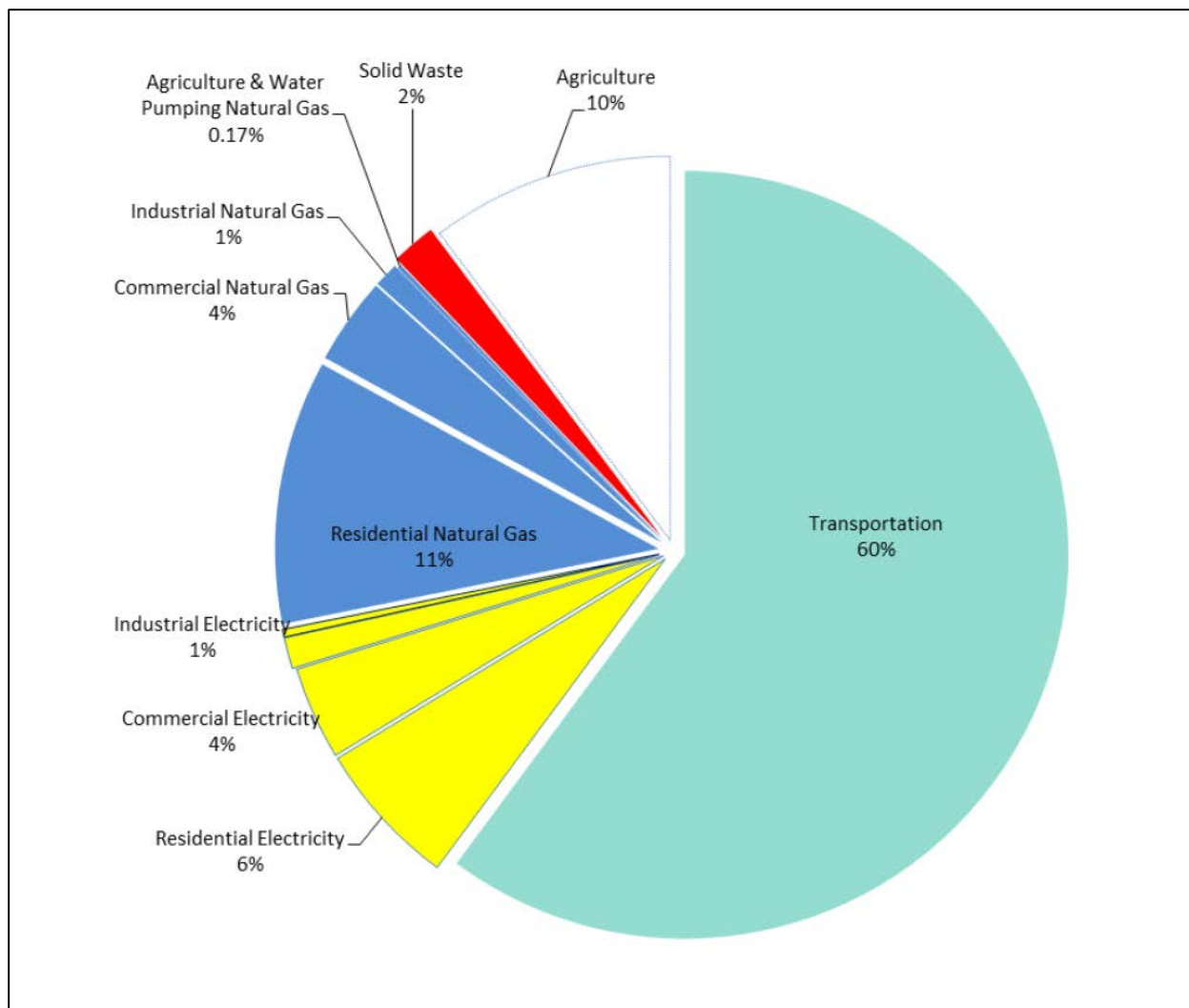


Figure 3.2-1. Sonoma County GHG Emissions by Sector (Source: Sonoma County Greenhouse Gas Report for 2011).

Sonoma County Efforts to Curb GHG Emissions

Sonoma County has worked toward reducing GHG emissions for several years. The timeline below lists the major milestones for efforts by local city and county jurisdictions to reduce GHG emissions (Erikson and Hancock 2010).

- **2002.** All nine cities, the County, and the Water Agency pledged to reduce GHG emissions.
- **2003.** All nine cities and the County completed GHG inventories for internal municipal operations.
- **2005.** The mayors of all nine cities signed the U.S. Mayors Climate Protection Agreement.

- 2005. The nine cities and County set targets to reduce GHG emissions to 25 percent below 1990 levels by 2015.
- 2006. The Water Agency begins efforts to achieve “carbon-free” water by 2015.
- 2008. The Climate Protection Campaign partnered with Sonoma County governments, businesses, and community leaders to issue a *Community Climate Action Plan*.
- 2009. All nine cities, the County, and the Water Agency partnered to create the Sonoma County Energy Independence Program. Additionally, all nine cities and the County began participating in the Sonoma County Regional Climate Protection Authority (RCPA).
- 2012. The City of Santa Rosa adopted its own Climate Action Plan.
- 2013. The RCPA, in partnership with all ten jurisdictions, began holding public outreach workshops in preparation for *Climate Action 2020*, an updated climate action plan for Sonoma County.
- 2015. The RCPA releases *Climate Hazards and Vulnerabilities Report* in support of *Climate Action 2020*.
- 2015. The Water Agency achieves “carbon-free” water.

Center for Climate Protection

The Center for Climate Protection, founded in 2001 as a local non-profit organization advocating for efforts to reduce climate change, worked with cities and the County to commit to GHG emissions reductions, complete emission inventories, and set numeric targets for those reductions. The County and all nine cities within the county adopted a target of 25 percent below 1990 levels by 2015. The Center for Climate Protection also created the *Community Climate Action Plan* in 2008, which served as a blueprint for achieving those reductions. Since 2008, the Center for Climate Protection has partnered with many organizations and government entities to further efforts such as the creation of Sonoma Clean Power, *Climate Action 2020*, energy retrofit programs, Windsor Pays, and other programs (Center for Climate Protection 2015).

Sonoma County Transportation Authority / Regional Climate Protection Authority

The Sonoma County Transportation Authority (SCTA) was formed in 1990 as a result of the passing of legislation to coordinate and advocate for transportation funding for Sonoma County. Recognizing transportation’s link to climate change, the Regional Climate Protection Authority (RCPA) was formed in 2009 through legislation to coordinate countywide climate protection efforts among Sonoma County’s nine cities as well as multiple county agencies. The RCPA helps secure grant funding for a variety of GHG reduction efforts, including energy efficiency, building retrofits, and alternative energy program. The SCTA/RCPA acts as the countywide planning and programming agency for transportation and coordinates many climate protection activities countywide

(Sonoma County Transportation Authority / Regional Climate Protection Authority no date).

North Bay Climate Adaptation Initiative

The North Bay Climate Adaptation Initiative (NBCAI) is a coalition of natural resource managers, policy makers, and scientists working to create solutions to climate adaptation challenges for Sonoma County ecosystems and watersheds. NBCAI is providing scientific support for *Climate Action 2020*.

Sonoma County Water Agency

As the water provider to more than 600,000 residents in Sonoma and Marin counties, operator of wastewater treatment facilities, and manager of flood protection in many areas throughout Sonoma County, the Water Agency is one of the largest electricity users in Sonoma County. In response to its large carbon footprint, in 2006, the Water Agency began working to achieve a carbon-neutral electricity supply by the year 2015.

Sonoma County Water Agency Sustainability and Energy Programs

Energy Policy and “Carbon-free Water” Campaign

The Board of Directors adopted the Water Agency’s Energy Policy in March 2011, which sets the guidelines for the Water Agency’s energy-related projects and innovations and lays the groundwork for a comprehensive program of water-use efficiency, system efficiency, and development and purchase of renewable energy sources.

Energy use can be decreased by reducing demand for water. By increasing water conservation, the Water Agency can pump less water and use less energy. Ongoing water conservation initiatives have helped reduce water deliveries throughout the region by approximately 20.7% since 2006 (Sonoma County Water Agency 2015). Water conservation initiatives include public awareness campaigns, programs targeting conversion to low water-use landscaping, and rebates and direct install programs for low water-use fixtures.

The Water Agency also continues efforts to reduce energy use throughout the water system through the implementation of efficiency upgrades. Energy efficiency measures include replacing old electric motors and fine-tuning system operations. Additionally the Operations and Maintenance Building and Services Center were retrofitted with highly efficient heating, ventilation and air conditioning (HVAC) supplied by ground-source and pond-loop heat pump systems which reduce HVAC energy use by 50 percent.

In addition to reducing energy use through conservation and efficiency, the Water Agency pursued expansion of its energy production facilities. In 2006, the Water Agency initiated the installation of a 500kW photovoltaic system at its administrative building.

The following year, another 500kW photovoltaic system was installed at the Airport Treatment Plant and a 930 kW system was installed at the Sonoma Valley Treatment Plant. In 2009, the Water Agency began using electricity generated by the existing hydroelectric facilities at Warm Springs Dam rather than selling it to Pacific Gas and Electric (PG&E) (Sonoma County Water Agency 2015). Two years later, the Water Agency contracted to use all of the electricity produced by the 2005 Landfill Gas Power Plant, approximately 3 MW (Sonoma County Waste Management District n.d.). The Water Agency is actively planning additional photovoltaic systems, including up to 12.5 MW of floating solar on recycled water storage ponds. The majority of the power produced by this network of floating solar will be purchased by Sonoma Clean Power, reducing emissions for the region as a whole (Sonoma County Water Agency 2015).

Additionally, in 2015, the Water Agency contracted to procure 100 percent of its electricity needs through renewable and carbon-free resources such as hydroelectric and landfill gas from the Power and Water Resources Pooling Authority (PWRPA), geothermal from Sonoma Clean Power (SCP) and its own solar photovoltaic sources, achieving a carbon neutral energy supply to power its water supply system. **Figure 3.2-2** illustrates energy sources for Water Agency operations.

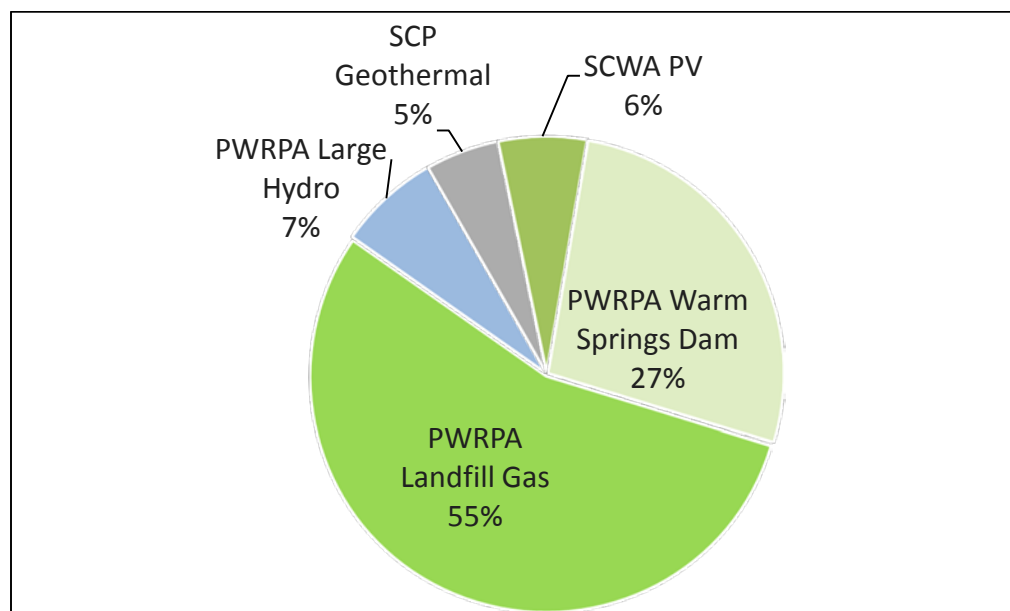


Figure 3.2-2. Sonoma County Water Agency Electric Energy Sources, 2015 (Source: SCWA, 2015)

Sonoma Clean Power

In 2011, the Water Agency Board of Directors directed the Water Agency to investigate forming a community power program in response to Sonoma County’s desire for lower

rates and cleaner power. In 2012, a Joint Powers Authority was approved by the Board, and Sonoma Clean Power (SCP) was launched. SCP is the new, locally controlled electricity provider in Sonoma County that provides the option of using power generated by renewable sources at competitive rates. SCP offers an “EverGreen” electricity purchase program which allows customers to choose 100% renewable energy from local geothermal sources.

Electric Vehicles Fleet

The Water Agency is part of a Bay Area coalition receiving funding for fleet electric vehicles and charging infrastructure through the Local Government Electric Vehicle Fleet Demonstration Project, a Metropolitan Transportation Commission grant project. Currently, the Water Agency has nearly 30 hybrid, plug-in hybrid and electric vehicles, which comprise almost 20 percent of the Water Agency's fleet.

Legislative Efforts

The Water Agency actively advocates and works with other cities and counties across the country to generate state and federal support for renewable energy, energy efficiency and sustainable resource management programs.

Applied Solutions

The Water Agency is a founding member of Applied Solutions, a non-profit organization that provides a shared forum for local governments to advance local and regional energy independence, economic stability, job creation and resilient infrastructure systems. The group includes over 170 local government affiliates (Sonoma County Water Agency 2015).

Water Agency 2013 GHG Emissions Inventory

The Water Agency reported GHG emissions to the California Climate Action Registry for the years 2006-2009 and to the Climate Registry (TCR)⁷ from 2010 to the present. The most recently published Greenhouse Gas Inventory Report to date for the Water Agency is for the Calendar Year 2013. The Water Agency's Greenhouse Gas Inventory Report for Calendar Year 2014 is expected to be published in October 2015.

The Water Agency's 2013 inventory includes emissions from administrative facilities such as office buildings; water supply facilities such as the Wohler-Mirabel diversions and booster pumps; wastewater facilities and pump stations; and mobile sources such as passenger vehicles and construction equipment. Direct emissions include stationary combustion; mobile combustion; process emissions, such as N₂O produced by

⁷ The Climate Registry is a nonprofit collaboration among North American states, provinces, territories and Native Sovereign Nations that sets consistent and transparent standards to calculate, verify, and publicly report GHG emissions to a single registry. The Water Agency follows the Registry's General Reporting Protocol v. 1.1, created in May 2008 and updated in July 15, 2011.

wastewater; and fugitive emissions, such as those from building and vehicle air conditioning systems. Indirect emissions are those resulting from purchased electricity.

Approximately 95 percent of Water Agency purchased electricity comes from the Joint Powers Authority (JPA) Power and Water Resource Pooling Authority (PWRPA) and the remainder of electricity used by the Water Agency is purchased from PG&E and SCP. PWRPA delivers most of its power from hydroelectric sources (zero emission factor) and also provides the Water Agency with renewable power from the local Landfill Gas to Energy facility. In 2013, the Water Agency purchased 43,107,549 kWh from PWRPA and 2,284,634 kWh from PG&E. The Water Agency's GHG emissions totaled 3,236.8 tons of CO₂ equivalents (tCO₂e) for the 2013 calendar year.

In 2012, the Water Agency achieved the Climate Registry's Platinum Status, the highest achievement level recognized, for the adoption of a carbon reduction plan, achieving greater than 20 percent reduction in emissions, and demonstrating implementation of five or more best practices for climate protection (Sonoma County Water Agency June 2014).

3.2.3 Regulatory Framework

Federal

Federal Clean Air Act

Air pollution control and planning began in 1963 with the passage of the Federal Clean Air Act (CAA), which has been amended six times, most recently in 1990. The CAA is a comprehensive federal law that regulates air emissions from area, stationary, and mobile sources and authorizes the United States Environmental Protection Agency (USEPA) to carry out programs that reduce ambient (outdoor) air pollutant concentrations, reduce emissions of toxic pollutants, and phase out production and use of chemicals that destroy stratospheric ozone. The USEPA sets ambient air pollutant limits through its National Ambient Air Quality Standards (NAAQS) for the six criteria pollutants previously described: ozone, CO, NO₂, SO₂, PM₁₀, PM_{2.5}, and lead. **Table 3.2-2** below summarizes the federal and state ambient air quality standards.

To protect human health and the environment, the USEPA has set "primary" and "secondary" maximum ambient thresholds for all criteria pollutants. Primary thresholds are set to protect human health, particularly sensitive receptors such as children, the elderly, and individuals suffering from chronic lung conditions such as asthma and emphysema. Secondary standards are set to protect the natural environment and prevent deterioration of animals, crops, vegetation, and buildings.

If an area does not meet the NAAQS over a period of three years, the USEPA designates it as a “nonattainment” area for each pollutant that exceeds the standards. The USEPA requires that a state with nonattainment areas prepare and submit an air quality plan, referred to as a State Implementation Plan (SIP), showing how the State

Table 3.2-2. Ambient Air Quality Standards for Criteria Pollutants

Pollutant	Averaging Time	State Standard	National Standard
Carbon Monoxide (CO)	1-hour	20 ppm	35 ppm (primary ⁸)
	8-hour	9.0 ppm	9 ppm (primary)
Lead	Monthly	1.5 µg/m ³	-
	Rolling 3-month average	-	0.15 µg/m ³ (primary and secondary ⁹)
Nitrogen Dioxide (NO ₂)	1-hour	0.18 ppm	0.100 ppm (primary)
	Annual	0.030 ppm	0.053 ppm (primary and secondary)
Ozone	1-hour	0.090 ppm	-
	8-hour	0.070 ppm	0.075 ppm (primary and secondary)
Particulate Matter, Respirable (PM ₁₀)	24-hour	50 µg/m ³	150 µg/m ³ (primary and secondary)
	Annual*	20 µg/m ³	-
Particulate Matter, Fine (PM _{2.5})	24-hour	-	35 µg/m ³ (primary and secondary)
	Annual	12 µg/m ³	12.0 µg/m ³ (primary) 15.0 µg/m ³ (secondary)
Sulfur Dioxide (SO ₂)	1-hour	0.25 ppm	0.075 ppm (primary)
	3-hour	-	0.5 ppm (secondary)
	24 hour	0.04 ppm	
	Annual	-	
Sources: CARB California Ambient Air Quality Standards, updated 2008. Available online at http://www.arb.ca.gov/research/aaqs/caaqs/caaqs.htm USEPA National Ambient Air Quality Standards, updated October 21, 2014. Available online at http://www.epa.gov/air/criteria.html			

would comply. These plans must include pollution control measures that demonstrate how the standards would be met. If a state cannot demonstrate how the standards would be met immediately, then it must show progress toward meeting the standards. In severe cases, the EPA may impose a federal plan to show progress in meeting the NAAQS (U.S. Environmental Protection Agency 2015a).

⁸ Primary standards are set to protect public health, including protecting the health of “sensitive” populations such as asthmatics.

⁹ Secondary standards are set to protect public welfare, including protecting against decreased visibility and damage to animals, crops, vegetation, and buildings.

Energy Policy and Conservation Act

The Energy Policy and Conservation Act (Energy Policy Act) was established in 1975 in response to the oil crisis of 1973, during which a shortage of oil reserves led to increased oil prices. The Energy Policy Act required that all vehicles sold in the U.S. meet certain fuel economy standards. The corporate average fuel economy (CAFÉ) standard for new passenger cars was 27.5 miles per gallon (mpg) from 1990 to 2010 and the CAFÉ standard for new light trucks (with a gross vehicle weight of 8,500 pounds or less) grew slowly from 20.0 to 23.5 mpg, respectively, and recent legislation continues to raise these standards for each future model year. Heavy-duty vehicles (with a gross vehicle weight of over 8,500 pounds) are not subject to CAFÉ standards. The Energy Policy Act does not apply directly to the proposed project but applies to vehicle fuel efficiencies of some of the vehicles to be used during construction.

The Energy Policy Act of 2005

The Energy Policy Act of 2005, amended in 2009, addresses various types of energy production, including energy efficiency, renewable energy, oil and gas, coal, Tribal energy, nuclear matters and security, vehicles and motor fuels, including ethanol and biofuels, hydrogen, electricity, energy tax incentives, hydropower and geothermal energy, and climate change technology. One provision of the Act increases the amount of biofuel that must be mixed with gasoline sold in the United States (U.S. Environmental Protection Agency 2015b).

State

California Clean Air Act and California Air Resources Board

In 1988, the State of California legislature passed the CCAA, which established California's air quality goals, planning mechanisms, regulatory strategies, and standards of progress. The CCAA provides the State with a comprehensive framework for air quality planning regulation and sets State air quality standards. The California Ambient Air Quality Standards (CAAQS) incorporate additional standards for most of the criteria pollutants and for other pollutants recognized by the State. In general, the State standards are more stringent than the federal standards. California has also established standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles.

The ARB is responsible for establishing and reviewing the State standards, compiling the California SIP and securing approval of the plan from the USEPA, conducting research and planning, and identifying toxic air contaminants. The ARB also oversees the activities of air quality management districts, which are organized at the county or regional level. Like the USEPA, the ARB regulates emissions from mobile sources and consumer products, however local air districts regulate stationary emission sources. While stationary sources are regulated through individual permits, mobile sources of air

pollutants are regulated through vehicle emissions standards, fuel specifications, and vehicle inspection and maintenance programs.

The ARB requires regions that do not meet the CAAQS to submit clean air plans that describe methods to attain the standard. If an area does not meet the CAAQS, the ARB designates the area as a nonattainment area. Areas that have met the state standards are considered to be attainment areas. An area that is close to attaining the standard would be given a nonattainment/transitional designation (ARB: Standards and Designations ...2015).

Assembly Bill 32 – California Climate Change Solutions Act

In 2005, Executive Order S-3-05 was established, which set forth a series of target dates (listed below) by which statewide emissions of GHG would be progressively reduced:

1. By 2010, reduce emissions to 2000 levels;
2. By 2020, reduce GHG emissions to 1990 levels; and
3. By 2050, reduce GHG emissions to 80 percent below 1990 levels.

In 2006, California passed the California Climate change Solutions Act of 2006 (Assembly Bill [AB] No. 32; California Health and Safety Code Division 25.5, Sections 38500, et seq., or AB 32), which requires ARB to design and implement emission limits, regulations, and other measures, such that statewide GHG emissions are reduced to 1990 levels by 2020 (representing an approximate 30 percent reduction in emissions from “business as usual”).

In June 2007, ARB directed staff to pursue 37 early actions for reducing GHG emissions under AB 32. The broad spectrum of strategies to be developed includes a Low Carbon Fuel Standard, regulations for refrigerants with high climate change potentials, guidance and protocols for local governments to facilitate GHG reductions, and green ports (ARB: Recommended Measures to Reduce GHG ...2007).

The CARB staff evaluated all the recommendations submitted on the GHG reduction strategies and published the Expanded List of Early Action Measures To Reduce Greenhouse Gas Emissions In California (CARB: Recommended Measures to Reduce GHG...2007). Based on its additional analysis, CARB staff recommended the expansion of the early action list to a total of 44 measures. Nine of the strategies meet the AB 32 definition of discrete early action measures. Discrete early action measures are measures that became enforceable by January 1, 2010. The discrete early action items include: low carbon fuel standards for ethanol, biodiesel, hydrogen, electricity, compressed natural gas, liquefied petroleum gas and biogas; restrictions on high climate change potential refrigerants; landfill methane capture, smartway truck

efficiency; port electrification; reduction of perfluorocarbons from the semiconductor industry; reduction of propellants in consumer products; a tire inflation program; and SF6 reductions from non-electricity sector.

The 2020 target reductions are currently estimated to be 174 million metric tons of CO2e. In total, the 44 recommended early actions have the potential to reduce GHG emissions by at least 42 million metric tons of CO2e emissions by 2020, representing about 25 percent of the estimated reductions needed by 2020. ARB staff has developed 1990 and 2020 GHG emission inventories in order to refine the projected reductions needed by 2020. The 44 measures are presented in **Table 3.10-3** and are in the sectors of fuels, transportation, forestry, agriculture, education, energy efficiency, commercial, solid waste, cement, oil and gas, electricity, and fire suppression (ARB: Recommended Measures to Reduce GHG ...2007).

Table 3.2-3 Recommended AB32 Greenhouse Gas Measures to be Initiated by ARB by 2012

ID#	Sector	Strategy Name	ID#	Sector	Strategy Name
1	Fuels	Above Ground Storage Tanks	23	Commercial	SF6 reductions from the non-electric sector
2	Transportation	Diesel – Off-road equipment (non-agricultural)	24	Transportation	Tire inflation program
3	Forestry	Forestry protocol endorsement	25	Transportation	Cool automobile paints
4	Transportation	Diesel – Port trucks	26	Cement	Cement (A): Blended cements
5	Transportation	Diesel – Vessel main engine fuel specifications	27	Cement	Cement (B): Energy efficiency of California cement facilities
6	Transportation	Diesel – Commercial harbor craft	28	Transportation	Ban on HFC release from Motor Vehicle AC service/ dismantling
7	Transportation	Green ports	29	Transportation	Diesel – off-road equipment (agricultural)
8	Agriculture	Manure management (methane digester protocol)	30	Transportation	Add AC leak tightness test and repair to Smog Check

ID#	Sector	Strategy Name	ID#	Sector	Strategy Name
9	Education	Local gov. Greenhouse Gas (GHG) reduction guidance / protocols	31	Agriculture	Research on GHG reductions from nitrogen land applications
10	Education	Business GHG reduction guidance/protocols	32	Commercial	Specifications for commercial refrigeration
11	Energy Efficiency	Cool communities program	33	Oil and Gas	Reduction in venting/ leaks from oil and gas systems
12	Commercial	Reduce high Climate change Potential (GWP) GHGs in products	34	Transportation	Requirement of low-GWP GHGs for new Motor Vehicle ACs
13	Commercial	Reduction of perfluorocarbons (PFCs) from semiconductor industry	35	Transportation	Hybridization of medium and heavy-duty diesel vehicles
14	Transportation	SmartWay truck efficiency	36	Electricity	Reduction of SF6 in electricity generation
15	Transportation	Low Carbon Fuel Standard (LCFS)	37	Commercial	High GWP refrigerant tracking, reporting and recovery program
16	Transportation	Reduction of HFC-134a from DIY Motor Vehicle AC servicing	38	Commercial	Foam recovery/ destruction program
17	Waste	Improved landfill gas capture	39	Fire Suppression	Alternative suppressants in fire protection systems
18	Fuels	Gasoline dispenser hose replacement	40	Transportation	Strengthen light-duty vehicle standards
19	Fuels	Portable outboard marine tanks	41	Transportation	Truck stop electrification with incentives for truckers
20	Transportation	Standards for off-cycle driving conditions	42	Transportation	Diesel – Privately owned on-road trucks
21	Transportation	Diesel – Vessel speed reductions	43	Transportation	Transportation refrigeration – electric standby
22	Transportation	Anti-idling enforcement	44	Agriculture	Electrification of stationary agricultural engines

State Office of Planning and Research

Senate Bill (SB) 97 acknowledges that local agencies must analyze the environmental impact of GHG under CEQA. Furthermore, the bill requires the State Office of Planning and Research (OPR) to develop CEQA guidelines for analyzing and mitigating GHG emissions. To comply with requirements set forth in SB 97, OPR published a technical advisory titled *CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review*. This advisory acknowledges the need for a threshold for GHG emissions and notes that OPR has asked ARB to recommend a method for setting thresholds to encourage consistency and uniformity in GHG analyses in CEQA documents throughout the State (Governor's Office of Planning and Research 2008).

In response to OPR's request, ARB has recommended that industrial projects that meet interim ARB performance standards for construction and transportation emissions, and emit no more than 7,000 metric tons of CO_{2e} per year from non-transportation related GHG sources, should be presumed to have a less than significant impact related to climate change. Non-transportation sources include combustion related components/equipment, process losses, purchased electricity, and water usage and wastewater discharge (ARB: Standards and Designations ...2015).

2014 Integrated Energy Policy Report Update

Senate Bill 1389 (Bowen, Chapter 568, Statutes of 2002) requires the California Energy Commission (CEC) to prepare a biennial report discussing California's electricity, natural gas, and transportation fuel sectors. The report also provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the state's economy; and protect public health and safety (Public Resources Code 25301a). The report highlights vehicle use as a major contributor to air pollution, such as NO_x, and climate change and discusses the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP), created by Assembly Bill 118 (Nunez, Chapter 750, Statutes of 2007) and recently extended to 2024 with the passage of Assembly Bill 8 (Perea, Chapter 401, Statutes of 2013). The ARFVTP authorizes the CEC to develop and deploy alternative and renewable fuels and advanced technologies for transportation to help meet California's climate change goals. This program includes programs to support improved heavy-duty vehicle technologies, that could reduce emissions related to construction and other similar activities (California Energy Commission: Energy Policy ...2014).

Local

North Coast Air Basin

The North Coast Air Basin (NCAB) includes three air districts: North Coast Unified Air Quality Management District (North Coast AQMD), Mendocino County Air Quality Management District (Mendocino County AQMD), and the Northern Sonoma County Air Pollution Control District (Northern Sonoma County APCD). The North Coast AQMD includes Del Norte, Humboldt, and Trinity counties. The Mendocino County AQMD includes Mendocino County. The Northern Sonoma County APCD includes northern Sonoma County.

The air quality rules and regulations applicable to the NCAB are set forth to achieve and maintain such levels of air quality as will protect human health and safety; prevent injury to plant and animal life; avoid damage to property; and preserve the comfort, convenience and enjoyment of the natural attractions of the North Coast Air Basin. It is the intent of all air districts in the NCAB to adopt and enforce rules and regulations which assure that reasonable provision is made to achieve and maintain State and

federal ambient air quality standards for the area under their jurisdiction and to enforce all applicable provisions of State law (NCUAQMD 2015).

Northern Sonoma County Air Pollution Control District

The Northern Sonoma County APCD was established by the State of California legislature in 1972 to prevent the emission of air pollution from stationary sources that may be detrimental to the health, safety, and welfare of the people in the Northern Sonoma County APCD. Rules and regulations are enacted by the Board of Directors for this District, the members of the Sonoma County Board of Supervisors, and enforced by the District. The Northern Sonoma County APCD regulates air quality within the portion of northern Sonoma County that falls within the NCAB (Northern Sonoma County Air Pollution Control District no date).

Sonoma County Community Climate Plan

The Sonoma County Community Climate Plan was prepared to identify potential solutions to help the nine cities in Sonoma County achieve greenhouse gas reduction goals. The plan established greenhouse gas reduction targets and goals for major sectors including commercial, residential, transportation, and land use planning (Climate Protection Campaign, 2008). An updated plan, *Climate Action 2020*, is in progress but not yet complete.

Sonoma County

Local policies established in the Sonoma County General Plan 2020 that govern air resources in the Project Area are summarized in Section 3.2.5, “General Plans and Consistency” below.

3.2.4 Environmental Impacts and Mitigation Measures

Approach to Analysis

This EIR includes project-level analysis for the Dry Creek Project, Miles 2-3 and program-level analysis for the Dry Creek Project, Miles 4–6.

Impacts analysis considers construction, operation, and maintenance of the proposed project. The majority of the ground disturbance would take place during the construction phase of the proposed project and it is anticipated that maintenance activities would primarily consist of vegetation management. However, there is a possibility that maintenance activities would also include activities similar to construction, such as repair to damaged structures or adjustments to structures if they are not functioning properly. Therefore, maintenance activities are considered alongside construction

activities in terms of their potential for impact in the analysis below. Operation of the proposed project is excluded from analysis since operation would not involve any emission of pollutants or greenhouse gases and would not require the consumption of energy.

Air Quality

In addition to the above significance criteria, the Northern Sonoma County APCD has established quantitative thresholds for specific criteria air pollutant emissions by which to assess the significance of a project’s potential air quality impacts (Northern Sonoma County Air Pollution Control District June 4, 2015). Thresholds are described below in **Table 3.2-4**.

Table 3.3-4. Northern Sonoma County APCD Air Quality Significance Thresholds

Pollutant	Tons/Year
NOx	40
ROG	40
PM10	15
CO	100

To determine the criteria pollutant levels that would be associated with the Dry Creek Project, daily construction logs from the construction of the Demonstration Project (Mile 1) were used to derive equipment and vehicle types and activity-levels as well as vehicle trips for Water Agency staff, contractors, and sub-contractors. Emission factors were derived using ARB’s Offroad2007 model and ARB’s EMFAC2011¹⁰ web database. Once the emission factors were determined, they were used to calculate construction-related emissions for Miles 2-6. Equipment and vehicle types and activity-levels as well as vehicle trips for Water Agency staff, contractors, and sub-contractors were derived from detailed daily construction logs created during the construction of the Demonstration Project. According to ARB, the average age of California’s tractors, loaders, and backhoes is 10.9 years and the average age of excavators is 9.2 years; therefore, emission rates for construction equipment were chosen based upon the assumption that construction equipment used would be approximately 10 years old (California Air Resources Board 2010). These data were then compiled compared to the significance thresholds mentioned above.

GHG Emissions

The Northern Sonoma County APCD currently does not have adopted GHG thresholds of significance for CEQA review projects (Northern Sonoma County Air Pollution Control

¹⁰ While the EMFAC2014 web database was available at the time of preparation of the Draft EIR, arb staff recommended against using it for CEQA analysis until it is approved by the EPA during a webinar that took place on June 4, 2015.

District June 4, 2015). Therefore, to determine impacts associated with GHG emissions, the Northern Sonoma County APCD recommends use of the BAAQMD's approach to the determination of significance of GHG emissions based on the BAAQMD's 2010 Guidelines operational significance threshold of 1,100 metric tons CO_{2e} per year for projects that are not stationary sources (BAAQMD 2010). There are no adopted thresholds for construction emissions, however, and the Northern Sonoma County APCD recommends a case-by-case consideration of construction GHG emissions and encourages lead agencies to incorporate Best Management Practices (BMPs) to reduce GHG emissions during construction. This impact analysis estimates GHG emissions that would be emitted during project construction and then compares them to BAAQMD's 2010 Guidelines operational significance thresholds. Since there are no construction-related thresholds to apply, construction-related emissions are treated as operational emissions and averaged over a conservative 25-year lifetime of the project and then compared to BAAQMD's operational threshold of 1,100 metric tons CO_{2e} per year.

To determine GHG emissions, daily construction logs from the construction of the Demonstration Project (Mile 1) were used to derive equipment and vehicle types and activity-levels as well as vehicle trips for Water Agency staff, contractors, and sub-contractors. The Water Agency currently reports GHG emissions to the Climate Registry (TCR)¹¹ according to the Registry's General Reporting v.2.0 (Protocol), created in March 2013 and updated on June 30, 2014. The Protocol provides a method for ensuring the relevance, completeness, consistency, transparency, and accuracy of GHG emissions quantification. The Water Agency began using this Protocol for CEQA analysis after consulting with BAAQMD staff (Michael, pers. comm., 2012). The Water Agency also received approval from Northern Sonoma County APCD staff (DePrimo, pers. Comm., 2015) to use this approach. The Water Agency chose to use the Protocol for the purpose of evaluating the impacts of construction projects on global climate change because (1) the Protocol enables the user to calculate GHG emissions more accurately than other publicly-available GHG emissions calculators; (2) the Registry emissions reporting is third party audited and verified; and (3) use of the Registry Protocol will ensure consistency between calculations completed for the purpose of environmental impact analysis and data reported to the Registry. The 2014 Climate Registry Default Emission Factors (released April 2014) were used to calculate GHG CO_{2e} emissions (CO₂, CH₄ and N₂O).

¹¹ The Climate Registry is a nonprofit collaboration among North American states, provinces, territories and Native Sovereign Nations that sets consistent and transparent standards to calculate, verify, and publicly report GHG emissions to a single registry. The Water Agency follows the Registry's General Reporting Protocol v. 1.1, created in May 2008 and updated in July 15, 2011.

Significance Criteria

In accordance with Appendix G of the CEQA Guidelines, implementation of the Dry Creek Project would have significant impacts on air quality, GHG emissions, energy, or sustainability if it would:

1. Conflict with or obstruct implementation of the applicable air quality plan;
2. Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
3. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under a federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
4. Expose sensitive receptors to substantial pollutant concentrations;
5. Create objectionable odors affecting a substantial number of people;
6. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or
7. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Two of the criteria included in Appendix G of the CEQA Guidelines do not apply to this analysis and are not discussed further, as explained below.

Conflict with or obstruct implementation of the applicable air quality plan. There is no applicable air quality plan for the Dry Creek Project area and the area is in attainment of all State and federal standards. There would be no potential that the Dry Creek Project would obstruct implementation of an applicable air quality plan. Therefore, there would be no impact associated with these issues and these issues are not addressed further in this EIR.

Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under a federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors). The area is in attainment of all State and federal standards. There would be no potential that the Dry Creek Project would contribute to an existing air quality violation, or result in a cumulatively considerable net increase of a criteria pollutant that the area is in non-attainment of air quality standards. Therefore, there would be no impact associated with these issues and these issues are not addressed further in this EIR.

In accordance with Appendix F of the *CEQA Guidelines*, implementation of the Dry Creek Project would have significant impacts on Energy Conservation if it would:

1. Result in the significant consumption of energy;
2. Result in a significant impact on local and regional energy supplies or on requirements for additional capacity;
3. Result in a significant impact on peak and base period demands for electricity or other forms of energy;
4. Conflict with existing energy standards; or
5. Result in a significant impact on transportation energy use or use of efficient transportation alternatives.

However, these energy conservation impacts are not relevant to the Dry Creek Project for the following reasons: While construction and occasional maintenance of the Dry Creek Project would require the use of fuel, the quantity of fuel consumed would not be substantial enough to impact local or regional energy supplies, conflict with existing energy standards, or impact transportation-related energy. Additionally, on-road vehicles used in transporting workers, equipment, or materials would acquire fuel at various locations throughout the region rather than at one single location, thus easing any potential impacts to local fuel supplies. Fuel consumption is addressed indirectly in this analysis under impacts related to criteria pollutant emissions and GHG emissions. Operation of the proposed project would not require electricity nor will it affect existing energy resources, such as the existing hydroelectric facility at Warm Springs Dam. Therefore, there would be no impacts associated with this issue and is not addressed further in this EIR.

Impact Analysis

The following section presents a detailed discussion of potential impacts associated within air quality, greenhouse gas emissions, energy, and sustainability resulting from the Dry Creek Project. Both program-level and project-level project components are analyzed. Impacts are summarized and categorized as either “less than significant,” “less than significant with mitigation,” or “significant and unavoidable.”

Impact 3.2.1: Construction, operation, and/or maintenance of the Dry Creek Project could potentially violate an air quality standard or contribute substantially to an existing or projected air quality violation. (Less than Significant)

Construction of the Dry Creek Project would require the use of numerous passenger vehicles, trucks, and heavy duty construction equipment. Because construction activities required for Miles 2-6 are similar to those used for Mile 1, Mile 1 daily construction logs were used to create a detailed estimate of emissions for one mile of project construction. That data was used to estimate emissions for Miles 2-6 (**Appendix 9.5**). Due to deadlines associated with the Russian River Biological Opinion, construction of Miles 2-6 will take place at an accelerated pace compared to the rate of construction for Mile 1. For the purposes of environmental analysis, it was assumed that

construction of Miles 2-6 would occur at a rate of up to two miles per construction season. **Table 3.2-5** below lists the maximum annual emissions for criteria pollutants based on this accelerated rate and compares those emissions with thresholds set by the Northern Sonoma County APCD. No annual emissions would exceed those standards.

Table 3.2-5. Estimated Criteria Pollutant Emissions for Construction of Miles 2-6

	ROG (tons/yr)	CO (tons/yr)	NOx (tons/yr)	PM (tons/yr)
Maximum annual emissions, assuming 2 miles constructed per year	1.03	10.73	33.06	0.95
Northern Sonoma County APCD threshold	40	100	40	15
Significant Impact?	No	No	No	No

The Sonoma County portion of the NCAB is considered in attainment¹² or unclassified for all of the State and federal standards (NCUAQMD 2015). Under the CCAA, areas not in compliance with a State or federal standard must prepare an air pollution reduction plan. Since the northern Sonoma County portion of the NCAB is in attainment status for all criteria pollutants; it does not have an air pollution reduction plan. The proposed project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation. This impact would be less than significant.

Although this impact would be less than significant, the Dry Creek Project would implement **Mitigation Measures 3.2.1a and 3.2.1b** below to reduce it further:

Mitigation Measure 3.2.1a: The project specifications will require the contractor to comply with the dust control provisions of the Sonoma County Water Agency’s Standard Contract Documents and the Northern Sonoma County Air Pollution Control District’s Rule 430 that regulate fugitive dust emissions. Measures to reduce dust emissions may include, but are not limited to sprinkling unpaved construction areas with water; covering trucks hauling dirt; limiting dust generating activities during periods of high winds (greater than 15 miles per hour); replacing ground cover in disturbed areas as soon as possible; enclosing, covering, watering, or applying soil binders to exposed stock piles; removing earth tracked onto neighboring paved roads at least once daily; and limiting equipment speed to 10 miles per hour in unpaved areas.

¹² A region is considered an “attainment area” or “in attainment” if it meets or does better than an air quality standard. An area is considered a “nonattainment area” or “in nonattainment” if it doesn’t meet an air quality standard. An area may be in attainment for some criteria pollutants and in nonattainment for others simultaneously.

Mitigation Measure 3.2.1b: The project specifications will require that all construction vehicles and equipment emission levels meet current air quality standards and that idling time for all heavy equipment be minimized to reduce on-site emissions.

Impact Significance: Less than Significant

Impact 3.2.2: Construction, operation, and/or maintenance of the Dry Creek Project could potentially expose sensitive receptors to substantial pollutant concentrations. (Less than Significant)

The primary toxic air contaminant (TAC) of concern that would be associated with the Dry Creek Project would be diesel particulate matter (DPM) from the combustion of diesel fuel associated with operations of heavy equipment. Health risk associated with exposure to DPM is typically associated with chronic exposure, in which 70-year exposure duration is often assumed. According to the BAAQMD, exposure of receptors to substantial concentrations of TACs could occur from either 1) siting a new TAC source (e.g., diesel generator, truck distribution center, freeway) near existing or planned receptors; and 2) siting a new receptor near an existing source of TAC emissions.

The closest residences average approximately 170 to 675 ft east and west of Dry Creek. The closest recreational area is located at Warm Springs Dam and Lake Sonoma, at the northern end of the project area.

It is anticipated that construction of the proposed project and occasional maintenance activities involving heavy duty diesel equipment would emit DPM. However, since health risks associated with DPM are generally associated with chronic exposure (70-year exposure), it can be assumed that the Dry Creek Project-related emissions would cause a negligible net increase in health risk, and impacts on nearby sensitive receptors would be less than significant.

Impact Significance: Less than Significant

Impact 3.2.3: Construction, operation, and/or maintenance of the Dry Creek Project could create objectionable odors affecting a substantial number of people. (Less than Significant)

Typical odor sources of concern include wastewater treatment plants, sanitary landfills, transfer stations, composting facilities, petroleum refineries, asphalt batch plants, chemical manufacturing facilities, fiberglass manufacturing facilities, auto body shops, rendering plants, and coffee roasting facilities. During project construction and major maintenance activities, nuisance diesel odors associated with operation of construction

equipment could occur at adjacent uses. However, this effect would be localized, affecting the closest residences and wineries, and would be temporary in nature. This impact would be less than significant.

Impact Significance: Less than Significant

Impact 3.2.4: Construction, operation, and/or maintenance of the Dry Creek Project could generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment. (Less than Significant)

The Northern Sonoma County APCD currently does not have adopted GHG thresholds of significance for CEQA review projects (Northern Sonoma County Air Pollution Control District June 4, 2015). Therefore, as the lead agency for this project, the Water Agency has elected to use an approach for the determination of significance of GHG emissions based on the GHG significance thresholds adopted by the BAAQMD, which is 1,100 metric tons CO_{2e} per year for projects that are not stationary sources. Given that the Dry Creek Project would result exclusively in construction equipment and vehicle-related emissions that are not stationary sources, the Water Agency believes that the BAAQMD’s significance threshold for non-stationary source projects is the most applicable air district-adopted GHG significance threshold available. Because the threshold is meant to measure operational emissions over the life of a project, construction emissions are presented as an average per year during the assumed operation of the project, 25 years.

Table 3.2-6 presents the estimated annual GHG emissions that would be generated by on-site equipment and off-site vehicles that would be associated with the Dry Creek Project. The same project-related assumptions that were used to estimate the criteria pollutant emissions were used to estimate the GHG emissions. Refer to **Appendix 9.5** for the emission factors and all other assumptions used to estimate the GHG emissions. As indicated in the table, emissions of CO_{2e} would be well under the BAAQMD significance criterion. Therefore, impacts associated with generation of GHG emissions would be less than significant.

Table 3.2-6. Estimated GHG Emissions from Construction of the Dry Creek Project

MT CO _{2e} /year over 25 year project lifespan:	218	MTCO _{2e} /year
BAAQMD operational threshold:	1100	MTCO _{2e} /year

Impact Significance: Less than Significant

Impact 3.2.5: Construction, operation, and/or maintenance could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the

emissions of greenhouse gases, such as Sonoma County's Community Climate Action Plan. (Less than Significant)

The Dry Creek Project would not conflict with the Sonoma County Community Climate Action Plan; therefore, the Dry Creek Project would not interfere with its implementation. Furthermore, the proposed project would not interfere with implementation of AB 32 because it would not conflict with the 44 Recommended Actions designed to achieve the 2020 GHG emissions limit required by AB 32 identified in ARB's Climate Scoping Plan. This impact would be less than significant.

Impact Significance: Less than Significant

3.2.5 General Plan and Consistency

The project area is located within Sonoma County. The following section lists goals, policies and objectives from *Sonoma County General Plan 2020* related to the Dry Creek Project in terms of air quality, GHG, energy, and sustainability and ends with a brief analysis discussing consistency with this plan.

Goal OSRC 14: Promote energy conservation and contribute to energy demand reduction in the County.

Objective OSRC-14.1: Increase energy conservation and improve energy efficiency in County government operations.

Objective OSRC-14.4: Reduce greenhouse gas emissions by 25 percent below 1990 levels by 2015.

Policy OSRC-14c: Continue to purchase and utilize hybrid, electric, or other alternative fuel vehicles for the County vehicle fleet; and encourage County residents and businesses to do the same.

Policy OSRC-14j: Encourage the Sonoma County Water Agency and other water and wastewater service providers to reduce energy demand from their operations.

Goal OSRC-16: Preserve and maintain good air quality and provide for an air quality standard that will protect human health and preclude crop, plant and property damage in accordance with the requirements of the Federal and State Clean Air Acts.

Objective OSRC-16.1: Minimize air pollution and greenhouse gas emissions.

Objective OSRC-16.2: Encourage reduced motor vehicle use as a means of reducing resultant air pollution.

The proposed project is anticipated to be consistent with *Sonoma County General Plan 2020*. Implementation of the Dry Creek Project would consume some energy and emit some pollutants and GHG gases during construction and maintenance activities but would produce no emissions during operation of the project. Operation of the project is intended to benefit threatened and endangered species. However, the Water Agency has taken a leadership role in reducing energy use and greenhouse gas emissions and other air quality emissions in the region through collaborative efforts with other agencies and organizations to provide clean energy options to Sonoma County residents as well as internally through system efficiency upgrades, water conservation efforts, and development of renewable energy sources. In 2015, the Water Agency contracted to procure all of its electricity needs through renewable and carbon free resources, thus achieving a carbon neutral electricity supply to power its system.

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CHAPTER 3.3 Biological Resources

3.3.1 Introduction

This section describes the existing biological resources in the Dry Creek Habitat Enhancement Project, Miles 2-6 (Dry Creek Project or proposed project) area and evaluates potential impacts to biological resources as a result of the proposed project. This section focuses on terrestrial resources and non-fisheries-related species, sensitive habitats or natural communities, special-status plant and animal species, and protected trees. Potential impacts to these biological resources resulting from the proposed project are analyzed in accordance with the California Environmental Quality Act (CEQA) significance criteria (CEQA Guidelines, Appendix G) and mitigation measures are proposed that could reduce, eliminate, or avoid such impacts.

Other impacts related to visual quality are addressed in sections as follows: impacts to visual resources are addressed in **Chapter 3.1, Aesthetics**; impacts to fisheries are addressed in **Chapter 3.5, Fisheries Resources**; impacts to recreation are addressed in **Chapter 3.12, Recreation**.

3.3.2 Environmental Setting

Regional Setting

The Dry Creek watershed is located in the interior coast range of northern Sonoma and southern Mendocino counties, approximately 30 miles from the Pacific Ocean and 60 miles north of San Francisco Bay. Dry Creek is a fourth-order¹ tributary that drains 217 square miles of rugged terrain in the southwestern portion of the Russian River Basin in a generally northwest to southeast direction, within a watershed measuring approximately 32 miles long and seven miles wide. Elevations range from 70 feet near the mouth to nearly 3,000 feet near the headwaters, with half of the watershed above 1,100 feet in elevation. Dry Creek is the largest tributary of the Russian River in terms of annual runoff contribution and second largest in terms of drainage area. Downstream of the Dry Creek confluence at Healdsburg, the Russian River flows westerly to the Pacific Ocean at Jenner, California (Inter-Fluve, 2010).

¹ First order streams are highest in the watershed; first and second order streams usually form on steep slopes and flow quickly until they slow down and meet third order streams. First through third order streams are considered headwaters. Fourth order stream are lower, slower, and wider than headwater streams.

Warm Springs Dam is located on Dry Creek at river mile (RM) 13.9, at the confluence of Dry and Warm Springs Creeks. Downstream of the dam, Dry Creek is a gravel bed river that flows through a flat agricultural valley 0.5 to one mile wide. Grapes are the primary agricultural crop in Dry Creek Valley (Inter-Fluve, 2010).

Warm, dry summers and cool, wet winters, typical of the Mediterranean climate characterize the region's climate. Average monthly temperatures range from 47 degrees F in December to 70.5 degrees F in July. Mean annual precipitation ranges from 41.3 inches in Healdsburg and 45.4 inches at Warm Springs Dam to over 60 inches in the coastal mountains at the western edge of the watershed. Over 90 percent of this precipitation occurs between October and April each year (Inter-Fluve, 2010).

Vegetation communities and wildlife habitats in the Dry Creek watershed include a mosaic of herbaceous, shrub, and tree dominated types as well as aquatic and developed types. Broad vegetative community categories within the watershed include scrubs and chaparrals, oak savannas and woodlands, coniferous forests and woodlands, grasslands, vineyards, and riparian communities. Historically, these communities provided habitat for a rich diversity of terrestrial and wetland plant and animal species. Although many of the species that historically occupied the watershed are still present, some, such as the spotted skunk (*Spilogale gracilis*) are now non-existent or extremely rare, or have had their numbers substantially reduced. Such loss or reduction in species diversity has been attributed to habitat loss and a variety of other complex factors (Sonoma County Water Agency and Circuit Rider Productions, Inc. 1998).

Vegetation Communities and Wildlife Habitat

Dry Creek Valley and the surrounding hills include a diverse suite of habitat types. Classification and Assessment with Landsat of Visible Ecological Groupings (CALVEG)² identifies three dominant vegetation communities in the Dry Creek Valley and several vegetation communities in the surrounding hills. The dominant vegetation communities in the surrounding hillsides from Warm Springs Dam to the confluence with the Russian River, as classified by CALVEG and the California Department of Fish and Wildlife's (CDFW) California Wildlife-Habitat Relationships System (CWHHR) include vineyard, montane hardwood, redwood, montane hardwood-conifer, douglas-fir, mixed chaparral, as well as developed and landscaped. The dominant vegetation communities in the Dry Creek Valley are described below,.

² The CALVEG classification system adheres to a set of U.S. Forest Service standards and procedures established at the national and regional levels to classify existing vegetation in California.

Dominant Vegetation Communities in Dry Creek Project Area

Riparian Forest and Woodland

Riparian vegetation occupies lands adjacent to streams, creeks, and rivers. Species composition differs from that of surrounding plant communities due to the higher soil moisture available. The composition of riparian vegetation is greatly influenced by the physical processes of the adjacent aquatic habitat; species that are found in the active channel are usually not the same as those found on the floodplain. In riparian communities, water may be permanent or ephemeral.

Plants in active channel areas, which are regularly flooded, are adapted to high levels of flood disturbance during the winter, often with substantial velocity and scour, while tolerating the dry conditions of the gravel bars during the summer. The vegetated sections of stream banks within the Dry Creek project area are dominated by an overstory of red, arroyo and sandbar willows (*Salix laevigata*, *S. lasiolepis*, and *S. exigua*), white alders (*Alnus rhombifolia*), cottonwood (*Populus fremontii*) and occasional box-elders (*Acer negundo*), buckeyes (*Aesculus californica*), and coast live oaks (*Quercus agrifolia*).

Floodplains are at higher elevations than the active channel and characterized by many more species and additional structural complexity (e.g., canopy layer, shrub layer, vine layer, and herbaceous layer) than the active channel. Such plants are adapted to flood scour and do not require as much summer moisture. Typical understory species occupying the floodplains within the Dry Creek project area include a mixture of Himalayan blackberry (*Rubus armeniacus*), California blackberry (*Rubus ursinus* var. *ursinus*), escaped grape (*Vitis vinifera*), mugwort (*Artemisia douglasiana*), and periwinkle (*Vinca major*). A few open areas without an overstory component exist within the Dry Creek project areas. These open areas are typically dominated by annual grasses (*Avena fatua*, *Bromus diandrus*, *Hordeum murinum*, *Lolium multiflorum*) and other herbaceous plants (*Verbascum thapsus*, *Melilotus albus*, *Hirschfeldia incana*). For a complete list of plant species observed in the project area, please refer to **Appendix 9.6**.

Riparian habitats are extremely productive and have diverse values for animal species. The availability of water, the diversity and abundance of plant life, and the complex vegetation structure provide a number of animal species with food and water, cover, and movement corridor, as well as breeding and resting sites. Animals typically found in riparian habitats include birds, such as Bewick's wren (*Thryomanes bewickii*), spotted towhee (*Pipilo maculatus*), and tree swallow (*Tachycineta bicolor*); mammals, such as brush rabbit (*Sylvilagus bachmani*), deer mice (*Peromyscus maniculatus*), dusky footed woodrat (*Neotoma fuscipes*), and raccoon (*Procyon lotor*); and amphibians such as

foothill yellow-legged frog (*Rana boylii*) (Warner and Hendrix 1984). For a complete list of bird species observed in the project area, please refer to **Appendix 9.6**.

CALVEG and the CDFW CWHRS categorize the riparian vegetation community along Dry Creek from Warm Springs Dam to approximately one mile north of Westside Road Bridge as Montane Hardwood. At that location, species composition becomes more similar to Montane Riparian, as defined by the CWHRS, and continues as such until the confluence with the Russian River. Montane Hardwood consists of a pronounced hardwood tree layer, with an infrequent and poorly developed shrub stratum, and a sparse herbaceous layer. Montane Riparian can also be referred to as riparian, riparian deciduous, mixed riparian woodland, riparian forest and woodland, as well as other terms. Generally, Montane Riparian occurs as a narrow, often dense grove of broad-leaved, winter deciduous trees with a sparse understory. The transition between montane riparian and adjacent non-riparian vegetation is often abrupt.

Riparian habitats have an exceptionally high value for many wildlife species. Such areas provide water, thermal cover, migration corridors and diverse nesting and feeding opportunities. The shape of many riparian zones, particularly the linear nature of streams, maximizes the development of edge which is so highly productive for wildlife. Amphibians, reptiles, birds, and mammals use riparian habitat for food, cover, and reproduction (Grenfell 1988).

Wetlands

Wetlands are transitional areas between aquatic and terrestrial habitats and include marshes, vernal pools, seeps, springs, and portions of riparian corridors with wetland vegetation. Wetlands have high fish and wildlife habitat values, provide habitat for unique plant and animal species, and water recharge and filtration. Wetlands provide essential habitat for many wildlife species, especially birds, such as the northern harrier, red-winged blackbird, great blue heron, and black-crowned night heron.

Wetlands that meet certain criteria are subject to regulation by the US Army Corps of Engineers (USACE), US Fish and Wildlife Service (USFWS), CDFW, or applicable Regional Water Quality Control Boards (RWQCBs) (PRMD 2013). Please see Section 3.3.3, "Regulatory Setting" for more information.

Areas potentially subject to the jurisdiction of the USACE under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act within the project site are restricted to the Section 404 Waters of the United States³ and vegetated wetlands

³ Waters of the United States are areas ponded for a duration to preclude vegetation from establishing and are subject to Section 404 of the Clean Water Act and U.S. Army Corps of Engineers jurisdiction.

below the ordinary high water (OHW) mark.⁴ The total amount of existing potential USACE jurisdictional areas within Miles 2-3 of the proposed project area is approximately 140.8 acres, consisting of 29.5 acres of Waters of the U.S. and 111.4 acres of jurisdictional wetlands (vegetated areas within the OHW).⁵ **Appendix 9.6** includes related calculations and figures.

Vineyard

The majority of the Dry Creek Valley from Warms Springs Dam to the confluence with the Russian River is developed for winegrape cultivation. Vineyards are composed of a single species planted in rows, typically supported on wood and wire trellises. Rows under the vines are often sprayed with herbicides to prevent the growth of herbaceous plants. Between rows of vines, grasses and other herbaceous plants may be planted or allowed to grow as a cover crop to control erosion. Generally, cover crops may include perennial grasses, such as Bermuda; annual grasses, such as soft chess; annual ryegrass, Johnsongrass, wildoats, red brome, red fescue, barnyardgrass, and others; or forbs such as wild mustard, fiddleneck, and filaree.

Vineyards are planted on deep, fertile soils, which once supported productive and diverse natural habitats. However, some species of birds and mammals have adapted to the vineyard habitats, many of which are considered “agricultural pests.” These include deer and rabbit that browse on the vines as well as squirrel and numerous birds that feed on the fruit. Some wildlife, such as Mourning Dove, use vineyards for cover and nesting sites. Because the vines are deciduous and relatively short, they do not provide significant cover during cold and wet winter months but irrigation may be a source of water for wildlife during hot, dry summers. Many wildlife species provide benefits to vineyards by feeding on weed seeds and insect pests. Raptors may use provided perches to hunt for rodents and other crop pests (Shultze 1999).

Wildlife Movement

Riparian corridors support a wide variety of wildlife and facilitate wildlife movement (i.e., dispersal, seasonal migration, and local movements within home ranges). Terrestrial mammals, such as mule deer (and the Coast Range subspecies, black-tailed deer), use the cover of the riparian forests and woodlands for protection from predators as they move between foraging areas. Similarly, amphibians and reptiles use the protective

⁴ The ordinary high water (OHW) mark is a line on the shore established by fluctuations of water indicated by physical characteristics such as a clear, natural line on the bank, shelving, changes in soil, destruction of terrestrial vegetation, or presence of litter and debris.

⁵ Project modeling was used to calculate acreage of Waters of the U.S. and USACE jurisdictional wetlands. Areas within the 105 cfs or 110 cfs contour lines (available data varied slightly by consultant) were used to estimate waters of the U.S. Areas beyond the Waters of the U.S. contours but within the 2-year flood contours were considered jurisdictional wetlands. Modeling was not available for Reaches nine through 11, therefore the overall average acreages per mile of creek was used to estimate Waters of the U.S. and USACE jurisdictional wetlands for Reaches nine through 11.

cover of this habitat as they disperse from their aquatic breeding sites. Migratory waterfowl use the waters and wetlands for their food supplies during their seasonal migration.

Special-Status Natural Communities

Special-status natural communities are communities that “are of limited distribution statewide or within a county or region and are often vulnerable to environmental effects of projects.” These communities often, but don’t necessarily, contain special-status species or their habitat. Most riparian and wetland communities are considered special-status natural communities due to their rarity (CDFW 2009).

As discussed in the *Current Conditions Inventory Report; Dry Creek: Warm Springs Dam to Russian River, Sonoma County, CA* (Inter-Fluve 2010) Dry Creek Valley has changed drastically since European settlement began around 1850. By 1870, settlers had cleared approximately 40 percent of the forested area of the watershed for grazing and agricultural production. This increased runoff and sediment production raised the floodplain by approximately three feet. By 1900, sediment delivery had reduced in volume and the channel had incised significantly. Gravel mining on the Russian River and lower Dry Creek, particularly in the 1950s and 1960s, further reduced the base level of Dry Creek at its downstream end. Incision and unstable banks resulted in additional sediment production resulting in Dry Creek being the highest sediment-yielding tributary of the Russian River. Flows changed significantly after Warm Springs Dam was completed in 1983. For example, peak discharge for a 100-year flow event upstream of the confluence of Peña Creek was estimated to be 40,000 cfs before construction of the dam but 6,900 after construction of the dam. Therefore, the riparian corridor of modern Dry Creek is more narrow, the channel more incised, and the interaction with the floodplain greatly reduced compared to Dry Creek as it was before European settlement. Many of the tributaries to Dry Creek experienced similar changes; major tributaries to Dry Creek downstream of Warm Springs Dam include Peña, Mill, and Felta creeks. The overall effect in the Dry Creek Valley is degraded riparian habitat and greatly reduced acreage of both streamside and floodplain wetlands.

The Dry Creek Project would take place within the Dry Creek riparian corridor as well as associated wetlands. Riparian habitats and wetlands receive federal protection under Section 10 of the River and Harbor Act, Sections 404 and 401 of the Clean Water Act, and the Porter-Cologne Water Quality Control Act as well as state protection under California Fish and Game Codes 1600-1616 (see Section 3.3.3, “Regulatory Setting” below).

Special-Status Plant and Animal Species

The potential occurrence of special-status plant and animal species in the Dry Creek Project area was initially evaluated by developing a list of special-status species that are

known to or have the potential to occur in Sonoma County. This list was primarily derived from a search of the CDFW Natural Diversity Database (CNDDDB) (CDFW 2015) and California Native Plant Society (CNPS) Electronic Inventory (CNPS 2010) for special-status species occurrences recorded on the Cloverdale, Geyserville, Healdsburg, and Guerneville USGS 7.5-Minute Quadrangles, and a review of federally endangered and threatened species as identified by the USFWS.

Tables 3.3-1 and **3.3-2** present those special-status species that are known to or have the potential to occur in the project area as well as each species' regulatory status, habitat requirements, and potential for occurrence in the Dry Creek Project area.

Special-Status Plants

Based on review of the CNDDDB and CNPS Rare Plant Inventory, Calflora review of other resources, and completion of field surveys in areas proposed for inclusion in Miles 2-3, two special-status plant species have been documented as occurring or potentially occurring in the vicinity of the Dry Creek Project area. Seventy special-status species are considered unlikely to occur or to have a low potential to occur within the project area.

Northern California Black Walnut

Northern California black walnut (*Juglans hindsii*) is a CNPS List 1B.1 species endemic to Northern California. Historically, this tree ranged from the San Joaquin Valley and Sacramento Valley to the inner Northern California Coast Range and the San Francisco Bay Area. Northern California walnut grows in riparian forests and woodlands and is often mixed with California oak species (*Quercus* spp.) and Fremont cottonwood (*Populus fremontii*). While not protected under the California or Federal Endangered Species Acts, Northern California black walnut is listed by the California Native Plant Society Rare Plant Inventory as Seriously Endangered due to habitat loss, conversion of habitat to agriculture and its hybridization with English walnut (*J. regia*). Northern California black walnut was widely used as rootstock for English walnut and readily hybridizes with it (CNPS, Rare Plant Program 2015). During botanical surveys in April 2014, Water Agency staff observed *Juglans* species in several locations throughout the habitat enhancement sites proposed for Miles 2-3 (see **Appendix 9.6**). However, it is likely that *Juglans* species observed in the project area are not native due to the presence of orchard walnut trees in Dry Creek Valley. Additionally, according to the CNPS, the closest confirmed stand of native walnut is located in Napa County (CNPS, Rare Plant Program 2015).

Hayfield Tarweed (White Seaside Tarplant)

Hayfield tarweed, also called white seaside tarplant, (*Hemizonia congesta* ssp. *congesta*) is a CNPS List 1B.2 species in the Asteraceae family that is endemic to California. It is an annual herb found in valley and foothill grassland and sometimes

along roadsides. Blooms appear from April to November. The species has been observed in the Healdsburg and Jimtown as well as several other areas in Sonoma County. The location of the closest reported occurrence is listed as “Warm Springs Dam” in the California Native Plants Society Rare and Endangered Plant Inventory (CNPS, Rare Plant Program 2015).

Table 3.3-1. Special-Status Plant Species Occurring in Sonoma County

Genus species Common Name	Status	Habitat	Potential to Occur	Phenology	Flowering/ Survey Period
Franciscan onion <i>Allium peninsulare</i> var. <i>franciscanum</i>	1.B2	Cismontane woodland, valley and foothill grassland, often on serpentine, ultramafic or clay soils, and dry hillsides between 52-300 meters. Known from MEN, SCL, SMT and, SON counties.	Unlikely. No potential habitat within project area. Known from 21 CNDDDB occurrences, 4 from SON County with most recent occurrence in 2006 in Sonoma.	Perennial bulbiferous herb	May - June
Sonoma alopecurus <i>Alopecurus aequalis</i> var. <i>sonomensis</i>	FE 1B.1	Occurs in freshwater marshes, swamps, and riparian scrub. Known from MRN and SON counties between 5-365 meters.	Unlikely. Known from fewer than 10 occurrences. Suitable habitat may be present within project area but the potential for occurrence is highly unlikely.	Perennial herb	May - July
Napa false indigo <i>Amorpha californica</i> var. <i>napensis</i>	1B.2	Broadleaved upland forest, chaparral, cismontane woodland. Prefers openings in forest or woodland or in chaparral. 120-2000 meters.	Unlikely. No potential habitat within project area. Known from 45 occurrences with 22 from SON County with most recent occurrence in 2003 in Calistoga.	Perennial deciduous shrub	April - July
twig-like snapdragon <i>Antirrhinum virga</i>	4.3	Rocky openings, often on serpentine soils and in chaparral and lower montane coniferous forests between 100-2015 meters. Known from LAK, MEN, NAP, SON, and YOL counties.	Unlikely. No potential habitat within project area. No CNDDDB occurrences.	Perennial herb	March - April
The Cedars manzanita <i>Arctostaphylos bakeri</i> ssp. <i>sublaevis</i>	1B.2	Serpentine in closed cone coniferous forest and serpentine chaparral, and Sargent cypress woodland, typically in canyons and on slopes. Known only from SON County between 275-600 meters.	Unlikely. No potential habitat within project area. No CNDDDB occurrences.	Perennial evergreen shrub	February - May
Howell's manzanita <i>Arctostaphylos hispidula</i>	4.2	Serpentinite and sandstone in chaparral between 120-1250 meters. Known from DNT, HUM, SIS, and SON counties.	Unlikely. No potential habitat within project area. No CNDDDB occurrences.	Perennial evergreen shrub	March - April

Genus species Common Name	Status	Habitat	Potential to Occur	Phenology	Flowering/ Survey Period
Rincon Ridge manzanita <i>Arctostaphylos stanfordiana</i> ssp. <i>decumbens</i>	1B.1	Chaparral and cismontane woodland often on barren red-rhyolites. Known from SON County between 75-370 meters.	Unlikely. No potential habitat within project area. Taxon recorded from 3 upland locations near Bradford Mountain.	Perennial evergreen shrub	February - May
Clara Hunts milk-vetch <i>Astragalus claranus</i>	FE CT 1B.1	Chaparral openings and cismontane woodland and valley and foothill grassland on serpentinite or volcanic, rocky or clay substrates. Known from NAP and SON counties between 75-275 meters.	Unlikely. No potential habitat within project area. Known from 6 occurrences, one in NE Santa Rosa on St. Helena Road.	Annual herb	March - May
Sonoma sunshine <i>Blennosperma bakeri</i>	FE 1B.1	Mesic valley and foothill grasslands and vernal pools. Known only from SON County between 10-110 meters.	Unlikely. No potential habitat within project area. Taxon recorded from the Laguna de Santa Rosa and Sonoma area.	Annual herb	March - May
narrow-anthered California brodiaea <i>Brodiaea californica</i> var. <i>leptandra</i>	1B.2	Broadleaved upland forest, chaparral, lower montane coniferous forest. Known from LAK, NAP and SON counties between 110-915 meters.	Unlikely. No potential habitat within project area. Known from 29 occurrences with 14 occurring in SON County, most recently in 2004 in Sonoma.	Perennial bulbiferous herb	May - June
narrow-anthered California brodiaea <i>Calamagrostis ophitidis</i>	4.3	Serpentinite and rocky soils in chaparral, lower montane coniferous forests, valley and foothill grassland, and meadows and seeps between 90-1065 meters. Known from LAK, MEN, MRN, NAP, and SON counties.	Unlikely. No potential habitat within project area. No CNDDDB occurrences.	Perennial herb	April - July
Mt. Saint Helena morning-glory <i>Calystegia collina</i> ssp. <i>oxyphylla</i>	4.2	Serpentinite and in chaparral, lower montane coniferous forest and valley and foothill grassland between 279-1010 meters. Known from LAK, MEN, MRN, NAP, SBT, and SON counties.	Unlikely. No potential habitat within project area. Known from 9 occurrence with 2 occurring in SON county, most recently in 1988 in Mark West Springs.	Perennial rhizomatous herb	April - June
white sedge <i>Carex albida</i>	FE 1B.1	Freshwater wetlands, wetland-riparian, freshwater marsh and bogs/fens.	Low. Suitable habitat may be present within project area. Only recorded occurrences at Lower Pitkin Marsh in 2008.	Perennial rhizomatous herb	No data

Genus species Common Name	Status	Habitat	Potential to Occur	Phenology	Flowering/ Survey Period
California sedge <i>Carex californica</i>	2B.3	Bogs and fens, closed-cone coniferous forest, coastal prairie, meadows, marshes and swales. Known from MEN and SON counties between 90-335 meters.	Unlikely. Suitable habitat not present within project area. Only CNDDDB occurrences known from Mendocino county. California occurrences known from both Mendocino and Sonoma counties.	Perennial rhizomatous herb	May - August
bristly sedge <i>Carex comosa</i>	2B.1	Coastal prairie, lake margins of marshes and swamps and valley and foothill grassland. Known from CCA, LAK, MEN, SAC, SHA, SJQ and SON counties between 0-625 meters.	Low. Suitable habitat may be present within project area. Taxon recorded in Guerneville but presumed extirpated. Additionally recorded at Bodega Head in 2011.	Perennial rhizomatous herb	May - September
johnny-nip <i>Castilleja ambigua var. ambigua</i>	4.2	Coastal bluff scrub, coastal prairie, coastal scrub, marshes and swamps, valley and foothill grassland and vernal pool margins. Known from ALA, CCA, DNT, HUM, MEN, MRN, NAP, SCR, SFO, SLO, SMT, SON counties between 0-435 meters.	Low. Suitable habitat may be present within project area however, there are no CNDDDB occurrences.	Annual hemiparasitic herb	March - August
Rincon Ridge ceanothus <i>Ceanothus confusus</i>	1B.1	Closed-cone coniferous forest, chaparral, and cismontane woodland on volcanic or serpentine soils. Known from LAK, MEN, NAP and SON counties between 75-1065 meters.	Unlikely. No potential habitat within project area. Taxon recorded from 3 upland locations near Bradford Mountain, as well as west of Wholer Bridge near the Russian River on Glider Ridge, and west Cloverdale on Red Mountain.	Perennial evergreen shrub	February - April
holly-leaved ceanothus <i>Ceanothus purpureus</i>	1B.2	Chaparral and cismontane woodland on volcanic and rocky substrates. Known from NAP, SOL and SON counties between 120-640 meters.	Unlikely. No potential habitat within project area. Only occurrence recorded outside Guerneville in 2002.	Perennial evergreen shrub	February - June
pappose tarplant <i>Centromadia parryi ssp. parryi</i>	1B.2	Coastal prairie, meadows and seeps, coastal salt marsh, valley and foothill grassland (vernally mesic, often alkaline sites). Known to occur from BUT, COL, GLE, LAK, NAP, SMT, SOL, and SON counties between 0-420 meters.	Low. Suitable habitat may be present within project area. Known from only one occurrence near the Sonoma County Airport in 2004.	Annual herb	May - November
Sonoma spineflower <i>Chorizanthe valida</i>	FE CE 1B.1	Coastal prairie in sandy substrate. Known from MRN and SON counties between 10-305 meters.	Unlikely. No potential habitat within project area. SON occurrences presumed extirpated.	Annual herb	July - August

Genus species Common Name	Status	Habitat	Potential to Occur	Phenology	Flowering/ Survey Period
Vine Hill clarkia <i>Clarkia imbricata</i>	FE CE 1B.1	Chaparral and valley and foothill grassland on acidic sandy loam. Known from SON county between 50-75 meters.	Unlikely. Known only from Vine Hill area. Last known occurrence in 1997.	Annual herb	June - August
Pennell's bird's-beak <i>Cordylanthus brunneus ssp. capillaris</i>	FE 1B.2	Closed-cone coniferous forest, chaparral, cismontane woodland on serpentinite substrates. Known from SON counties between 45 - 305 meters.	Unlikely.No potential habitat within project area. Last known occurrence in Camp Meeker in 2001.	Annual hemiparasitic herb	June-September
soft bird's-beak <i>Cordylanthus mollis ssp. mollis</i>	FE CR 1B.2	Coastal salt marshes and swamps. Known from CCA, MRN, NAP, SAC, SOL and SON counties between 0-3 meters.	Unlikely. No potential habitat within project area. No CNDDDB occurrences.	Annual hemiparasitic herb	July-November
serpentine bird's-beak <i>Cordylanthus tenuis ssp. Brunneus</i>	4.3	Serpentinite, in chaparral and closed-cone coniferous forests and cismontane woodland. Known to occur from LAK, NAP, and SON counties between 475-915 meters.	Unlikely. No potential habitat within project area. No CNDDDB occurrences.	Annual hemiparasitic herb	July - August
serpentine cryptantha <i>Cryptantha dissita</i>	1B.2	Chaparral on ultramafic and serpentine outcrops. Known from COL, LAK, MEN, NAP, SHA, SIS and SON counties between 395-580 meters.	Unlikely. No potential habitat within project area. Last known occurrence 2 miles N of Redwood Mountain in 1999.	Annual herb	April - June
mountain lady's-slipper <i>Cypripedium montanum</i>	4.2	Broadleaved upland forest, cismontane woodland, lower montane coniferous forest and north coast coniferous forest. Known from DNT, HUM, MAD, MEN, MOD, MPA, PLU, SCR, SHA, SIE, SIS, SMT, SON, TEH, TRI, and TUO counties between 185-2225 meters.	Unlikely. No potential habitat within project area. No CNDDDB occurrences.	Perennial rhizomatous herb	March - August
Baker's larkspur <i>Delphinium bakeri</i>	FE CE 1B.1	Broadleafed upland forest, coastal scrub and valley and foothill grassland on decomposed shale, often mesic sites. Known from MRN and SON counties between 80-305 meters.	Low. Marginally suitable habitat may be present within project area. Known from 3 occurrences, most recent in 2011 in MRN county.	Perennial herb	March - May
golden larkspur <i>Delphinium luteum</i>	FE CR 1B.1	Chapparral, coastal prairie, coastal scrub, valley and foothill grassland on rocky substrates. Known from MRN and SON counties between 0-100 meters.	Low. Suitable habitat may be present within project area. Known from 11 occurrences, 2 most recent occurrences in 2011 from Tomales and Bodega Head areas.	Perennial herb	March - May

Biological Resources

Genus species Common Name	Status	Habitat	Potential to Occur	Phenology	Flowering/ Survey Period
dwarf downingia <i>Downingia pusilla</i>	2B.2	Mesic sites in valley and foothill grassland and vernal pools. Known from MER, MPA, NAP, PLA, SAC, SOL, SON, STA, THE, and YUB counties between 1-445 meters.	Low. Suitable habitat may be present within project area. Known from 3 occurrences on SON county, all of which contain vernal pool and/or swale habitat.	Annual herb	March - May
serpentine daisy <i>Erigeron serpentinus</i>	1B.3	Serpentine seeps in chaparral. Known only from SON County between 60- 670 meters.	Unlikely. No potential habitat within project area. Known from 3 occurrences, most recent in 1998 at The Cedars.	Perennial herb	May - August
Loch Lomond button celery <i>Eryngium constancei</i>	FE CE 1B.1	Vernal pools. Known only from LAK, NAP and SON counties between 460-855 meters.	Unlikely. No potential habitat within project area. Known from 1 occurrence in SON County in 1996 near Diamond Mountain.	Annual / Perennial herb	April – June
fragrant fritillary <i>Fritillaria liliacea</i>	1B.2	Cismontane woodland, coastal prairie, coastal scrub, valley and foothill grassland near the coast, on clay or serpentinite. Known from ALA, CCA, MNT, MRN, SBT, SCL, SFO, SMT, SOL, and SON counties between 3-410 meters.	Unlikely. No potential habitat within project area. Only extant occurrence in SON County in 2013 near Camp Meeker.	Perennial bulbiferous herb	February - April
Roderick's fritillary <i>Fritillaria roderickii</i>	CE 1B.1	Coastal bluff scrub, coastal prairie, valley and foothill grasslands. Known from MEN and SON counties between 15-400 meters.	Unlikely. No potential habitat within project area. Only extant occurrence in SON County in 1987 near Gualala.	Perennial bulbiferous herb	March - May
White seaside tarplant <i>Hemizonia congesta ssp. congesta</i>	1B.2	Coastal scrub, valley and foothill grassland and in grassy valleys and hills, often in fallow fields. Known to occur from MEN, MRN, SFO, SMT and SON counties between 20-560 meters.	Moderate. Suitable habitat may be present within project area. Known from 3 CNDDDB occurrences, 2 most recent occurrences from 1990 in Windsor.	Annual herb	April - Novemeber
thin-lobed horkelia <i>Horkelia tenuiloba</i>	1B.2	Broadleaved upland forest and chaparral on mesic openings and sandy substrates. Known from MEN, MRN and SON counties between 50-500 meters.	Unlikely. No potential habitat present within project area. Taxon recorded from 2 upland locations near Bradford Mountain.	Perennial herb	May - July

Genus species Common Name	Status	Habitat	Potential to Occur	Phenology	Flowering/ Survey Period
northern California black walnut <i>Juglans californica</i> var. <i>hindsii</i>	1B.1	Riparian forests and woodlands, floodplain terraces. Known from CCA, LAK, NAP, SAC, SOL, and YOL counties between 0-440 meters.	Moderate. <i>Juglans</i> species detected in several locations within project area for Miles 2-3 during botanical surveys, however, unlikely to be native. Suitable habitat is present within project area. CNPS Rare Plant inventory states closest confirmed location is Napa County. Calflora observation database includes one observation in the Lake Sonoma area and 7 other recorded occurrences in Sonoma County. No CNDDDB occurrences in Sonoma County.	Perennial deciduous tree	April - May
Burke's goldfields <i>Lasthenia burkei</i>	FE CE 1B.1	Vernal pools, swales, seeps (mesic), and meadows between LAK, MEN, NAP, and SON counties between 15 – 600 meters.	Unlikely. Known from 25 occurrences in SON County. Taxon recorded in 2 locations near Healdsburg in 2007 and 2012. No vernal pools in project area.	Annual herb	April - June
Contra Costa goldfields <i>Lasthenia conjugens</i>	FE 1B.1	Cismontane woodland, alkaline playas, valley and foothill grasslands (mesic), vernal pools. Known from ALA, CCA, MEN, MNT, MRN, NAP, SBA, SCL, SOL, and SON counties between 0 – 470 meters.	Unlikely. No potential habitat within project area. Known from 33 occurrences, only 1 from SON County in 2003 near Petaluma.	Annual herb	March - June
Colusa layia <i>Layia septentrionalis</i>	1B.2	Chaparral, cismontane woodland, and valley and foothill grasslands on sandy or serpentine soils. Known from COL, GLE, LAK, MEN, NAP, SON, SUT, THE, and YOL counties between 100-1095 meters.	Unlikely. No potential habitat within project area. Known from 46 occurrences, 2 in SON County from 1902 and 1949 near Kenwood and Cloverdale.	Annual herb	April - May
Jepson's leptosiphon <i>Leptosiphon jepsonii</i>	1B.2	Volcanic substrates in chaparral and cismontane woodland. Known from LAK, NAP, SON and YOL counties between 100-500 meters.	Unlikely. No potential habitat within project area. 36 occurrences, 17 in SON County.	Annual herb	March - May
Crystal Springs lessingia <i>Lessingia arachnoidea</i>	1B.2	Serpentinite, often roadsides and cismontane woodland, coastal scrub, and valley and foothill grassland between 60-200 meters. Known from SMT and SON counties.	Unlikely. No potential habitat within project area. 11 occurrences, 3 in SON county outside Camp Meeker from 1992, 1996 and 2005.	Annual herb	July - October

Biological Resources

Genus species Common Name	Status	Habitat	Potential to Occur	Phenology	Flowering/ Survey Period
Pitkin Marsh Lily <i>Lilium pardalinum ssp. pitkinense</i>	FE CE 1B.1	Cismontane woodland, meadows and seeps and freshwater marshes and swamps. Known from SON Conuty between 35-65 meters.	Low. Suitable habitat may be present within project area. Known from 4 occurrences near Sebastopol, most recent in 2012 at Pitkin Marsh.	Perennial bulbiferous herb	June - July
Sebastopol meadowfoam <i>Limnanthes vinculans</i>	FE CE 1B.1	Vernally mesic sites in meadows and seeps, valley and foothill grassland, vernal pools, wet meadows, marshy areas in Valley Oak savanna and on poorly drained soils of clay and sandy loam. Known from SON County. Possibly occurs in NAP County. Recorded between 15- 305 meters.	Unlikely. Known from 41 occurrences in SON County, most occurrences in the Laguna de Santa Rosa.	Annual herb	April - May
Tidestrom's lupine <i>Lupinus tidestromii</i>	FE CE 1B.1	Coastal dunes. Known from MNT, MRN and SON counties between 0-100 meters.	Unlikely. No potential habitat within project area. Known from 21 occurrences, 2 in SON County at Bodega Head, Goat Rock State Beach, and Duncans Mills.	Perennial rhizomatous herb	April - June
Mt. Diablo cottonweed <i>Micropus amphibolus</i>	3.2	Rocky areas in broadleaved upland forest, chaparral, cismontane woodland, valley and foothill grassland between 45-825 meters. Known from ALA, CCA, COL, LAK, MNT, MRN, NAP, SBA, SCL, SCR, SJQ, SLO, SOL, and SON counties.	Unlikely. No potential habitat within project area. No CNDDDB occurrences.	Annual herb	March - May
marsh microseris <i>Microseris paludosa</i>	1B.2	Closed-cone coniferous forest, cismontane woodland, coastal scrub, valley and foothill grassland between 5-300 meters. Known from MEN, MNT, MRN, SBT, SCR, SFO, SLO, SMT, and SON counties.	Low. No potential habitat within project area. Known from 1 occurrence recorded in 1981, 2 miles NW of Windsor.	Perennial herb	April - July
green monardella <i>Monardella viridis</i>	4.3	Broadleafed upland forest, chaparral, and cismontane woodland. Known from LAK, NAP, SOL, and SON counties between 100-1010 meters.	Unlikely. No potential habitat within project area. No CNDDDB occurrences.	Perennial rhizomatous herb	June - September

Genus species Common Name	Status	Habitat	Potential to Occur	Phenology	Flowering/ Survey Period
Baker's navarretia <i>Navarretia leucocephala ssp. bakeri</i>	1B.1	Cismontane woodland, lower montane coniferous forest, meadows and seeps, valley and foothill grassland on mesic sites also on adobe or alkaline soils and vernal pools. Known from COL, LAK, MEN, MRN, NAP, SOL, SON, and THE counties between 5-1740 meters.	Low. Suitable habitat unlikely to be present within project area. Known from 3 occurrences found between 1989-1992 near Windsor.	Annual herb	April - July
many-flowered navarretia <i>Navarretia leucocephala ssp. plieantha</i>	FE CE 1B.2	Swales and volcanic ash flow vernal pools. Known from LAK, SON, counties between 30-950 meters.	Unlikely. No potential habitat within project area. Known from 1 occurrence, 2 miles S of Windor.	Annual herb	May - June
Gairdner's yampah <i>Perideridia gairdneri ssp. gairdneri</i>	4.2	Broadleaf upland forests, chaparral, valley and foothill grasslands at mesic sites, vernal pools. Known from CCA, KRN, LAX, MEN, MNT, MRN, NAP, ORA, SBT, SCL, SCR, SDG, SLO, SMT, SOL and SON counties between 0-610 meters.	Low. Suitable habitat may be present within project area. No CNDDDB occurrences.	Perennial herb	June - October
North Coast semaphore grass <i>Pleuropogon hooverianus</i>	CT 1B.1	Broadleaf upland forest, meadows, north coast coniferous forest at mesic sites, vernal pools. Known from MEN, MRN and SON counties between 10-671 meters.	Unlikely. No potential habitat within project area. Known from 24 CNDDDB occurrences. 2 in SON county of which, 1 extirpated and 1 extant occurrence observed in 2003 in Cotati.	Perennial rhizomatous herb	May - August
Hickman's cinquefoil <i>Potentilla hickmanii</i>	FE CE 1B.1	Coastal bluff scrub, closed-cone coniferous forest, vernal mesic meadows and seeps, freshwater marshes and swamps. Known from MNT, SMT and SON counties between 10-149 meters.	Unlikely. No potential habitat within project area. No CNDDDB occurrences in SON county.	Perennial herb	April - August
Two-fork clover <i>Trifolium amoenum</i>	FE 1B.1	Coastal bluff scrub, valley and foothill grassland on sometimes serpentine soil. Known from MRN, NAP, SCL, SMT, SOL and SON counties between 5-415 meters.	Unlikely. No potential habitat within project area. Known from 26 occurrences with 10 from SON county, most recent occurrence in 1993 at Camp Meeker.	Annual herb	April - June
Lobb's aquatic buttercup <i>Ranunculus lobbii</i>	4.2	Mesic locations, cismontane woodland, north coast coniferous forest, valley and foothill grassland, and vernal pools. Known from ALA, CCA, MEN, MRN, NAP, SCR, SMT, SOL, and SON counties between 15-470 meters.	Low. Suitable habitat may be present within project area. No CNDDDB occurrences.	Annual herb	February - May

Genus species Common Name	Status	Habitat	Potential to Occur	Phenology	Flowering/ Survey Period																																																												
showy rancheria clover <i>Trifolium amoenum</i>	FE 1B.1	Coastal bluff scrub, valley and foothill grassland, sometimes serpentine. Known from MRn, NAP, SCL, SMT, SOL, and SON counities between 5-415 meters.	Low. No potential habitat within project area. One plant rediscovered in Marin County in 1993.	Annual herb	April - June																																																												
Methuselah's beard lichen <i>Usnea longissima</i>	4.2	Broadleaved upland forests, North Coast coniferous forests on tree branches; ussally on old growth hardwoods and conifers. Known from DNT, HUM, MEN, SCR, SMT, and SON counties between 50 and 1460 meters.	Unlikely. No potential habitat within project area. Known from 206 occurrences with 7 occurring in SON county, Most recent occurrence in 2004 at Camp Meeker.	Fruticose epiphytic lichen	Lichen (no blooming period)																																																												
<p>List of species based on review of California Department of Fish and Game Natural Diversity Data Base for the Geyserville, Cloverdale, Healdsburg and Guerneville U.S. Geological Survey 7.5 minute quadrangles and species lists provided by the U.S. Fish and Wildlife Service.</p> <p>Status FE: Endangered under federal Endangered Species Act (ESA). FT: Threatened under federal ESA. FPE: Proposed endangered under federal ESA. FC: Candidate for listing under federal ESA. FSC: U. S. Fish and Wildlife Service Species of Concern. SE: Endangered under California ESA. ST: Threatened under California ESA. SR: Listed as rare under the California Native Plant Protection Act. 1A: California Native Plant Society List 1A: Plants presumed extinct in California. 1B: California Native Plant Society List 1B: Plants rare, threatened or endangered in California. 2: California Native Plant Society List 2: Plants rare, threatened, or endangered in California, but more common elsewhere. .1 Seriously Endangered in California (over 80% of occurrences Threatened/ high degree of immediacy of threat) .2 Fairly Endangered in California (20-80% occurrences Threatened) .3 Not very Endangered in California (<20% of occurrences Threatened or no current threats known)</p> <p>Abbreviations:</p> <table border="0"> <tr> <td>ALA Alameda</td> <td>LAK Lake</td> <td>NEV Nevada</td> <td>SCT Santa Catalina Island</td> <td>SHA Shasta</td> </tr> <tr> <td>AMA Amador</td> <td>LAS Lassen</td> <td>ORA Orange</td> <td>SCZ Santa Cruz Island</td> <td>SIE Sierra</td> </tr> <tr> <td>BUT Butte</td> <td>LAX Los Angeles</td> <td>PLA Placer</td> <td>SDG San Diego</td> <td>SIS Siskiyou</td> </tr> <tr> <td>CAL Calaveras</td> <td>LCP Local Coastal Plan</td> <td>PLU Plumas</td> <td>SFO San Francisco</td> <td>SOL Solano</td> </tr> <tr> <td>CCA Contra Costa</td> <td>MAD Madera</td> <td>RIV Riverside</td> <td>SHA Shasta SIE Sierra</td> <td>SON Sonoma County</td> </tr> <tr> <td>COL Colusa</td> <td>MOD Modoc</td> <td>SAC Sacramento</td> <td>SIS Siskiyou</td> <td>STA Stanislaus</td> </tr> <tr> <td>DNT Del Norte</td> <td>MEN Mendocino</td> <td>SBA Santa Barbara</td> <td>SJQ San Joaquin</td> <td>SJQ San Joaquin</td> </tr> <tr> <td>ELD El Dorado</td> <td>MER Merced</td> <td>SBD San Bernardino</td> <td>SMI San Miguel Island</td> <td>SMI San Miguel Island</td> </tr> <tr> <td>FRE Fresno</td> <td>MNT Monterey</td> <td>SBT San Benito</td> <td>SMT San Mateo</td> <td>SMT San Mateo</td> </tr> <tr> <td>GLE Glenn</td> <td>MPA Mariposa</td> <td>SCF Sonoma County Flora</td> <td>SNI San Nicolas Island</td> <td>SNI San Nicolas Island</td> </tr> <tr> <td>HUM Humboldt</td> <td>MRN Marin</td> <td>SCL Santa Clara</td> <td>SDG San Diego</td> <td></td> </tr> <tr> <td>KRN Kern</td> <td>NAP Napa</td> <td>SCR Santa Cruz</td> <td>SFO San Francisco</td> <td></td> </tr> </table>						ALA Alameda	LAK Lake	NEV Nevada	SCT Santa Catalina Island	SHA Shasta	AMA Amador	LAS Lassen	ORA Orange	SCZ Santa Cruz Island	SIE Sierra	BUT Butte	LAX Los Angeles	PLA Placer	SDG San Diego	SIS Siskiyou	CAL Calaveras	LCP Local Coastal Plan	PLU Plumas	SFO San Francisco	SOL Solano	CCA Contra Costa	MAD Madera	RIV Riverside	SHA Shasta SIE Sierra	SON Sonoma County	COL Colusa	MOD Modoc	SAC Sacramento	SIS Siskiyou	STA Stanislaus	DNT Del Norte	MEN Mendocino	SBA Santa Barbara	SJQ San Joaquin	SJQ San Joaquin	ELD El Dorado	MER Merced	SBD San Bernardino	SMI San Miguel Island	SMI San Miguel Island	FRE Fresno	MNT Monterey	SBT San Benito	SMT San Mateo	SMT San Mateo	GLE Glenn	MPA Mariposa	SCF Sonoma County Flora	SNI San Nicolas Island	SNI San Nicolas Island	HUM Humboldt	MRN Marin	SCL Santa Clara	SDG San Diego		KRN Kern	NAP Napa	SCR Santa Cruz	SFO San Francisco	
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Special-Status Animals

Based on review of databases, including the CNDDDB, and other information sources, such as the Sonoma County Breeding Bird Atlas (1995), and completion of field surveys, 67 special-status animal species have been documented as either occurring or having the potential to occur in the vicinity of the Dry Creek Project. Fifty-one of these special-status animal species are considered unlikely to occur or to have a low potential to occur in the Dry Creek Project area for reasons such as absence of essential habitat required for the species, or the distance to known occurrences and/or the species distributional range. These species are not discussed further in this section. The remaining 16 special-status animal species are considered to have moderate to high potential to occur within the project area, based on occurrences and availability of suitable habitat. These species are discussed below.

Amphibians

California Red-legged Frog

California red-legged frog (*Rana [aurora] draytonii*) is federally listed as threatened (CDFW 2015) and is a California species of special concern (CDFW 2015). The USFWS released a recovery plan in 2002 (USFWS 2002), and critical habitat for the California red-legged frog was designated in 2010 (USFWS 2010). The Dry Creek Project area is not within designated critical habitat for the California red-legged frog.

The California red-legged frog occurs in the Coast Ranges from Mendocino County south to northern Baja Mexico and in parts of the Sierra Nevada and Cascades ranges below 1,200 meter (m) (3,936 feet). It prefers the quiet pools of streams, marshes, and ponds. This species is usually found in aquatic habitats and occupies shorelines and pools with dense vegetation. Dispersal generally requires rains and individuals have been observed far from breeding sites on rainy nights. Adult frogs move seasonally between their egg-laying sites and foraging habitat, and may move long distances from their aquatic habitat. When disturbed, it will dive into the water and to the bottom of pools of at least 1 m (3 feet) in depth. The diet of the California red-legged frog is highly variable and may include aquatic and terrestrial insects, crustaceans, snails, worms, fish, tadpoles, smaller frogs, and even small mammals. Aquatic larvae (tadpole) are generally herbivorous.

Breeding takes place during winter and early spring. In Sonoma County, breeding typically occurs from January to February. Females deposit between 750 and 4,000 eggs in a cluster up to ten inches across, attached to emergent vegetation at the water surface and hatch in about two weeks (CDFW 2008).

The CNDDDB lists thirty-eight occurrences of California red-legged frog in Sonoma County. Russian River watershed occurrences were generally located in the lower watershed. No occurrences were listed for the Dry Creek watershed (CDFW 2015).

Foothill Yellow-legged Frog

Foothill yellow-legged frog (*Rana boylei*) is a California species of special concern (CDFW 2015). The foothill yellow-legged frog occurs in the Coast Ranges from the Oregon border to Southern California, in most of northern California west of the Cascade crest and along the western edge of the Sierra south to Kern County. It prefers rocky streams in a variety of habitats, including valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral, and wet meadows. The foothill yellow-legged frog spends most of its time near permanent water during all seasons. A typical home range is small, probably less than 10m (33 feet), only venturing farther during period of winter flooding. Adults may be found basking on exposed rocks near pools. When disturbed, they dive into the water and hide under submerged rocks or other cover. During cold weather and other times of inactivity, individuals take refuge under rocks in the streams or on shore within a few meters of water. Tadpoles require water for at least three to four months to metamorphose. The diet of adult frogs includes mostly aquatic and terrestrial invertebrates. Tadpoles likely consume algae and diatoms along rocky stream bottoms (Morey 2000).

Reproduction generally takes place when spring flooding subsides and may begin sometime from mid-March to May. The breeding season usually lasts about two weeks. Females attach eggs to rocks in slow moving water near stream edges, which hatch in approximately two weeks.

Seventy-one occurrences of foothill yellow-legged frog have been reported in several locations throughout Sonoma County. One CNDDDB occurrence describes foothill yellow-legged frog within the Dry Creek watershed: four individuals were collected from Skaggs Springs for the Museum of Vertebrate Zoology between 1970 and 1974, before Warm Springs Dam was built and Lake Sonoma inundated the area (CDFW n.d.).

Reptiles

Western Pond Turtle

Western pond turtle (*Actinemys [=Emys] marmorata*) is a California species of special concern and is uncommon to common in suitable aquatic habitats throughout California, west of the Sierra-Cascade crest and is mainly absent from desert regions (CDFW, 2008). Western pond turtles are associated with a variety of warm water aquatic habitats, both permanent and intermittent, including rivers, creeks, small lakes and ponds, marshes, irrigation ditches, and reservoirs. Adult turtles are often found in slow

moving water with depths of at least two feet and exposed logs or rocks that are used for basking. Although pond turtles spend much of their lives in water, they require terrestrial habitats for nesting. They also may overwinter on land and may spend part of the warmest months in aestivation on land. Use of terrestrial habitats for overwintering and aestivation may vary considerably with latitude and habitat type, as some turtles do not leave aquatic habitat (Stebbins, 2003).

In general, nesting occurs between late April and early August (Jennings and Hayes, 1994). Females typically leave the water in late afternoon or early evening and travel to an upland location that may be a considerable distance from aquatic habitat. Eggs are deposited in the flask-shaped nest excavated by the female. Because digging the nest may require several hours, the female commonly remains on or near the nest site overnight (Jennings and Hayes, 1994). The young hatch and may overwinter in the nest, emerging from the nest site and moving to the aquatic habitat in the spring. Hatchlings spend much of their time feeding in shallow water that typically has a relatively dense vegetative cover. Threats to western pond turtle include impacts to nesting habitat from agricultural and grazing activities, loss of aquatic habitat, and increased predation pressure from native and non-native predators as a result of human-induced landscape changes (Jennings and Hayes, 1994).

There are 73 recorded occurrences of western pond turtle in Sonoma County included in the CNDDDB. Several occurrences are listed for the Dry Creek watershed. Eleven individuals were reported in 1995 in the Warm Springs arm of Lake Sonoma. In 1994, an individual was observed in Dry Creek 0.6 mile south of Westside Road Bridge. One individual was observed on Dry Creek 1.3 miles downstream of Warm Springs Dam in 2006. Two individuals were observed in Dry Creek, 1.8 miles upstream of the Westside Road Bridge in 2007 (CDFW, 2015).

Birds

Allen's Hummingbird

The Allen's hummingbird (*Selasphorus sasin*) is currently included on the USFWS "Birds of Conservation Concern" list and was previously categorized as a Federal Species of Concern.⁶ The species is a common summer resident and migrant along most of coastal California. Migrants occur in a variety of woodland and scrub habitats. Breeding takes place more often in coastal scrub, valley foothill hardwood, and valley foothill riparian habitats (Green 1999). While the species generally does not occur more than 20 miles from the coast, Allen's Hummingbirds have been confirmed nesting in inland Sonoma County and the Dry Creek Valley (Burrige 1995). Allen's Hummingbirds

⁶ The USFWS Sacramento office no longer maintains a Federal Species of Concern list but the term commonly refers to species that are in decline or are in need conservation.

feed by taking nectar from a variety of herbaceous and woody flowering plants; they also eat insects and spiders. Nests are constructed in eucalyptus, juniper, willow, or other trees as well as vines, shrubs, or ferns (Green 1999).

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) was listed as endangered under the Federal Endangered Species Act (ESA) in 1967 and under the California Endangered Species Act (CESA) in 1971. The species was deemed recovered and delisted at the federal level in 2007 but maintains its endangered status under CESA. The bald eagle is a permanent resident and uncommon winter migrant in California. Most breeding takes place in the Klamath Basin (Polite and Pratt 1999a), although breeding is known to occur at Lake Sonoma (USGS Patuxent Wildlife Research Center 2015). Nests are large stick platforms built in a large tree, often the largest tree in a stand, but below the tree crown. Bald eagles prefer to be within one mile of water, generally large lakes or rivers with fish to take and perches from which to hunt (Polite and Pratt 1999a).

Cooper's Hawk

The Cooper's hawk (*Accipiter cooperii*) is included in the CDFW "Watch List." It prefers dense tree stands or patchy woodland habitat and, therefore, is a skilled flier, flying through tree canopies at high speeds in pursuit of other birds. The breeding range for the Cooper's hawk extends throughout most of California's wooded habitats (Polite 1999a). The closest confirmed nest sites are located in the hills east of Dry Creek and near Healdsburg with probable nesting in the lower Dry Creek Valley (USGS Patuxent Wildlife Research Center 2015). Nests are built in conifers or deciduous trees near streams or open water, commonly associated with riparian zones (Polite 1999a).

Loggerhead Shrike

The loggerhead shrike (*Lanius excubitor*) is currently included on the USFWS list of "Birds of Conservation Concern" and is categorized by CDFW as a "State Species of Special Concern" (CDFW 2015). It is a common resident and winter visitor in lowlands and foothills throughout California. The loggerhead shrike prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. Its diet includes insects, especially large insects, as well as small birds, mammals, amphibians, reptiles, fish, carrion, and various other invertebrates (Granholm, Life History Account for Loggerhead Shrike 1999). In Sonoma County, it is considered an uncommon permanent resident with numbers declining over the last few decades (Parmeter and Bolander 2002). Prey items are often skewered on thorns, sharp twigs, or wire barbs to store for later feeding. Nests are generally built on a stable branch in dense trees or shrubs and are well hidden (Granholm, Life History Account for Loggerhead Shrike 1999). Nesting has been observed in the southern half of Sonoma County (Burrige 1995).

Merlin

The merlin (*Falco columbarius*) is a small falcon that is categorized by CDFW as a “State Species of Special Concern” (CDFW 2015). This species is an uncommon winter migrant from September to April (Parmeter and Bolander 2002). Merlins prefer coastlines, grasslands, savannahs, woodlands, lakes, wetlands, edges, and early successional stages. Its diet includes small birds, small mammals, and insects. Nests are usually open platforms of sticks in a tree, usually a conifer, adapted from existing corvid or hawk nests. Occasionally, nests are located in cavities, cliffs, in a deserted building, or on the ground (Polite 1999b). Nesting has not been observed in Sonoma County (Burrige 1995). One individual was observed in the Demonstration Project area by a Water Agency biologist in January 2014.

Olive-sided Flycatcher

The olive-sided flycatcher (*Contopus cooperi*) is currently included on the USFWS list of “Birds of Conservation Concern” and is categorized by CDFW as a “State Species of Special Concern” (CDFW 2015). It is found in a wide variety of forest and woodland habitats in California (Gaines 2005). In Sonoma County, it is a fairly common summer resident from April to September of coniferous forest and broadleaf forests with a coniferous component (Parmeter and Bolander 2002). This flycatcher sallies⁷ out for flying insects over forest canopy or adjacent meadows, clearings, or shrub-covered slopes in wide-ranging flights from high, conspicuous perches. Its preferred prey is honey bees. Nests are an open cup of grasses, mosses, lichens, rootlets, and pine needles located on a horizontal limb in a conifer (Gaines 2005). Nesting is probable or confirmed throughout much of Sonoma County and one record exists of possible nesting in the Dry Creek Valley (Burrige 1995).

Osprey

The osprey (*Pandion haliaetus*) is included on the CDFW “Watch List” (CDFW 2015). This raptor breeds in northern California from the Cascade Ranges south to Lake Tahoe and along the coast south to Marin County. Osprey prefer large, fish-bearing waters and regular breeding occurs on inland lakes, reservoirs and river systems (Polite 1999c). It is a fairly common summer resident and an uncommon winter resident in Sonoma County (Parmeter and Bolander 2002). Osprey feed mostly on fish but other prey may include mammals, birds, reptiles, amphibians, and invertebrates. In order to prey upon fish, the osprey requires open, clear water (Polite 1999c) such as that of Lake Sonoma or the Russian River. Nests are platforms of sticks at the top of large snags, dead-topped trees, on cliffs, or on human-made structures (Polite 1999c).

⁷ Sallying involves flying out from a perch to catch an insect mid-air and then returning to the perch. Sallying is a technique used to catch flying insects by flycatchers and some other bird species

Nesting has been confirmed east of Lake Sonoma and in several areas adjacent to the Russian River (Burrige 1995).

Peregrine Falcon

Following the decline of its population due to DDT poisoning, the peregrine falcon (*Falco peregrinus anatum*) was listed as endangered under the Federal Endangered Species Act in 1970 and under the California Endangered Species Act in 1971. The species was deemed recovered and delisted at the federal level in 1999 and state level in 2009 (CDFW 2015). Currently, the peregrine falcon is included on the USFWS list of “Birds of Conservation Concern” and is considered a fully protected species in California (CDFW 2015).

The peregrine falcon is a medium-sized raptor that hunts other birds by dropping down on them from high above at great speeds. This species may travel ten to 12 miles from their nests in search of prey. Its range extends throughout most of California in winter and during migrations. The breeding range includes the Channel Islands, the coast of southern and central California, inland north coastal mountains, the Klamath Mountains and Cascade Range, and the Sierra Nevada. Nesting sites are generally on ledges of large cliff faces that are adjacent to wetlands, woodlands, agricultural areas, and coastal habitats but nesting also occurs on city buildings and bridges. Some individuals nest in cavities of coastal redwoods (Polite and Pratt 1999b). There is a known nesting location on the eastern side of Lake Sonoma, approximately 3.4 miles upstream of Warm Springs Dam and 3.9 miles upstream of the northern extent of the proposed project (Burrige 1995). While no suitable nesting habitat exists within the project area, suitable foraging habitat is present and Water Agency staff observed one individual peregrine falcon soaring over Dry Creek Valley in 2014.

White-tailed Kite

The white-tailed kite (*Elanus leucurus*) is not listed under the Federal or State Endangered Species Acts, but is considered a fully protected species by the state of California. White-tailed kite occupy nearly all areas of California up to the western Sierra Nevada foothills and southeast deserts, inhabiting low elevation, open grasslands, savannah-like habitats, but are rarely found away from agricultural areas (Polite 1999d). In Sonoma County, it is considered a fairly common permanent resident and fall migrant with numbers peaking in the winter as birds arrive from other areas (Parmeter and Bolander 2002). The preferred diet for the white-tailed kite consists of voles and other small, diurnal mammals, birds, insects, reptiles, and amphibians. Foraging occurs in undisturbed, open grasslands, meadows, farmlands, and emergent wetlands. Nests are placed near the top of a dense oak, willow, or other tree stand and consist of loosely piled sticks and twigs, lined with grass, straw, or rootlets (Polite 1999d).

Yellow Warbler

The yellow warbler (*Dendroica petechia*) is considered a “Species of Special Concern” (breeding) by CDFW and a “Bird of Conservation Concern” by USFWS (CDFW 2015). In California, this species continues to occupy much of its former breeding range in Northern and Central California, with the exception of the Central Valley where it is near extirpation. The species has experienced other local declines as well. The yellow warbler’s range extends into Southern California via the Coast Ranges. Yellow warblers prefer riparian vegetation along streams and in wet meadows, especially willows, cottonwoods, alders, and Oregon ash (Gardali and Shuford 2008). In Sonoma County, the yellow warbler is considered a fairly common summer resident of riparian woodland from April through October (Parmeter and Bolander 2002) and nests most often along streams with well-developed deciduous tree canopy cover, particularly along the Russian River and larger wooded streams in the County. Nests are located in riparian vegetation and are open cups placed close to the trunk or in saplings or brush. In the breeding season, its diet consists primarily on insects caught by gleaning and hovering in the upper canopy (Burrige 1995). There are confirmed nesting occurrences in the Dry Creek Valley (USGS Patuxent Wildlife Research 2015).

Yellow-breasted Chat

The yellow-breasted chat (*Icteria virens*) is considered a “Species of Special Concern” (breeding) by CDFW (CDFW 2015). In California, this species was considered a fairly common to common summer resident breeding throughout California up to about 5,000 feet elevation but it is now rare or absent during breeding season in much of the Central Valley and parts of the southern Coastal Ranges (Gardali and Shuford 2008). In Sonoma County, the yellow-breasted chat is considered an uncommon summer resident, present from April to early September, in thick riparian woodland with heavy undergrowth (Parmeter and Bolander 2002), often with a fairly open canopy (Gardali and Shuford 2008).

Very little information exists regarding diet for California populations but in other locations adults consume insects and spiders as well as wild fruits and berries. Nesting often occurs in blackberry, wild grape, willow and other plants that form dense thickets and tangles (Gardali and Shuford 2008).

No nesting has been confirmed or reported as probable along Dry Creek but an individual was observed during breeding season on Dry Creek (Burrige 1995). Because suitable habitat is present within the project area and the yellow-breasted chat has been observed on Dry Creek during the breeding season, this species is considered to have a moderate potential to occur within the project area.

Mammals

Pallid Bat

The pallid bat, a California species of special concern (CDFW 2015), occurs throughout California, except in parts of the high Sierra and the northwestern corner of the state (Zeiner, W.F. Laudenslayer and K.E. Mayer, California's Wildlife. Vol. III: Mammals 1990). The pallid bat inhabits a variety of habitats, such as grasslands, shrublands, woodlands, and forests; however, it is most abundant in open, dry habitats with rocky areas for roosting. Pallid bats roost alone, in small groups, or gregariously (Sherwin and Rambaldini 2005). Roosts include caves, crevices in rocky outcrops and cliffs, mines, hollowed trees, and various man-made structures (e.g., bridges, barns, porches), and generally have unobstructed entrances/exits and are high above the ground, warm, and inaccessible to terrestrial predators. Year-to-year and night-to-night roost reuse is common; however, bats may switch day roosts on a daily and seasonal basis (Sherwin and Rambaldini 2005). Mating occurs from late October to February, and maternity colonies of up to 100 individuals form in early April. One or two pups are usually born May or June, and are weaned in approximately six to seven weeks. Maternity colonies disperse between August and October (Harris 1999).

Four occurrences of pallid bat were recorded within Dry Creek Valley (one in 1994, two in 1996, and one in 2001) at vineyard and residential buildings around the Lambert Bridge area (CDFW n.d.). In addition to human-made structures, pallid bats also roost in hollowed trees. While no additional observations have been recorded in the years since, suitable roosting habitat in the form of hollowed trees exists within the project area. Pre-construction surveys for pallid bat roost locations prior to construction activities for the Demonstration Project uncovered no active bat roosts despite suitable habitat. For these reasons, this species is considered to have a moderate potential to occur within the project area.

Table 3.3-2. Special-Status Wildlife Species With Potential to Occur in Sonoma County

<i>Genus species</i> Common Name	Status	Habitat	Potential to Occur
Invertebrates			
Conservancy fairy shrimp <i>Branchinecta conservation</i>	CE	Endemic to the grasslands of the northern two-thirds of the Central Valley; Inhabits astatic pools located in swales formed by old braided alluvium; filled by winter/spring rains. Known from BUT, GLE, KRN, MER, SOL, STA, TEH, and YOL counties.	Unlikely. No potential habitat within project area. No CNDDDB occurrences in SON County.
vernal pool fairy shrimp (including critical habitat) <i>Branchinecta lynchi</i>	CT	Endemic to the grasslands of Central Valley, Central coast mountains, and south coast mountains. Inhabits small, clear-water sandstone depression pools and grassed swale, earth slump, or basalt-flow depression pools. Known from ALA, AMA, BUT, CAL, COL, CCA, ELD, FRE, GLE, KRN, KIN, LAX, MAD, MER, MNT, NAP, PLA, RIV, SAC, SBN, SJO, SDI, SLO, SBA, SHA, SOL, STA, SUT, TEH, TUL, TUO, VEN, YOL, and YUB counties.	Unlikely. No potential habitat within project area. No CNDDDB occurrences in SON County.
Sonoma artc skipper <i>Carterocephalus palaemon</i> ssp.	FSC	Grasses including purple reed grass (<i>Calamagrostis purpurascens</i>) host caterpillars. Adults found in glades and openings in heavily forested woods, moist meadows, and streamsides. Known from SON county.	Unlikely. No potential habitat within project area. The only CNDDDB occurrence was observed near Salt Point State Park in 1965.
Giuliani's dubiraphian riffle beetle <i>Dubiraphia giulianii</i>	NL	Aquatic. Inhabits rocks and vegetation and found in slow parts of the Russian River. Known from SON County.	Unlikely due to the relatively high water velocities in Dry Creek. The only CNDDDB occurrence was recorded in 1948 at Rio Nido on the Russian River.
Leech's skyline diving beetle <i>Hydroporus leechi</i>	FSC	Shallow water, pond shores. Known from CAL, MAD, MRP, MEN, MNO, PLU, SMA, SHA, SIS, and SON counties.	Low. Potential habitat may be present on project area, but additional information required on distribution data. The only CNDDDB occurrence in SON County was located in 1963 at Annadel State Park, in Bennett Mountain Lake, west of Kenwood.
California linderiella <i>Linderiella occidentalis</i>	NL	Seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions. Known from ALA, AMA, BUT, CCO, FRE, GLE, MAD, MER, MNT, PLA, SAC, SBA, SJO, SLO, SCR, SHA, SOL, SON, STA, SUT, TEH, YOL, and YUB counties.	Unlikely. No potential habitat within the project area. Closest CNDDDB occurrence in 1993 at vernal pools south-east of Windsor.
Callippe silverspot butterfly <i>Speyeria callippe callippe</i>	FE	Restricted to the northern coastal scrub of the San Francisco peninsula. Host plant is <i>Viola pedunculata</i> . Most adults found on east facing slopes; males congregate on hilltops in search of females. Known from NAP, SFR, SMA, and SOL counties.	Unlikely. Project area is located outside the normal range for this species; colonies are all restricted to the coastal scrub of the San Francisco peninsula.

Genus species Common Name	Status	Habitat	Potential to Occur
Behren's silverspot butterfly <i>Speyeria zerene behrensii</i>	FE	Early successional coastal terrace prairie habitat extending along the northern coast of California, from the mouth of the Russian River (north bank) in Sonoma County northward to the vicinity of Point Arena in Mendocino County. May also inhabit coastal sand dune systems. Larval host plant is western dog violet (<i>Viola adunca</i>). Known from HUM, MEN, and SON counties.	Unlikely. Project area is located outside the normal range for this species; two CNDDDB occurrences in Sonoma County of specimens collected near Jenner, at the mouth of the Russian River are unclear, possibly an intermediate zone with Myrtles' silverspot butterfly (see below).
Myrtle's silverspot <i>Speyeria zerene myrtleae</i>	FE	Coastal dunes, coastal scrub, and coastal prairie habitat extending along the northern coast of California, from the mouth of the Russian River (south bank) in Sonoma County southward to Point Ano Nuevo in San Mateo county. Larval host plant is western dog violet (<i>Viola adunca</i>). Known from MRN, SMA, and SON counties.	Unlikely. Project area is located outside the normal range for this species; Known from 7 CNDDDB occurrences in SON County all of which are coastally located, in Bodega Head, Valley Ford, and Duncans Mills.
California freshwater shrimp <i>Syncaris pacifica</i>	FE CE	Endemic to low-elevation and low gradient perennial freshwater streams in MRN, SON, and NAP counties.	Low. Marginally suitable habitat within project area due to current high water velocities. There are 12 CNDDDB occurrences in Sonoma County. The closest occurrences to the project location are at Mark West Springs, Sonoma, and Glen Ellen.
Reptiles			
western pond turtle <i>Actinemys (=Emys) marmorata</i>	CSC	Variety of aquatic habitats, both permanent and intermittent, with suitable aerial and aquatic basking sites. Needs upland habitats for nesting, overwintering, and aestivating.	High. Suitable habitat within project area. Known from 3 CNDDDB occurrences on Dry Creek and has been observed during fisheries monitoring surveys on the mainstem Russian River near the confluence with Dry Creek.
California horned lizard <i>Phrynosoma coronatum frontale</i>	FSC, SSC	Areas with exposed gravelly-sandy substrates with scattered shrubs; clearings in riparian woodlands; dry uniform chamise chaparral; and annual grassland with scattered perennial seepweed (<i>Suaeda fruticosa</i>) or saltbush (<i>Atriplex polycarpa</i>).	Low. Marginally suitable habitat present within project area. Known throughout California, but no confirmed occurrences in Sonoma County.
Amphibians			
California tiger salamander Sonoma County DPS <i>Ambystoma californiense</i>	FE, FT, CT	Endemic to CA with isolated populations in Santa Barbara and Sonoma counties. Frequents lowland grassland and oak woodlands. Adults spend most of their live underground in animal burrows. Breeding occurs in vernal pools and ephemeral ponds that form during winter rains and dry out in summer.	Unlikely. No suitable habitat outside the range of this species. 79 CNDDDB occurrences in Sonoma County, all of which are located near the Santa Rosa Plain approximately 12-30 miles outside of project area.
tailed frog <i>Ascaphus truei</i>	SSC	Clear, cold, rocky streams in humid mixed forests. Grassland, chaparral, or shrub growth may be interspersed. Known from Coast Range and Cascade mountains from Humboldt County and north.	Unlikely. Project area is located outside of species range. No suitable within project area and no CNDDDB occurrences in Sonoma County.

Genus species Common Name	Status	Habitat	Potential to Occur
northern red-legged frog <i>Rana aurora aurora</i>	SSC	Permanent or temporary water bordered by dense, grassy or shrubby vegetation. Requires 4-6 months of permanent water for larval development. Known from Coast Mountains from Humboldt County and north .	Unlikely. Project area is located outside of species range. No CNDDB occurrences in Sonoma County.
foothill yellow-legged frog <i>Rana boylei</i>	SSC	Foothill streams with pools and riffles with rocky substrate in a variety of habitats. Known throughout CA and OR.	Moderate. Marginally suitable habitat in project area. Seventy-one CNDDB occurrences in Sonoma County and present in multiple locations within 5 miles of project area; the nearest occurrence recorded at Warm Springs Creek in 1974 prior to dam construction.
California red-legged frog (including critical habitat) <i>Rana draytonii</i>	FT, SSC	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development; must have access to aestivation habitat. Known from Coast Range Mountains from Sonoma County south.	Moderate. No known occurrences within Dry Creek watershed. Potentially suitable habitat present in project area. Known from 38 occurrences in Sonoma County with the nearest in occurrence in Guerneville at Armstrong Redwoods State Reserve.
Birds			
Allen's hummingbird (nesting) <i>Selasphorus sasin</i>	FSC, BCC	Pacific coastal fog belt in meadows, moist canyon bottoms, humid woody or brushy ravines, brushy edges of coniferous forest, coastal chaparral and low riparian woodlands. Known to occur throughout CA and Mexico.	Moderate. Potential to occur in project area. Suitable habitat exists within project area and known to occur in SON during breeding season. No CNDDB occurrences in SON County.
bald eagle (nesting & wintering) <i>Haliaeetus leucocephalus</i>	FE-delisted, CE, FP BCC	Found on coasts, rivers, and large lakes in open areas. Nests primarily in coniferous trees and on cliffs. Known from ALA, ALP, BUT CAL, COL, CCO, DNO, ELD, FRE, GLE, HUM, IMP, INY, KER, LAK, LAS, LAN, MAD, MEN, MER, MOD, MNO, MNT, NAP, NEV, ORA, PLA, PLU, RIV, SBN, SBR, SLO, SBA, SHA, SIE, SIS, STA, TEH, TRI, TUO, and YUB counties.	Moderate. No suitable breeding habitat in project area, but a pair is known to have maintained an active nest at Lake Sonoma from 2001 to the present. May occasionally forage in the project area and on the Russian River. No CNDDB occurrences in SON County.
bank swallow (nesting) <i>Riparia riparia</i>	CT	Open country near running water. Nests in burrows along the banks of streams, creeks, and rivers. Known from ALA, BUT, COL, EDL, FRE, GLE, HUM, INY, LAS, LAN, MOD, MNO, MNT, NAP, ORA, PLA, PLU, SAC, SBN, SDI, SFR, SJO, SLO, SMT, SBA, SCR, SHA, SIE, SIS, SON, SUT, TEH, VEN, YOL, and YUB counties.	Unlikely. Project area is outside of the known breeding range for this species. Only CNDDB in SON county from 1960 at Duncans Mills approximately 30 miles from project area.
Bell's sage sparrow (nesting) <i>Artemisiospiza belli belli</i>	WL, BCC	Found in sage-covered brushlands and arid chaparral-covered hillsides. Known from LAK, LAN, RIV, SRB, and SDI counties.	Unlikely. No suitable habitat within project area. No CNDDB occurrence in SON County.
Ridgway's clapper rail <i>Rallus obsoletus</i>	FE, CE	Wetland habitats and tidal marshes with dense vegetation for foraging and nesting. Known from ALA, CCO, HUM, MRN, MNT, NAP, SFR, SLO, SMA, SCL, SOL, and SON counties.	Unlikely. No suitable habitat within project area. Known occurrences in SON County are in the the marshes and tidal baylands adjacent to San Pablo Bay.

Genus species Common Name	Status	Habitat	Potential to Occur
California horned lark <i>Eremophila alpestris actia</i>	WL	Grasslands and other open habitats with low, sparse vegetation. Builds grass-lined nest; cup-shaped in depression on open ground. Known from ALA, CCO, FRE, KER, LAN, MER, MNT, ORA, RIV, SBN, SBR, SDI, SJO, SLO, STA, and VEN counties.	Low. Small patches of marginally suitable habitat adjacent to the project area. Known to occur in SON County year-round, however there are no CNDDDB occurrences in SON County.
California least tern (nesting colony) <i>Sternula antillarum browni</i>	FE, CE	Often palagic, and found in marine habitats. Colonial nesters prefer open beaches with limited vegetation. Known from ALA, CCO, LAN, ORA, SDI, SLO, SMA, SBA, SCL, SOL, and VEN counties.	Unlikely. Project area is located outside of species range. No ocean or coastal habitat within the project area.
Cooper's hawk (nesting) <i>Accipiter cooperii</i>	WL	Riparian, oak woodland, or other forest habitats near water. Occurs in variety of habitats during migration. Known from ALA, COL, CCO, FRE, HUM, IMP, INY, KER, LAN, MEN, MNT, ORA, PLA, RIV, SAC, SBN, SBR, SDI, SLO, SBA, SCL, SCR, SIS, TUL, TUO, and VEN counties.	High. Suitable breeding habitat identified in project area. Known to be a year-round resident of SON County, however, there are no CNDDDB occurrences.
ferruginous hawk (wintering) <i>Buteo regalis</i>	BCC, WL	Open country, usually prairies and plains. Nests in coniferous trees with expansive view. Prefers open, rolling, grassy hills. Known from ALA, CCO, IMP, KER, LAN, MER, MNT, NAP, ORA, RIV, SAC, SDI, SJO, SLO, SBA, SIS, SOL, and VEN counties.	Unlikely. Uncommon winter resident in SON County. No suitable habitat within project area. No CNDDDB in SON County.
golden eagle (nesting & wintering) <i>Aquila chrysaetos</i>	WL, FP	Open habitats, particularly hills and mountains. Nests on cliffs or in high tree tops. Known from ALA, COL, CCO, ELD, FRE, HUM, IMP, INY, KER, LAK, LAS, LAN, MAD, MER, MOD, MNO, MNT, NAP, ORA, RIV, SAC, SBR, SDI, SJO, SLO, SCL, SIS, SOL, STA, TRI, TUL, and VEN county.	Low. No suitable breeding habitat within project area but nesting recorded in the hills east of Highway 101 near Geyserville and Healdsburg with possible nesting recorded at Lake Sonoma and elsewhere within the Dry Creek watershed. May occasionally forage in the project area. No CNDDDB occurrences in SON County.
grasshopper sparrow (nesting) <i>Ammodramus savannarum</i>	SSC	Dense, dry or well-drained grassland with scattered shrubs for perching. Known from LAN, MEN, ORA, PLA, SAC, SDI, SLO, SOL and YUB counties.	Low. Marginally suitable habitat in grasslands adjacent to project area. Known to occur in SON County in the summer months, however, there are no CNDDDB occurrences in SON County.
Lewis' woodpecker (nesting) <i>Melanerpes lewis</i>	FSC, BCC	Breeds in open forest and woodland with an open canopy and brushy understory. Requires dead trees for nest cavities. Known to occur throughout western North America.	Low. Uncommon, sporadic winter resident of SON county. Project area outside known breeding range for this species. Suitable wintering habitat identified in project area. No CNDDDB occurrences in SON County.
little willow flycatcher (nesting) <i>Empidonax traillii brewsteri</i>	FSC, CE BCC	Swamps, willow thickets, riparian woodland. Nests in the forks of trees or shrubs, approximately 0.5 to 3 meters above ground. Known throughout California, Oregon and Washington.	Unlikely. Project area outside known breeding range for this species. Only CNDDDB occurrence in HUM County.

Genus species Common Name	Status	Habitat	Potential to Occur
Loggerhead Shrike (nesting) <i>Lanius ludovicianus</i>	BCC, SSC	Open habitats with sparse shrubs and trees, other suitable perches, bare ground, and low or sparse herbaceous cover. Known from ALA, BUT, CCO, FRE, IMP, INY, KER, LAN, RIV, SBR, SDI, SJO, SLO, STA, and TUL counties.	Moderate. Marginally suitable breeding and foraging habitat identified adjacent to project area. Known to nest in Sonoma County but all recorded nesting occurrences are located south of Windsor. A year-round resident, however, no CNDDDB occurrences in SON County.
long-billed curlew (nesting) <i>Numenius americanus</i>	BCC, WL	Upland shortgrass prairies and wet meadows are used for nesting; coastal estuaries, open grasslands, and croplands are used in winter. Known to occur throughout the US, Canada and Mexico.	Unlikely. Project area outside known breeding range for this species. No CNDDDB occurrences in SON County.
long-eared owl (nesting) <i>Asio otus</i>	SSC	Dense riparian and live-oak thickets near meadow edges, and nearby woodland and forest habitats. Known from FRE, INY, KER, LAS, MOD, MNO, NEV, ORA, RIV, SBN, SBR, SDI, SLO, and SMA counties.	Unlikely. Project area outside of known breeding range for this species, however, some records indicate that breeding pairs identified in Sonoma County previously along Russian River. No CNDDDB occurrences in SON County.
marbled murrelet (nesting and critical habitat) <i>Brachyramphus marmoratus</i>	FT, CE	Feeds near-shore; nests in old-growth trees along coast of California, from Eureka to Oregon border and from Half Moon Bay to Santa Cruz. Nests in old-growth forests, characterized by large trees, multiple canopy layers, and moderate to high canopy closure. Forests are located close enough to the marine environment for the birds to fly to and from nest sites.	Unlikely. No suitable habitat in project area. No confirmed nesting in Sonoma County. Sightings occur along coast. Present offshore of Arched Rock Beach, approximately 40 miles from project area. No ocean or coastal habitat within the project area. No CNDDDB occurrences in SON County.
merlin (wintering) <i>Falco columbarius</i>	SSC	Does not breed in California. Winters on coastlines, open grasslands, savannahs, woodlands, lakes, wetlands, and early successional stages. Known from BUT, FRE, IMP, KER, LAN, MER, RIV, SAC, SBN, SJO, SLO, SMA, and YOL counties.	Moderate. Marginally suitable foraging habitat identified in project area. Individual was observed in Demonstration Project area by Water Agency biologist. No CNDDDB occurrences in SON county.
northern harrier (nesting) <i>Circus cyaneus</i>	SSC	Prairie, savanna, slough, wet meadow, marshes. Nests on elevated ground or in thick vegetation. Known from ALA, BUT, CCO, FRE, INY, MRN, MER, MNO, MNT, NAP, ORA, RIV, SDI, SJO, SMT, SOL, and YUB counties.	Low. No suitable habitat within project area. This species has been observed in SON county near the Laguna de Santa Rosa approximately 35 miles from the project area, as well as tidal marsh areas near Petaluma, approximately 40 miles from project site. No CNDDDB occurrences in SON County.
northern spotted owl (including critical habitat) <i>Strix occidentalis caurina</i>	FT, SC	Dense coniferous and deciduous forests. Nests primarily in coniferous trees, occasionally on cliffs in heavily wooded canyons. Known to occur in Northern CA, Oregon, Washington, and Canada.	Unlikely. Potentially suitable nesting habitat in woodlands adjacent to project area. Known to be a year round resident of SON County.
olive-sided flycatcher (nesting) <i>Contopus cooperi</i>	BCC, SSC	Summer resident. Breeds in forest and woodland especially where burns or slashing has occurred. Also in eucalyptus trees in foothill canyons.	High. Marginally suitable habitat within project area. This species has been observed in project area during summer bird surveys. Known to be a summer resident in SON County, however, there are no CNDDDB occurrences in SON County.

Genus species Common Name	Status	Habitat	Potential to Occur
osprey (nesting) <i>Pandion haliaetus</i>	WL	Found along rivers, lakes, and coasts. Nests in deciduous or coniferous trees or standing snags (occasionally power poles) near or over water. Known from BUT, COL, DNO, ELD, FRE, GLE, HUM, INY, LAK, LAS, MRN, MEN, MOD, MNO, NEV, ORA, PLA, PLU, SDI, SJO, SCL, SCR, SHA, SIS, SOL, SON, TEH, TRI, and TUO counties.	Moderate. Suitable foraging and marginal breeding habitat identified in project area. Known to nest at Lake Sonoma as well as throughout the Russian River area. Possible breeding occurrences recorded in Dry Creek Valley. Requires large, open bodies of water for preying on fish. Dry Creek is largely covered by tree canopy and presents hazards due to a swift current, reducing the likelihood that Osprey would forage in the project area.
peregrine falcon (nesting) <i>Falco peregrinus anatum</i>	FE/CE delisted FP BCC	In open habitats from tundra, savanna, and coasts to high mountains. Known to occur in urban areas on tall buildings. Usually nests in scrapes on cliff ledges. Known from ALA, AMA, BUT, HUM, LAN, MEN, NAP, SBN, SDI, SMA, SBA, SCL, SCR, SHA, SIS, SOL, TEH, and TUO counties.	Moderate. Water Agency staff observed one individual soaring over Dry Creek Valley in 2014. No suitable breeding habitat exists within the project area, but nesting is known to occur among the mountains and cliffs immediately east of Lake Sonoma, approximately 3 miles upstream of the dam. May occasionally forage in the project area. No occurrences are listed in the CNDDDB in SON County.
red-breasted sapsucker (nesting) <i>Sphyrapicus ruber</i>	SAL	Coastal ranges in moist coniferous or mixed forests at low elevations. Known from KER county.	Moderate. Fairly common throughout county in winter. Nesting recorded in extreme northwest SON county. Nesting reported as "possible" in portions of Dry Creek Valley. This species has been observed on Dry Creek during bird surveys. No CNDDDB occurrences in SON county.
rufous hummingbird (nesting) <i>Selasphorus rufus</i>	BCC	Open arid scrub, brushy slopes, desert vegetation and North Coast coniferous forests. Breeds in transition life zones of northwest coastal area from Oregon border to southern SON County.	Unlikely. Uncommon spring migrant, casual summer and winter visitant in SON county. No known breeding occurrences in SON County.
sharp-shinned hawk (nesting) <i>Accipiter striatus</i>	WL	Nests in dense, pole and small-tree stands of conifers, which are cool, moist, well-shaded, with little ground cover, near water. Forages in openings at woodland edges, hedgerows, brushy pastures, and shorelines. Known from ALA, CAL, ELD, HUM, MEN, NAP, SBN, SLO, and TUO counties.	Low. Rare summer resident and nester, fairly common fall migrant along the coast, fairly common in winter. Confirmed nesting at Annadel State Park and location near Windsor. Potentially suitable nesting habitat within project area. No CNDDDB occurrences in SON County.
short-eared owl (nesting) <i>Asio flammeus</i>	SSC	Found in open, treeless areas and grasslands with elevated sites for perches, and dense vegetation for roosting and nesting. Nests on dry ground in a depression concealed with vegetation, and lined with grasses, forbs, sticks, and feathers; occasionally nests in burrows. Known from CCO, FRE, IMP, LAN, MOD, MNT, SMA, and SOL counties.	Unlikely. Uncommon winter resident, only a few recorded occurrences in summer. Only one possible nest recorded for all of SON County, in Annadel State Park in 1979. CNDDDB occurrences in SON County.
summer tanager (nesting) <i>Piranga rubra</i>	SSC	Found in cottonwoods and willows, especially older, dense stands along rivers and streams, which provide nesting, feeding, and other cover. Known from IMP, INY, KER, RIV, and SBR counties.	Unlikely. Rare in SON County during all seasons. No breeding occurrences recorded for SON County.

Genus species Common Name	Status	Habitat	Potential to Occur
tricolored blackbird (nesting colony) <i>Agelaius tricolor</i>	SE, BCC	Nest located over or near fresh water, especially in emergent wetland. Usually nests in dense cattails or tules; also nests in thickets of willow, blackberry, wild rose, tall herbs. Known from ALA, BUT, GLE, CAL, COL, CCO, ELD, FRE, HUM, KER, KIN, LAK, LAS, LAN, MAD, MRN, MEN, MER, MOD, MNT, NAP, ORA, PLA, RIV, SAC, SBN, SBR, SDI, SJO, SLO, SBA, SCL, SCR, SHA, SIS, SOL, SON, STA, SUT, TEH, TUL, TUO, YOL and YUB counties.	Low. Nesting generally occurs in emergent tules and cattails associated with freshwater marsh habitat; seldom in willow, blackberry, or edge thickets. Little or no habitat within project area. Closest confirmed breeding location is near the Sonoma County Airport. Two CNDDDB occurrences in SON County in Cotati, approximately 30 miles south from project area and Sears Point, approximately 50 miles south/southeast of project area.
Vaux's swift (nesting) <i>Chaetura vauxi</i>	SSC	Old-growth coniferous forests, especially in coast redwood, and mixed deciduous/coniferous forests. Nests in hollow or broken top trees, stumps, and chimneys.	Low. No suitable nesting habitat identified in project area. Potentially suitable nesting habitat in adjacent forested areas. Confirmed nesting in Healdsburg and Russian River area. Suitable foraging habitat identified in project area. No CNDDDB occurrences in SON County.
western snowy plover (nesting) <i>Charadrius alexandrinus nivosus</i>	FT, SSC, BCC	Alkaline habitats and sandy or coralline beaches along the coast, roost in flocks on the ground, coastal nesters in dune hollows on sandy beaches. Known from ALA, DNO, HUM, IMP, INY, KER, KIN, LAN, MRN, MEN, MOD, MNT, NAP, ORA, RIV, SBR, SDI, SLO, SMT, SBA, SCR, SIS, SON, TUL, VEN and YOL counties.	Unlikely. No suitable nesting or foraging habitat present in project area. No ocean or coastal habitat within the project area.
western Yellow-billed Cuckoo (nesting) <i>Coccyzus americanus occidentalis</i>	FT, CE BCC	Open woodlands, especially with dense undergrowth, riparian woodlands, and thickets. Nests in deciduous trees or shrubs approximately one to two meters from the ground. Known from BUT, COL, FRE, GLE, HUM, IMP, INY, KER, LAK, LAN, RIV, SAC, SBN, SBR, SDI, SJO, SLO, SIS, SON, SUT, TEH, and VEN counties.	Unlikely. Suitable nesting or foraging habitat within project area, however project area is located outside known breeding range for this species. No recorded breeding occurrences within SON County since 1940s. Single bird seen briefly on Dry Creek in 1988 but subsequent searches yielded no results. Known from 2 CNDDDB occurrences in SON County at Glen Ellen, approximately 34 miles from project area and Valley Ford, approximately 40 miles from project area.
white-tailed Kite (nesting) <i>Elanus leucurus</i>	FP	Nests in dense-canopied woodlands adjacent to grasslands, agricultural fields, and wetlands. Known from ALA, COL, CCO, ELD, DNO, KER, LAN, MRN, MEN, MNT, NAP, ORA, PLA, RIV, SAC, SBN, SBR, SDI, SJO, SLO, SMA, SBA, SCL, SCR, SOL, SON, TEH, VEN, YOL and YUB counties.	Moderate. Suitable nesting and foraging habitat within project area. No confirmed nesting reported in Dry Creek Valley but nesting considered confirmed and probable in several locations throughout SON County.
yellow warbler (nesting) <i>Dendroica petechia brewsteri</i>	SSC, BCC	Riparian; open to medium-density woodlands and forests with a heavy brush understory. Known from ALA, BUT, FRE, IMP, INY, KER, LAN, MRN, MEN, MNO, MNT, NEV, PLA, RIV, SBR, SDI, SJO, SBA, SIE, TEH, and VEN counties.	High. Suitable breeding and foraging habitat within project area. Nesting confirmed along Dry Creek. Known to breed in Sonoma County but no CNDDDB occurrences in Sonoma County.
yellow-breasted chat (nesting) <i>Icteria virens</i>	SSC	Dense brushy thickets and tangles near water and thick understory in riparian woodland. Known from IMP, INY, KER, LAN, MEN, MER, ORA, RIV, SBN, SBR, SDI, SJO, SOL, STA, TEH, and VEN counties.	Moderate. Potential to occur on site. Suitable breeding and foraging habitat within project area. Known to breed in Sonoma County but no CNDDDB occurrences in SON County.

Genus species Common Name	Status	Habitat	Potential to Occur
Mammals			
American badger <i>Taxidea taxus</i>	SSC	Herbaceous, shrub, and open stages of most habitats with dry, friable soils. Known from ALA, BUT, COL, CCO, ELD, FRE, GLE, HUM, IMP, INY, KER, KIN, LAK, LAS, LAN, MAD, MRN, MRP, MEN, MER, MOD, MNO, MNT, NAP, ORA, PLU, RIV, SAC, SBN, SBR, SDI, SFR, SJO, SLO, SMA, SBA, SCL, SCR, SHA, SIE, SIS, SOL, SON, STA, TEH, TRI, TUL, TUO, VEN and YOL counties.	Low. No suitable habitat within project area, however potential habitat occurs in undeveloped portions of the surrounding valley and hills. Seventeen CNDDDB occurrences in SON County, most of which are located near the coast. Nearest occurrence is west of Santa Rosa at the Wright Preserve, approximately 12 miles from project area.
fringed myotis bat <i>Myotis thysanodes</i>	FSC	Pinyon-juniper, valley foothill hardwood, and hardwood-conifer habitats at 4,000-7,000 feet are optimal, but occurs in a wide variety of habitats. Breeds in caves and old buildings. Known from BUT, DNO, ELD, FRE, HUM, KER, LAK, LAS, LAN, MRP, MNO, NAP, PLU, RIV, SBN, SBR, SDI, SLO, SMA, SHA, SIE, SON, TRI, TUL, TUO and VEN counties.	Low. No suitable roosting habitat within project area. Potential foraging habitat identified in project area. Two extant CNDDDB occurrences in SON County, Santa Rosa at Pepperwood Ranch Preserve, 22 miles from project area and Pinnacle Rock, Bodega Bay, approximately 40 miles from project area.
greater western mastiff-bat <i>Eumops perotis californicus</i>	FSC, SSC	Extensive open areas with abundant roost locations provided by crevices in rock outcrops and buildings. Known from ALA, BUT, CAL, FRE, IMP, INY, KER, LAN, MAD, MRP, MER, MNO, MNT, ORA, RIV, SBN, SBR, SDI, SJO, SLO, SBA, SIS, STA, THE, TUL, TUO, and VEN counties.	Low. No suitable roosting habitat within project area. Potential foraging habitat identified in project area. No CNDDDB occurrences in SON County.
long-eared myotis bat <i>Myotis evotis</i>	FSC	Coniferous forests and woodlands preferred, but found in nearly all brush, woodland and forested habitats. Does not roost colonnially. Roosts in buildings, crevices, spaces under bark, and snags. Caves used primarily as night roosts. Known from BUT, FRE, HUM, INY, LAK, LAS, LAN, MAD, MAR, MEN, MON, NAP, PLU, SBN, SBR, SDI, SCL, SHA, SIE, SIS, SON, TEH, TRI, TUL, and TUO counties.	Low. Marginal roosting habitat within project area. Suitable foraging habitat identified in project area. Only CNDDDB occurrence in SON County at Pinnacle Rock, Bodega Bay, approximately 40 miles from project area.
long-legged myotis bat <i>Myotis volans</i>	FSC	Forages in chaparral, coastal scrub, early successional woodlands and forests. Roosts in trees, buildings, rock crevices, under tree bark, in snags, and crevices in cliffs. Caves and mines used as night roosts. Known from ALP, DNO, ELD, FRE, HUM, INY, KER, LAS, LAN, MAD, MRP, MNO, PLA, PLU, SBR, SDI, SLO, SHA, SIS, TRI, TUL, TUO and VEN counties.	Low. Marginal roosting habitat within project area. Suitable foraging habitat identified in project area. No CNDDDB occurrences in SON County.

Genus species Common Name	Status	Habitat	Potential to Occur
pallid bat <i>Antrozous pallidus</i>	SSC	Forages in variety of habitats. Roosts in caves, crevices, mines, and occasionally hollow trees and buildings. Prefers mesic sites. Known from ALA, AMA, BUT, CAL, CCO, ELD, FRE, HUM, IMP, INY, KER, LAK, LAS, LAN, MAD, MRN, MRP, MEN, MER, MOD, MNO, MNT, NAP, ORA, PLU, RIV, SAC, SBN, SBR, SDI, SJO, SLO, SMA, SBA, SCL, SCR, SHA, SIS, SOL, SON, STA, SUT, TEH, TRI, TUL, TUO, VEN and YOL counties.	Moderate. Marginal roosting habitat within project area. Suitable foraging habitat in project area. Nineteen CNDDDB occurrences in SON County. Closest recorded occurrences are located at residential and vineyard buildings in the Lambert Bridge area but three of these four are presumed extirpated.
Point Arena mountain beaver <i>Aplodontia rufa nigra</i>	FE SSC	Coastal areas of Point Arena with springs or seepages on north-facing slopes of ridges and gullies with friable soils and thickets of undergrowth. Known from MEN County.	Unlikely. Project area is outside known range for this species. No CNDDDB occurrences in SON County.
salt marsh harvest mouse <i>Reithrodontomys raviventris</i>	FE, CE	Known only to occur in the saline emergent wetlands of San Francisco Bay and its tributaries. Found almost exclusively in pickleweed habitat, they build loosely organized nests and require higher areas for flood escape. Known ALA, CCO, MRN, NAP, SMA, SCL, SOL, and SON counties.	Unlikely. No suitable habitat within project area (pickleweed or emergent wetland). Project area is outside species' range.
Sonoma tree vole <i>Arborimus pomo</i>	SSC	North coast coniferous forests from the Klamath Mountains to Sonoma County. Nest, reproduces and forages high up in coniferous trees. Known from DNO, HUM, MEN, SON and TRI counties.	Unlikely. No suitable habitat within project area. Nearest occurrence is approximately 11 miles west in Austin Creek watershed.
Townsend's big-eared bat <i>Corynorhinus townsendii</i>	FSC, SSC	Forages in variety of habitats: cliff, desert, and coniferous, riparian hardwood, and mixed forests, grasslands, savannah, and chaparral. Roosts in caves, mine shafts, and buildings. Known from ALA, AMA, BUT, CAL, COL, CCO, DNO, ELD, FRE, HUM, IMP, INY, KER, LAK, LAN, MRN, MRP, MEN, MOD, MNO, MNT, NAP, PLA, PLU, RIV, SBN, SBR, SDI, SFR, SJO, SLO, SMA, SBA, SCL, SCR, SHA, SIE, SIS, SOL, SON, STA, TEH, TRI, TUL, TUO, VEN and YOL counties.	Low. Potential to occur in project area. Suitable foraging habitat identified in project area. Known from 11 CNDDDB occurrences in SON County with the closest occurrence recorded at Healdsburg in 1954. The most recent occurrence was from 1999 at Bodega Head, approximately 50 miles from project area.
Yuma myotis bat <i>Myotis yumanensis</i>	FSC	Commonly occurs along wooded canyon botteoms with sources of water to forage over. Roosts in caves and old buildings. Known from ALA, BUT, CAL, COL, DNO, ELD, FRE, HUM, IMP, INY, KER, LAS, LAN, MAD, MRP, MER, MNO, NAP, ORA, PLU, RIV, SBN, SBR, SDI, SLO, SBA, SCL, SHA, SIE, SON, STA, TEH, TRI, TUL, TUO, and YUB counties.	Low. Marginal roosting habitat in project area. Potential foraging habitat identified in project area. One extant occurrence in SON County located at House Creek off Skaggs Springs Road approximately 15 miles west of the project area.

CODES:

FC: Federal Candidate for listing	CD: State of California Delisted	SAL: CDFW Special Animals List
FD: Federal Delisted	CE: Listed as endangered under the California ESA.	SC: Candidate for listing under the California ESA
FE: Federally listed as Endangered	CP: State of California Proposed for listing	WL: California Department of Fish and Wildlife Watch List
FT: Federally listed as Threatened	CT: Listed as threatened under the California ESA.	BCC: U.S. Fish and Wildlife Service Birds of Conservation Concern
FPE: Proposed for listing under the federal ESA.	CSC: California Species of Special Concern	SSC: A California Department of Fish and Wildlife Species of Special Concern.
FP: Fully protected under California Fish and Wildlife Code (Birds §3511; Mammals §4700; Reptiles and Amphibians §5050; Fish §5515).		SCT: State Candidate for Listing

FSC: Species previously identified as a Species of Concern. *Please note that The U.S. Fish and Wildlife Service Sacramento Office no longer maintains a "Species of Concern" list. Species of Concern is not defined in the federal Endangered Species Act, but the term commonly refers to species that are declining or appear to be in need of conservation.

POTENTIAL TO OCCUR:

Unlikely: Habitat not present in the Dry Creek Project Area and/or species is not known to occur in the Dry Creek Project Area based on CNDDB occurrences, recent field surveys or species distribution information.

Low: Habitat not present in the Dry Creek Project Area and/or few occurrence in the region.

Moderate: Marginal habitat present in the Dry Creek Project Area and/or some occurrences in the region.

High: Good habitat present in the Dry Creek Project Area and nearby occurrences or species is known to occur in the Dry Creek Project Area based on CNDDB occurrences or recent field surveys

SOURCES:

List of species based on review of California Department of Fish and Wildlife, California Natural Diversity Database (CNDDDB) for the Cloverdale, Geyserville, Healdsburg and Guerneville U.S. Geological Survey 7.5 minute quadrangles and species lists provided by the U.S. Fish and Wildlife Service.

<https://map.dfg.ca.gov/rarefind/view/RareFind.aspx> Accessed December 2, 2014

http://www.fws.gov/sacramento/es_species/Lists/es_species_lists-form.cfm Accessed December 18, 2014

<http://ecos.fws.gov/ecos/home.action> Accessed March 5, 2015

<http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/spanimals.pdf> Accessed March 5, 2015

<http://www.allaboutbirds.org/guide/id> The Cornell Lab of Ornithology, Accessed March 31, 2015

<http://www.calflora.org/> The Calflora

Burridge, Betty. 1995. *Sonoma County Breeding Bird Atlas*. Santa Rosa: Madrone Audubon Society, Inc.

Bolander, Gordon L. and Benjamin D. Parmeter. Revised and Updated 2000. *Birds of Sonoma County, California: An Annotated Checklist and Birding Gazetteer*. Napa. Redwood Region Ornithological Society.

Abbreviations:

ALA Alameda	LAK Lake	NEV Nevada	SCT Santa Catalina Island	SHA Shasta
AMA Amador	LAS Lassen	ORA Orange	SCZ Santa Cruz Island	SIE Sierra
BUT Butte	LAX Los Angeles	PLA Placer	SDG San Diego	SIS Siskiyou
CAL Calaveras	LCP Local Coastal Plan	PLU Plumas	SFO San Francisco	SOL Solano
CCA Contra Costa	MAD Madera	RIV Riverside	SHA Shasta SIE Sierra	SON Sonoma County
COL Colusa	MOD Modoc	SAC Sacramento	SIS Siskiyou	STA Stanislaus
DNT Del Norte	MEN Mendocino	SBA Santa Barbara	SJQ San Joaquin	SJQ San Joaquin
ELD El Dorado	MER Merced	SBD San Bernardino	SMI San Miguel Island	SMI San Miguel Island
FRE Fresno	MNT Monterey	SBT San Benito	SMT San Mateo	SMT San Mateo
GLE Glenn	MPA Mariposa	SCF Sonoma County Flora	SNI San Nicolas Island	SNI San Nicolas Island
HUM Humboldt	MRN Marin	SCL Santa Clara	SDG San Diego	
KRN Kern	NAP Napa	SCR Santa Cruz	SFO San Francisco	

3.3.3 Regulatory Framework

The following discussion identifies federal, state, and local regulations that serve to protect sensitive biological resources relevant to the CEQA review process.

Federal Regulations

Federal Endangered Species Act

The Secretary of the Interior (represented by the USFWS) and the Secretary of Commerce (represented by the National Marine Fisheries Service [NMFS]) have joint authority to list a species as threatened or endangered under the Federal Endangered Species Act (FESA) [United States Code (USC), Title 16, Section 1533(c)]. FESA prohibits the “take” of endangered or threatened fish, wildlife, or plants species in areas under federal jurisdiction or in violation of state law, in addition to adverse modifications to their critical habitat. Under FESA, the definition of “take” is to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct (USFWS 2013).” The USFWS and NMFS also interpret the definition of “harm” to include significant habitat modification that could result in the take of a species.

If an activity would result in the take of a federally listed species, one of the following is required: an incidental take permit under Section 10(a) of FESA, or an incidental take statement issued pursuant to federal interagency consultation under Section 7 of FESA. Such authorization typically requires various measures to avoid and minimize species take, and to protect the species and avoid jeopardy to the species’ continued existence.

Pursuant to the requirements of Section 7 of FESA, a federal agency reviewing a proposed project, which it may authorize, fund, or carry out, must determine whether any federally listed threatened or endangered species, or species proposed for federal listing, may be present in the project area and determine whether implementation of the proposed project is likely to affect the species. In addition, the federal agency is required to determine whether a proposed project is likely to jeopardize the continued existence of a listed species or any species proposed to be listed under FESA or result in the destruction or adverse modification of critical habitat proposed or designated for such species [16 USC 1536(3), (4)].

Generally, the USFWS implements FESA for terrestrial and freshwater fish species and the NMFS implements FESA for marine and anadromous fish species. USFWS and/or NMFS must authorize projects where a federally listed species is present and likely to be affected by an existing or proposed project. Authorization may involve a letter of concurrence that the project will not result in the potential take of a listed species, or may result in the issuance of a Biological Opinion that describes measures that must be undertaken to minimize the likelihood of an incidental take of a listed species. A project

that is determined by USFWS or NMFS to jeopardize the continued existence of a listed species cannot be approved under a Biological Opinion.

Where a federal agency is not authorizing, funding, or carrying out a project, take that is incidental to the lawful operation of a project may be permitted pursuant to Section 10(a) of FESA through approval of a habitat conservation plan (HCP).

FESA requires the federal government to designate “critical habitat” for any species it lists under the Endangered Species Act. “Critical habitat” is defined as: (1) specific areas within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to the species conservation, and those features that may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species if the regulatory agency determines that the area itself is essential for conservation.

Federal Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA) (16 USC, Section 703, Supp. I, 1989), as amended by the Migratory Bird Treaty Reform Act, prohibits killing, possessing, or trading in migratory birds, except in accordance with regulations prescribed by the Secretary of the Interior. The MBTA addresses whole birds, parts of birds, and bird nests and eggs. For projects that would not cause direct mortality of birds, the MBTA is generally interpreted in CEQA analyses as protecting active nests of all species of birds that are included in the “List of Migratory Birds” published in the Federal Register in 1995 and as amended in 2005. Though the MBTA allows permits to be issued for import and export, banding, scientific collecting, taxidermy, and rehabilitation, among other reasons, there is no provision in the MBTA that allows for species take related to creation or other development. Take refers to harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting to engage in any such conduct (Code of Federal Regulations, Title 50: Wildlife and fisheries Part 21; Migratory Bird Permits).

Federal Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 USC 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from “taking” bald eagles, including their parts, nests, or eggs. The act provides criminal penalties for persons who “take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle... [or any golden eagle], alive or dead, or any part, nest, or egg thereof.” The act defines “take” as pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb.”

River and Harbor Act and Clean Water Act

The Secretary of the Army [represented by the USACE] has permitting authority over activities affecting waters of the United States under Section 10 of the River and Harbor Act (33 USC 403) and Section 404 of the Clean Water Act (33 USC 1344). Waters of the United States are defined in Title 33 CFR Part 328.3(a) and include a range of wet environments such as lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds. Section 10 of the River and Harbor Act requires a federal license or permit prior to accomplishing any work in, over, or under navigable⁸ waters of the United States, or which affects the course, location, condition or capacity of such waters. Section 404 of the Clean Water Act requires a federal license or permit prior to discharging dredged or fill material into waters of the United States, unless the activity is exempt (33 CFR 324.4) from Section 404 permit requirements (e.g., certain farming and forestry activities). To obtain a federal license or permit, project proponents must demonstrate that they have attempted to avoid the resource or minimize impacts on the resource; however, if it is not possible to avoid impacts or minimize impacts further, the project proponent is required to mitigate remaining project impacts on all federally-regulated waters of the United States.

Section 401 of the Clean Water Act (33 USC 1341) requires any project proponents for a federal license or permit to conduct any activity including, but not limited to, the creation or operation of facilities, which may result in any discharge into navigable waters of the United States, to obtain a certification from the state in which the discharge originates or would originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over the navigable waters at the point where the discharge originates or would originate, that the discharge will comply with the applicable effluent limitations and water quality standards. A certification obtained for the creation of any facility must also pertain to the subsequent operation of the facility. The responsibility for the protection of water quality in California rests with the State Water Resources Control Board (SWRCB) and its nine Regional Water Quality Control Boards (RWQCBs).

State Regulations

California Endangered Species Act

Pursuant to the California Endangered Species Act (CESA) and Section 2081 of the California Fish and Game Code, a permit from the CDFW is required for activities that could result in the take of a state-listed threatened or endangered species (*i.e.*, species

⁸ "Navigable waters of the United States" (33 CFR Part 329) are defined as waters that have been used in the past, are now used, or are susceptible to use as a means to transport interstate or foreign commerce up to the head of navigation.

listed under CESA). The definition of “take” is to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill (Fish and Game Code Section 86).

Unlike the federal definition of “take,” the state definition does not include “harm” or “harass”. As a result, the threshold for take under CESA is typically higher than that under FESA. Section 2080 of the Fish and Game Code prohibits the taking of plants and animals listed under the authority of CESA, except as otherwise permitted under Fish and Game Code Sections 2080.1, 2081, and 2835. Under CESA, the California Fish and Game Commission retains a list of threatened species and endangered species (Fish and Game Code Section 2070). The California Fish and Game Commission also maintains two additional lists:

1. Candidate species (CDFW has issued a formal notice that the species is under review for addition to either the list of endangered species or the list of threatened species); and
2. Species of special concern (which serves as a watch list)

A lead agency reviewing a proposed project within its jurisdiction must determine whether any state-listed threatened or endangered species may be present in a project area and determine whether the proposed project may take a listed species, consistent with the requirements of CESA. If a take would occur, an incidental take permit would be required from the CDFW, including a mitigation plan that provides measures to minimize and fully mitigate the impacts of the take. The measures must be roughly proportional in extent to the impact of the taking and must be capable of successful implementation. Issuance of an incidental take permit may not jeopardize the continued existence of a state-listed species. For species that are also listed as threatened or endangered under the FESA, CDFW may rely on a federal incidental take statement or incidental take permit to authorize an incidental take under CESA.

California Fully Protected Species and Species of Special Concern

The classification of “fully protected” was the CDFW’s initial effort to identify and provide additional protection to those animals that were rare or faced possible extinction. Lists were created for fish, amphibian and reptiles, birds, and mammals. Most of the species on these lists have subsequently been listed under CESA and/or FESA. The California Fish and Game Code sections (fish at Section 5515, amphibian and reptiles at Section 5050, birds at Section 3511, and mammals at Section 4700) dealing with “fully protected” species state that these species “...may not be taken or possessed at any time and no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected species,” although take may be authorized for necessary scientific research. This language makes the “fully protected” designation the strongest and most restrictive regarding the “take” of these species. In 2003, the code sections dealing with fully protected species were amended

to allow the CDFW to authorize take resulting from recovery activities for state-listed species.

Species of special concern are broadly defined as animals not listed under the FESA or CESA, but which are nonetheless of concern to the CDFW because the species are declining at a rate that could result in listing or historically occurred in low numbers and known threats to their persistence currently exist. This designation is intended to result in special consideration for these animals by the CDFW, land managers, consulting biologists, and others, and is intended to focus attention on the species to help avert the need for costly listing under FESA and CESA and cumbersome recovery efforts that might ultimately be required. This designation also is intended to stimulate collection of additional information on the biology, distribution, and status of poorly known at-risk species, and focus research and management attention on them. Although these species generally have no special legal status, they are given special consideration under the CEQA during project review.

California Fish and Game Code Sections 3503

Independent of the MBTA, birds of prey are protected in California under the Fish and Game Code (Section 35043.5, 1992). Section 3503.5 states that it is “unlawful to take, possess, or destroy any birds in the order Falconiformes (diurnal birds of prey) or Strigiformes (owls) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.” Disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings or otherwise lead to nest abandonment. The CDFW considers any disturbance that causes nest abandonment and/or loss of reproductive effort to be “taking.”

California Native Plant Protection Act

The California Native Plant Protection Act (Fish and Game Code Sections 1900-1913) and the Natural Communities Conservation Planning Act provide guidance on the preservation of plant resources; these two acts underlie the language and intent of Section 15380(d) of the CEQA Guidelines. Vascular plants listed as rare or endangered by the CNPS (2001), but which have no designated status or protection under state or federal endangered species legislation, are defined as follows:

1. List 1A: Plants presumed extinct
2. List 1B: Plants rare, threatened, or endangered in California and elsewhere
3. List 2: Plants rare, threatened, or endangered in California, but more numerous elsewhere
4. List 3: Plants about which more information is needed – a review list
5. List 4: Plants of limited distribution – a watch list

In general, plants appearing on CNPS Lists 1A, 1B, or 2 are considered to meet the criteria for endangered, threatened, or rare as provided in Section 15380 of the CEQA Guidelines. Additionally, plants listed on CNPS Lists 1A, 1B, or 2 also meet the definition of Section 1901, Chapter 10 (Native Plant Protection Act) and Sections 2062 and 2067 (CESA) of the California Fish and Game Code.

California Fish and Game Code Sections 1600-1616

Streams, lakes, and riparian vegetation as habitat for fish and other wildlife species, are subject to jurisdiction by the CDFW under Sections 1600-1616 of the California Fish and Game Code. Any activity that would do one or more of the following: (1) substantially obstruct or divert the natural flow of a river, stream, or lake; (2) substantially change or use any material from the bed, channel, or bank of a river, stream, or lake; or (3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake generally require a Section 1602 Lake and Streambed Alteration Agreement. The term “stream,” which includes creeks and rivers, is defined in the California Code of Regulations (CCR) as “a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life.” This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation” (14 CCR 1.72). In addition, the term stream can include ephemeral streams, dry washes, watercourses with subsurface flows, canals, aqueducts, irrigation ditches, and other means of water conveyance if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife. Riparian is defined as “on, or pertaining to, the banks of a stream;” therefore, riparian vegetation is defined as “vegetation which occurs in and/or adjacent to a stream and is dependent on, and occurs because of, the stream itself.” Removal of riparian vegetation also requires a Section 1602 Lake and Streambed Alteration Agreement from the CDFW.

State Water Resources Control Board and Porter-Cologne Water Quality Control Act

The SWRCB was created by the Legislature in 1967. The mission of the SWRCB is to ensure the highest reasonable quality for waters of the State while at the same time allocating those waters to achieve the optimum balance of beneficial uses. Waters of the state are defined by the Porter-Cologne Water Quality Control Act as “any surface water or groundwater, including saline waters, within the boundaries of the state.” The SWRCB protects all waters in its regulatory scope, but has special responsibility for isolated wetlands and headwaters. These waterbodies have high resource value, are vulnerable to filling, and may not be regulated by other programs, such as Section 404 of the Clean Water Act. Waters of the State are regulated by the SWRCB and RWQCBs under the State Water Quality Certification Program, which regulates discharges of dredged and fill material under Section 401 of the Clean Water Act and the Porter-

Cologne Water Quality Control Act. Projects that require a USACE permit, or fall under other federal jurisdiction, and have the potential to impact waters of the State are required to comply with the terms of the Water Quality Certification Program. If a proposed project does not require a federal license or permit, but does involve activities that may result in a discharge of harmful substances to waters of the State, the RWQCBs have the option to regulate such activities under its State authority in the form of Waste Discharge Requirements or Certification of Waste Discharge Requirements.

Local

County of Sonoma Tree Ordinances

The Tree Protection Ordinance (Section 26-88-010[m]) of the Sonoma County Code sets preservation and protection standards for protected trees with a nine inch or greater diameter at breast (standard) height (dbh). Protected trees include big leaf maple (*Acer macrophyllum*), black oak (*Quercus kelloggii*), blue oak (*Quercus douglasii*), coast live oak (*Quercus agrifolia*), interior live oak (*Quercus wislizenii*), madrone (*Arbutus menziesii*), oracle oak (*Quercus morehus*), Oregon oak (*Quercus garryana*), redwood (*Sequoia sempervirens*), valley oak (*Quercus lobata*), California bay (*Umbellularia californica*) and their hybrids. Only mature valley oaks are considered a protected tree of special significance and are given special consideration in the design review process to the extent that mature specimens shall be retained to the fullest extent possible. The number and size of replacement plantings is calculated using one of the two arboreal value charts as instructed in the ordinance. Arboreal Value Chart No. 1 requires analysis to be completed in the creation area and requires 100 percent replacement or in lieu fees. Arboreal Value Chart No. 2 requires analysis of the entire site but allows for removal of up to 50 percent of the arboreal value. Compensation for the loss of trees greater than 50 percent requires determining the number of trees to replace using the arboreal value chart.

Local policies established in the *Sonoma County General Plan 2020* are summarized in Section 3.3.5, “General Plans and Consistency,” below.

3.3.4 Environmental Impacts and Mitigation Measures

Significance Criteria

The criteria used to determine the significance of an impact are based on the environmental checklist in Appendix G of the CEQA Guidelines. For this analysis, implementation of the proposed Dry Creek Project would be considered to have a significant impact associated with biological resources if it would:

1. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by the CDFW, USFWS, or NMFS;
2. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the CDFW or USFWS;
3. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
4. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
5. Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or substantially reduce the number or restrict the range of an endangered, rare, or threatened species;
6. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
7. Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved plan.

All of the significance criteria listed above will be included in the impact analysis, except for the following criterion, which is determined to be not relevant to the proposed project:

Approach to Analysis

This EIR includes project-level analysis for the Dry Creek Project, Miles 2-3 and program-level analysis for the Dry Creek Project, Miles 4–6.

As explained in **Chapter 2.0, Project Description**, the Dry Creek Project would include construction activities such as vegetation clearing, excavation, grading, and hauling of materials in and out of the area as well as installation of rock, root wads, tree stumps, and native plants and trees. Operation of the proposed project would involve the functioning of the habitat enhancement features. Maintenance activities could include irrigation, vegetation management, removal of sediment, repair of habitat enhancement features, or other activities. The impact analysis below considers the construction, operation, and maintenance of the proposed project.

Impacts on biological resources are evaluated based on the likelihood that special-status plant and animal species, special-status or sensitive natural communities, wildlife corridors, and other protected biological resources are present in the project area (as discussed in Section 3.3.2, “Environmental Setting”), and the likely effects that

construction, operation, and maintenance of the Dry Creek Project may have on these resources. Sensitive biological resources that are considered unlikely or have a low potential to occur within the project area are not considered in the impact analysis (see Section 3.3.2).

For the purpose of this section, the definition of “substantial,” as used in the significance criteria above, has three principal components, each of which contributes to the determination of impacts on biological resources and their significance:

1. Magnitude and duration of the impact (e.g., substantial/not substantial);
2. Uniqueness of the affected resource (rarity); and
3. Susceptibility of the affected resource to disturbance.

Impact Analysis

Impacts associated with biological resources are summarized and categorized as either “less than significant,” “less than significant with mitigation,” “significant and unavoidable,” or “no impact.” Impacts are also identified as applicable to construction, operation, and/or maintenance phases of the project.

Impact 3.3.1: Construction, operation, and maintenance of the Dry Creek Project could have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by the CDFW, USFWS, or NMFS or on nesting birds. (Less than Significant with Mitigation)

Combined Analysis for Miles 2–3 and Miles 4–6

Plants

Due to a lack of suitable habitat as well as the distances from known occurrences, no impacts are anticipated to the majority of special-status plant species known to occur in Sonoma County and listed in **Table 3.3-1** above.

Two plant species have the potential to occur in the project area. The white seaside tarplant (*Hemizonia congesta* ssp. *congesta*) has a moderate potential to occur in the project area and the northern California black walnut (*Juglans californica* var. *hindsii*) has a moderate potential to occur in the project area.

As described in Section 3.3.2, “Environmental Setting,” white seaside tarplant is an annual herb found in valley and foothill grassland and sometimes along roadsides. The closest recorded occurrence is at Warm Springs Dam, one half mile north of the northernmost proposed site for habitat enhancement. This species may occur in grassy floodplain areas adjacent to Dry Creek and could be impacted during staging and ground-disturbing activities.

Northern California black walnut is a tree found in riparian forests and woodlands and is often mixed with California oak species (*Quercus* spp.) and Fremont cottonwood (*Populus fremontii*). The CNPS lists only one confirmed occurrence of this species remaining (CNPS 2015). *Juglans* species were found throughout the project area during botanical surveys within the footprint of potential habitat enhancement sites for Miles 2-3, however the walnut trees observed were likely hybrids with *J. regia*, English walnut, and are fairly common throughout Sonoma County riparian woodlands. These trees could be removed along with other vegetation in preparation for construction.

Implementation of **Mitigation Measures 3.3.1a** (incorporation of key biological resources into project design), **3.3.1b** (pre-construction biological resources survey), **3.3.1c** (revegetation with native plants) and **3.3.1d** (worker environmental training) below would reduce potentially significant impacts on special-status plant species. Implementation of these measures would reduce potential impacts to less than significant.

Animals

Due to a lack of suitable habitat as well as the distances from known occurrences, no impacts are anticipated to the special-status animal species with potential to occur in Sonoma County listed in **Table 3.3-3** in Section 3.3.2, “Environmental Setting” above.

Table 3.3-6 lists special-status animal species that have a moderate to high potential to occur in the project area. Special-status invertebrates are excluded from the table as none are expected to occur in the project area.

Table 3.3-6. Special-status animal species that could potentially occur in the project area.

Common Name Scientific Name		
Reptiles		
western pond turtle <i>Actinemys (=Emys) marmorata</i>	-	-
Amphibians		
foothill yellow-legged frog <i>Rana boylei</i>	California red-legged frog <i>Rana draytonii</i>	-
Birds		
Allen's hummingbird (nesting) <i>Selasphorus sasin</i>	merlin (wintering) <i>Falco columbarius</i>	white-tailed kite (nesting) <i>Elanus leucurus</i>
peregrine falcon (nesting) <i>Falco peregrinus anatum</i>	olive-sided flycatcher (nesting) <i>Contopus cooperi</i>	yellow warbler (nesting) <i>Dendroica petechial brewsteri</i>
Cooper's hawk (nesting) <i>Accipiter cooperii</i>	osprey (nesting) <i>Pandion haliaetus</i>	yellow-breasted chat (nesting) <i>Icteria virens</i>
Birds		
loggerhead shrike (nesting) <i>Lanius ludovicianus</i>	red-breasted sapsucker (nesting) <i>Sphyrapicus ruber</i>	-
Mammals		
pallid bat <i>Antrozous pallidus</i>	-	-

Invertebrates

No special-status invertebrates have a moderate or high potential of occurring in the project area, therefore, no impacts to special-status invertebrates are anticipated.

Reptiles

The western pond turtle has a high potential for occurring in the project area. This turtle has been reported from Dry Creek in the CNDDDB and observed in the project area during fisheries monitoring by Water Agency staff. As described above in Section 3.3.2, "Environmental Setting," western pond turtles could be found either in Dry Creek itself or on land adjacent to the creek, particularly when females move overland for egg-laying between April and August. Females return to the water after laying eggs and leave behind an underground nest containing eggs that is usually well camouflaged and difficult to detect. Project excavation, vehicle activity, and foot traffic associated with construction and maintenance of the proposed project could disturb underground nests located on the upper banks of Dry Creek and its adjacent floodplains and could cause short-term impacts to this species. However, operation of the project would provide long-term benefits due to the creation of backwaters, alcoves, and other areas with reduced velocity water that would provide improved habitat.

Short-term impacts to western pond turtles due to construction and maintenance activities would be reduced to less than significant with the implementation of Mitigation Measures 3.3.1a (incorporation of key biological resources into project design), 3.3.1b (pre-construction biological resources survey), 3.3.1c (revegetation with native plants) and 3.3.1d (worker environmental training). Implementation of these measures would reduce potential impacts to less than significant.

Amphibians

Two special-status amphibians have a moderate likelihood of occurring in the project area: the foothill yellow-legged frog (*Rana boylei*) and the California red-legged frog (*Rana draytonii*). The foothill yellow-legged frog has 71 recorded occurrences in Sonoma County and several within five miles of the project area, the closest of which was in 1974 at the current location of Warm Springs Dam. Egg masses may be present in water with low velocities while adults may be found in and around water with faster velocities. The California red-legged frog has 38 recorded occurrences in Sonoma County, the closest is in Guerneville at Armstrong Redwoods State Reserve, approximately eight miles from the southernmost portion of the project area. California red-legged frogs could be found in areas of Dry Creek with lower velocities or in thick vegetation adjacent to the creek, although this habitat is very limited in Dry Creek.

While vegetation removal and excavation related to project construction and maintenance activities would potentially temporarily remove habitat for the foothill yellow-legged frog and the California red-legged frog, operation of the project would provide long-term benefits due to the creation of backwaters, alcoves, and other areas with reduced velocity water that would provide improved habitat.

Short-term impacts to amphibians due to construction and maintenance activities would be reduced to less than significant with the implementation of **Mitigation Measures 3.3.1a** (incorporation of key biological resources into project design), **3.3.1b** (pre-construction biological resources survey), **3.3.1c** (revegetation with native plants) and **3.3.1d** (worker environmental training). Implementation of these measures would reduce potential impacts to less than significant.

Birds

Several special-status bird species have a moderate to high potential for occurring in the project area. They include: Allen's hummingbird (*Selasphorus sasin*), Cooper's hawk (*Accipiter cooperii*), great blue heron (*Ardea herodias*), lark sparrow (*Chondestes grammacus*), loggerhead shrike (*Lanius ludovicianus*), merlin (*Falco columbarius*), olive-sided flycatcher (*Contopus cooperi*), osprey (*Pandion haliaetus*), peregrine falcon (*Falco peregrinus anatum*), red-breasted sapsucker (*Sphyrapicus ruber*), white-tailed kite (*Elanus leucurus*), yellow warbler (*Dendroica petechial brewsteri*), and yellow-breasted chat (*Icteria virens*).

Birds in the project areas could be impacted during construction and maintenance activities through vegetation clearing as well as noise and other human disturbance. Different species would be impacted in different ways and to different degrees.

Birds that only forage along Dry Creek would be minimally impacted by construction and maintenance activities because the total area that would be under construction or undergoing maintenance at any one time would be small compared to the extent of foraging habitat available to them. Of the special-status species considered potentially present in the project area, foraging species could include: merlin, osprey, and peregrine falcon. For these species, impacts due to construction and maintenance of the proposed project would be less than significant because disturbed areas would be revegetated with native plants and trees following construction- and maintenance-related activities.

Avian species that may potentially nest in the project area could be impacted through the temporary loss of nesting habitat and through direct impacts to the nest, either by accidental damage during vegetation clearing or through noise and human activity near the nest. Of the special-status species considered potentially present in the project area, nesting species may include: Allen's hummingbird, Cooper's hawk, great blue heron, lark sparrow, loggerhead shrike, olive-sided flycatcher, red-breasted sapsucker, white-tailed kite, yellow warbler, yellow-breasted chat. For these birds, thorough pre-construction and pre-maintenance nesting bird surveys would be required. Additionally, project designs could incorporate, when feasible, snags and live trees that provide cavity nesting opportunities for the red-breasted sapsucker.

Short-term impacts to birds due to construction and maintenance activities would be reduced to less than significant with the implementation of **Mitigation Measures 3.3.1a** (incorporation of key biological resources into project design), **3.3.1b** (pre-construction biological resources survey), **3.3.1c** (revegetation with native plants) and **3.3.1d** (worker environmental training). Implementation of these measures would reduce potential impacts to less than significant.

Mammals

One special-status mammal, the pallid bat (*Antrozous pallidus*), has a moderate to high potential for occurring in the project area. As described in Section 3.3.2, Environmental Setting above, pallid bats have been observed roosting on buildings near Lambert Bridge, although three of four of those occurrences are presumed extirpated. Pallid bats also use hollow trees for roosting. Hollowed trees in Miles 2-3 of the project area were inspected preliminarily for signs of pallid bat roosting during field surveys but none were found. Nevertheless, roosting could take place within the areas proposed for Miles 2-3 and Miles 4-6.

Short-term impacts to pallid bats due to construction and maintenance activities would be reduced to less than significant with the implementation of **Mitigation Measures 3.3.1a** (incorporation of key biological resources into project design), **3.3.1b** (pre-construction biological resources survey), **3.3.1c** (revegetation with native plants), and **3.3.1d** (worker environmental training). Implementation of these measures would reduce potential impacts to less than significant.

Mitigation Measure 3.3.1a: Habitat enhancement features will be placed and designed in a way that preserves trees with high wildlife habitat value where feasible. These may include snags, living trees with cavities, or other large, mature trees.

Mitigation Measure 3.3.1b: The Water Agency shall conduct a pre-construction biological resources survey to identify special-status plants, amphibians, reptiles, and nesting birds present within 50 feet of the project footprint. The pre-construction survey shall:

- Be conducted by a qualified biologist no more than one week prior to commencement of construction activities or maintenance that could impact special-status plant or animal species. The biologist shall have familiarity with special-status species of the area and experience with conducting special-status species and nesting bird surveys.
- If no special-status plants or animals, or nesting birds are encountered, no further mitigation would be required for at least two weeks, unless additional measures are required by regulatory permit conditions obtained for the proposed project.
- Additional pre-construction surveys, specifically for nesting birds, shall be conducted such that no more than two weeks will have lapsed between the survey and construction or maintenance activities.
- If a special-status plant or animal is encountered, the location shall be documented and avoidance and minimization shall be prepared by the qualified Water Agency biologist, or consulting biologist, in coordination with the Water Agency and appropriate resource agencies. Avoidance and minimization measures may include, but not be limited to, establishment of a no-work buffer around federally- or state-listed threatened or endangered plants or replanting of other special-status plant species during revegetation. Should foothill yellow-legged frog, California red-legged frog, or western pond turtle be found within the construction area, individuals will be relocated by a qualified biologist to an area of appropriate habitat outside of the construction area.
- If a nesting bird is encountered, the location shall be documented and avoidance and minimization shall be prepared by the qualified Water Agency biologist, or consulting biologist in coordination with the Water Agency, and appropriate resource agencies. A no-work buffer shall be established around

active bird nests in coordination with the CDFW. Nests will be monitored weekly during construction activities.

Mitigation Measure 3.3.1c: Sites where construction activities result in exposed soil will be stabilized to prevent erosion. For each of these sites, the Water Agency will prepare and implement a revegetation plan to mitigate the loss of native riparian vegetation.

- Erosion control fabric, hydromulch, or other mechanisms will be applied as appropriate to provide protection to seeds, hold them in place, and help retain moisture.
- Recontoured banks will be seeded and revegetated and erosion control fabric will be used to prevent erosion.
- Plant species selected for revegetation will be based upon surveys of riparian habitat along Dry Creek upstream and downstream of the project site.
- Planting requirements in the revegetation plan will be based upon species composition and density recommendations associated with the overall habitat enhancement design for the project.
- If soil moisture is deficient, new vegetation will be supplied with supplemental water until vegetation is firmly established.
- Revegetation shall be regularly monitored for survival until minimum survival/cover is achieved.
- If invasive plant species colonize the area, action shall be taken to control their spread; options include hand and mechanical removal and replanting with native species.
- The final revegetation plan will include details regarding planting, implementation, maintenance, and monitoring.

Mitigation Measure 3.3.1d: A worker environmental awareness training shall be included to inform construction personnel of their responsibilities regarding sensitive biological resources that are present within 50 feet of the project footprint, staging areas, and access roads; or 300 feet for nesting raptors. The training shall comply with the following measures:

- The training shall be developed by a qualified biologist familiar with the sensitive biological resources that are known or have the potential to occur in the area.
- The training shall be completed by all construction personnel before any work occurs at the proposed habitat enhancement sites, including construction equipment and vehicle mobilization. If new personnel are added to the proposed project, the Contractor shall ensure that new personnel receive training before they start working.
- The training shall provide educational information on the special-status species that are known or have potential to occur in the area, how to identify the species, as well as other sensitive biological resources (e.g., sensitive

natural communities, federal and state jurisdictional waters). The training shall also review the required mitigation measures to avoid impacts on the sensitive resources, and penalties for noncompliance with biological mitigation requirements.

Impact Significance: Less than Significant with Mitigation.

Impact 3.3.2: Construction, operation, and maintenance could have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the CDFW or USFWS. (Less than Significant)

Combined Analysis for Miles 2–3 and Miles 4–6

The proposed project would take place within the riparian habitat and associated wetlands that are located along Dry Creek. Regulatory agencies consider riparian woodlands and forests as well as wetlands sensitive natural communities. For more on regulatory protection and jurisdictions, please see Section 3.3.3, “Regulatory Framework” and Impact 3.3.3 regarding wetlands and waters in terms of state and federal regulations.

The proposed project falls within the jurisdiction of *Sonoma County General Plan 2020*, which considers riparian woodlands and forests, as well as wetlands, sensitive natural communities. Several goals, objectives, and policies are relevant, including the following:

Objective OSRC-7.1: Identify and protect native vegetation and wildlife, particularly occurrences of special-status species, wetlands, sensitive natural communities, woodlands, and areas of essential habitat connectivity.

Policy OSRC-7p: Support voluntary programs for habitat restoration and enhancement, hazardous fuel management, removal and control of invasive exotics, native plant revegetation, treatment of woodlands affected by Sudden Oak Death, use of fencerows and hedgerows, and management of biotic habitat.

GOAL OSRC-8: Protect and enhance Riparian Corridors and functions along streams, balancing the need for agricultural production, urban development, timber and mining operations, and other land uses with the preservation of riparian vegetation, protection of water resources, flood control, bank stabilization, and other riparian functions and values.

While construction and maintenance of the proposed project would result in temporary impacts, operation of the project would be beneficial to these sensitive natural communities because non-native plants will have been removed and replaced with native species, additional wetlands will have been created in backwaters, alcoves, and other

areas designed with the intention of slowing water velocities to create fish habitat. Therefore, the project would be consistent with Objective OSRC-7.1 described above.

The proposed project would also be consistent with Policy OSRC-7p described above in that the proposed project encourages voluntary participation of landowners in a large-scale project that would enhance habitat for special-status fish and wildlife, remove non-native plant species from project sites and revegetate project areas with native plant species.

The proposed project would be consistent with Goal OSRC-8 described above because the purpose of the project is to enhance Dry Creek and its associated riparian corridor and improve aquatic and riparian functions and values.

Short-term impacts to sensitive natural communities due to construction and maintenance activities would be reduced to less than significant with the implementation of **Mitigation Measures 3.3.1a, 3.3.1b, 3.3.1c, and 3.3.1d** as described above.

Impact Significance: Less than Significant with Mitigation.

Impact 3.3.3: Construction, operation, and/or maintenance could have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. (Less than Significant with Mitigation)

Combined Analysis for Miles 2–3 and Miles 4–6

The proposed project is a habitat enhancement project intended to improve aquatic habitat and water quality within the project areas. For work proposed within Dry Creek, the Water Agency will apply for an Individual Permit from the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act, a water quality certification from the North Coast Regional Water Quality Control Board under Section 401 of the Clean Water Act, and a Streambed Alteration Agreement from the California Department of Fish and Wildlife under Section 1602 of the California Fish and Game Code.

The total estimated amount of existing potential USACE jurisdictional areas within Miles 2-3 of the proposed project area is approximately 140.8 acres, consisting of 29.5 acres of Waters of the U.S. and 111.4 acres of jurisdictional wetlands (vegetated areas within the OHW). Miles 4-6 likely contain a similar amount of jurisdictional waters and wetlands that will be calculated once project-level designs are underway, access is granted for participating parcels, and project-level analysis has begun. Exact boundaries of jurisdictional areas would be delineated in the field during the Section 404 and Section 10 permitting processes.

The proposed project does not require mitigation for impacts to wetlands, as the proposed activities are anticipated to improve the quality and increase the acreage of waters of the United States within the project area. Implementation of **Mitigation Measures 3.8.1a through 3.8.1d** from **Chapter 3.8, Hydrology and Water Quality** as well as **Mitigation Measure 3.6.8a** from **Chapter 3.6, Geology, Soils, and Mineral Resources** are anticipated to reduce any construction-related impacts to a less-than-significant level. Please see **Chapter 3.8, Hydrology and Water Quality** for more information on the water quality in the project area. No substantial adverse effects to wetlands or other waters of the United States are anticipated to result from the proposed project.

Impact Significance: Less than Significant with Mitigation.

Impact 3.3.4: Construction, operation, and/or maintenance of the Dry Creek Project could interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. (Less than Significant)

Combined Analysis for Miles 2–3 and Miles 4–6

Construction activities would temporarily restrict terrestrial wildlife movements through the project sites. (Project-related impacts to Fisheries are discussed in **Chapter 3.5, Fisheries Resources**.) This impact will be temporary (June-October) and is limited to the project sites under construction at any one time. The impact is considered less than significant because neighboring properties would serve as alternative corridors available during construction activities.

Impact Significance: Less than Significant.

Impact 3.3.5: Construction and/or maintenance of the Dry Creek Project could have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or substantially reduce the number or restrict the range of an endangered, rare, or threatened species. (Less than Significant with Mitigation)

Combined Analysis for Miles 2–3 and Miles 4–6

Construction and maintenance of the proposed project would include vegetation clearing, excavation, grading, and installation of habitat enhancement features adjacent to and within Dry Creek. As described in **Impact 3.3.1** above and in **Impact 3.5.1** in **Chapter 3.5, Fisheries Resources**, these activities have the potential to disturb fish and wildlife species in the short-term. However, implementation of **Mitigation**

Measures 3.3.1a through 3.3.1d and Mitigation Measure 3.5.1 described in **Chapter 3.5, Fisheries Resources** would reduce these impacts to less than significant.

Impact Significance: Less than Significant.

Impact 3.3.6: Operation of the Dry Creek Project could have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or substantially reduce the number or restrict the range of an endangered, rare, or threatened species. (Beneficial Impact)

Combined Analysis for Miles 2–3 and Miles 4–6

Operation of the Dry Creek Project would be beneficial to fish and wildlife species in several ways. First, terrestrial species benefit in the long term because non-native plant species would be removed and replaced with native plant species in terrestrial habitat adjacent to Dry Creek. These project areas would be maintained over time per agreements with individual landowners in the project area. Second, the proposed project is a habitat enhancement project intended to improve aquatic habitat and water quality within the project areas with the purpose of supporting endangered and threatened fish populations. Therefore operation of the Dry Creek Project would result in beneficial impacts.

Impact Significance: Beneficial Impact.

Impact 3.3.7: Construction, operation, and/or maintenance of the Dry Creek Project could conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. (No Impact)

Combined Analysis for Miles 2–3 and Miles 4–6

As described above in the impact analysis for Impact 3.3.2 and below in Section 3.3.6, General Plan Consistency, the proposed project would not conflict with *Sonoma County General Plan 2020*.

The Tree Protection Ordinance (Section 26-88-010[m]) of the Sonoma County Code sets preservation and protection standards for protected trees with a nine inch or greater dbh. Tree and vegetation removal will be required prior to installation of habitat enhancement components. As described in Impact 3.3.1c, following completion of construction activities at each site, the Water Agency will prepare a revegetation plan which will include replacement of protected trees in compliance with the Tree Protection Ordinance. No impact is anticipated to result from the proposed project.

Impact Significance: No Impact.

Impact 3.3.8: Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved plan. (No Impact)

Combined Analysis for Miles 2–3 and Miles 4–6

The proposed project would not conflict with any Habitat Conservation, Natural Community Conservation, or any other conservation plans within the project area. The project would support the following objectives of the NMFS's *Recovery Plan for the Evolutionary Significant Unit of Central California Coast Coho Salmon* (NOAA Fisheries Service 2012):

- *Immediately implement focused instream restoration actions where coho salmon persist to increases (sic) the probability of salmonid survival within, and across, all freshwater life stages; and*
- *Prioritize restoration projects that can have immediate benefits to coho salmon freshwater survival probability.*

The Dry Creek Project would also be consistent with the following goals of the California Department of Fish and Wildlife's *Recovery Strategy for California Coho Salmon* (CDFW 2004):

- *Enhance and restore habitat within the range of coho salmon.*

No impact is anticipated to result from the proposed project.

Impact Significance: No Impact.

3.3.5 General Plan Consistency

Sonoma County General Plan 2020

The project area is located within Sonoma County. The following section lists goals, policies and objectives related to biological resources from *Sonoma County General Plan 2020* (PRMD 2013) and ends with a brief analysis discussing consistency with this plan.

GOAL OSRC-7: *Protect and enhance the County's natural habitats and diverse plant and animal communities.*

Objective OSRC-7.1: *Identify and protect native vegetation and wildlife, particularly occurrences of special-status species, wetlands, sensitive natural communities, woodlands, and areas of essential habitat connectivity.*

Objective OSRC-7.2: *Designate important Biotic Habitat Areas and update designations periodically using credible data sources.*

Objective OSRC-7.3: *Establish development guidelines to protect designated Biotic Habitat Areas and assure that the quality of these natural resources is maintained.*

Objective OSRC-7.4: *Where appropriate, support regulatory efforts by other agencies to protect biotic habitat.*

Objective OSRC-7.5: *Maintain connectivity between natural habitat areas.*

Objective OSRC-7.6: *Establish standards and programs to protect native trees and plant communities.*

Objective OSRC-7.7: *Support use of native plant species and removal of invasive exotic species.*

Objective OSRC-7.8: *Encourage voluntary efforts to restore and enhance biotic habitat.*

Objective OSRC-7.9: *Preserve and restore the Laguna de Santa Rosa, San Pablo Bay and Petaluma marshes and other major marshes and wetlands.*

Objective OSRC-7.10: *Promote production of native marine and shoreline plant and animal habitats along the Pacific Coast and San Pablo Bay shorelines.*

The following policies shall be used to achieve these objectives:

Policy OSRC-7a: *Designate as Biotic Habitat Areas in the Open Space and Resource Conservation Element the known locations shown on Figures OSRC-5a through OSRC 5i and identified as Special-Status Species Habitat, Marshes and Wetlands, Sensitive Natural Communities, and Habitat Connectivity Corridors.**

Policy OSRC-7b: *Rezone to the Biotic Resources combining district all lands designated as Biotic Habitat Areas. Prepare and adopt an ordinance that provides for protection of designated Biotic Habitat Areas in conformance with the following principles. Until the ordinance is adopted, require that land use and development in designated areas comply with these principles:*

(1) For discretionary projects, notify applicants of protected habitats and species and possible requirements of Federal and State regulatory agencies, request identification of known protected habitats and species, and:

(a) *In designated Biotic Habitat Areas, require site assessment and adequate mitigation. The priorities for adequate mitigation are, in order of highest to lowest priority:*

- *Avoid the habitat.*
- *Mitigate on site to achieve no net loss.*
- *Mitigate off site to achieve no net loss.*
- *Create replacement habitat off site to achieve no net loss.*

To the extent feasible, the mitigation required by the County should be consistent with permit requirements of Federal and State regulatory agencies.

(b) *In designated Marshes and Wetlands, require a setback of 100 feet from the delineated edges of wetlands. The setback may be reduced based upon site assessment and appropriate mitigation.*

(c) *In designated Habitat Connectivity Corridors, encourage property owners to consult with CDFG, install wildlife friendly fencing, and provide for roadway undercrossings and oversized culverts and bridges to allow movement of terrestrial wildlife.*

(d) *The acreage required for adequate mitigation and replacement habitat shall be at least two times the acreage affected unless a lower level is acceptable to the applicable State and Federal agencies, with the amount depending on the habitat affected and the applicable mitigation priority value.*

(2) *For discretionary projects in all designated Biotic Habitat Areas, send referrals to appropriate regulatory agencies and, where such agencies' comments or other agency information indicates biotic resources could be adversely affected, require site assessment, compliance with agency requirements and adequate mitigation pursuant to the priorities in (1) (a).*

Policy OSRC-7c: *Notify discretionary and ministerial permit applicants of possible requirements of Federal and State regulatory agencies related to jurisdictional wetlands or special-status species.*

Policy OSRC-7d: *In all areas outside Urban Service Areas, encourage property owners to utilize wildlife friendly fencing and to minimize the use of outdoor lighting that could disrupt native wildlife movement activity.*

Policy OSRC-7e: *In coordination with resource agencies, landowners and affected public, review Biotic Habitat Area designations and related policy issues periodically, but at least every five years. If warranted, develop recommendations for additional policies that may be needed to ensure appropriate protection of biotic resources. Include consideration of methods to identify and monitor cumulative habitat loss and establish thresholds to protect sensitive resources.*

Policy OSRC-7f: *Support acquisition of conservation easements or fee title by the Sonoma County Agricultural Preservation and Open Space District (SCAPOSD) of designated Biotic Habitat Areas.**

Policy OSRC-7g: *Where additional Biotic Habitat Areas are designated in Area Plans, revise such plans and guidelines as needed to provide protection of biotic resources equivalent or better than the protection provided by the General Plan.*

Policy OSRC-7h: *In coordination with resource agencies, landowners and affected public, conduct a comprehensive study of the cumulative impacts of habitat fragmentation and connectivity loss and the effects of exclusionary fencing on wildlife movement. If warranted, identify essential habitat connectivity corridors and develop recommendations for policies to protect essential habitat corridors and linkages and to restore and improve opportunities for native plant and animal dispersal.*

Policy OSRC-7i: *Conduct a comprehensive habitat identification and mapping program for use in future policy determinations.*

Policy OSRC-7j: *Establish a clearinghouse of information for public use related to biotic habitat protection and management and work toward making this information available by computer.*

Policy OSRC-7k: *Require the identification, preservation and protection of native trees and woodlands in the design of discretionary projects, and, to the maximum extent practicable, minimize the removal of native trees and fragmentation of woodlands, require any trees removed to be replaced, preferably on the site, and provide permanent protection of other existing woodlands where replacement planting does not provide adequate mitigation.*

Policy OSRC-7l: *Identify important oak woodlands, assess current protection, identify options to provide greater protection of oak woodlands and their role in connectivity, water quality and scenic resources, and*

develop recommendations for regulatory protection and voluntary programs to protect and enhance oak woodlands through education, technical assistance, easements and incentives.

Policy OSRC-7m: *Designate important valley oak habitat areas, reevaluate current designations, and apply a Valley Oak Habitat combining district zoning that requires adequate mitigation for trees removed and monitoring of replacement tree survival.*

Policy OSRC-7n: *Encourage landowners to voluntarily participate in a program that protects officially designated individual trees or groves that either have historical interest or significance or have outstanding size, age, rarity, shape or location.*

Policy OSRC-7o: *Encourage the use of native plant species in landscaping. For discretionary projects, require the use of native or compatible non-native species for landscaping where consistent with fire safety. Prohibit the use of invasive exotic species.*

Policy OSRC-7p: *Support voluntary programs for habitat restoration and enhancement, hazardous fuel management, removal and control of invasive exotics, native plant revegetation, treatment of woodlands affected by Sudden Oak Death, use of fencerows and hedgerows, and management of biotic habitat.*

Policy OSRC-7r: *Develop comprehensive programs for preservation and restoration of the freshwater marsh habitat of the Laguna de Santa Rosa area, the extensive marsh areas along the Petaluma River, other tidal marshes, and freshwater marshes such as the Pitkin, Kenwood, Cunningham, and Atascadero Marshes. Include mechanisms for preservation and enhancement such as land acquisition, zoning restrictions, public and private conservation easements, regulating filling, grading or construction, floodwater retention, and wetland restoration.*

Policy OSRC-7t: *Continue to actively participate in the FishNet4C program and work cooperatively with participating agencies to implement recommendations to improve and restore aquatic habitat for listed anadromous fish species and other fishery resources.*

Policy OSRC-7u: *Identify and consider designation of old growth Redwood and Douglas Fir as sensitive natural communities. Encourage preservation and public acquisition of remaining old growth Redwood and Douglas Fir forests in private ownership with the County. Because of their*

rarity and biological importance, these sensitive natural community types should be made priorities for protection through conservation easements, fee title purchase, or other mechanisms.

GOAL OSRC-8: *Protect and enhance Riparian Corridors and functions along streams, balancing the need for agricultural production, urban development, timber and mining operations, and other land uses with the preservation of riparian vegetation, protection of water resources, flood control, bank stabilization, and other riparian functions and values.*

Objective OSRC-8.1: *Designate all streams shown on USGS 7.5 minute quadrangle topographic maps as of March 18, 2003, as Riparian Corridors and establish streamside conservation areas along these designated corridors.*

Objective OSRC-8.2: *Provide standards for land use and development in streamside conservation areas that protect riparian vegetation, water resources and habitat values while considering the needs of residents, agriculture, businesses and other land users.*

Objective OSRC-8.3: *Recognize and protect riparian functions and values of undesignated streams during review of discretionary projects. The following policies shall be used to achieve these objectives:*

Policy OSRC-8a: *Classify “Riparian Corridors” designated in the Open Space and Resource Conservation Element as follows:*

(1) *“Russian River Riparian Corridor” is the corridor adjacent to the main stem of the Russian River, excluding lands located within the Urban Residential, Commercial, Industrial, or Public-Quasi Public land use categories or within the jurisdiction of a city.*

(2) *“Flatland Riparian Corridors” are the corridors adjacent to designated streams in the 1989 General Plan that flow through predominantly flat or very gently sloping land, generally with alluvial soil. This classification excludes areas located within the “Russian River Riparian Corridor” or within the Urban Residential, Commercial, Industrial, or Public/Quasi-Public land use categories.*

(3) *“Other Riparian Corridors” are the corridors adjacent to all designated streams not Policy OSRC-8b: Establish streamside conservation areas along both sides of designated Riparian Corridors as follows, measured from the top of the higher bank on each side of the stream as determined by PRMD: (1) Russian River Riparian Corridor: 200' (2) Flatland Riparian*

Corridors: 100' (3) Other Riparian Corridors: 50' Policy OSRC-8c: Continue to utilize the Biotic Resources combining district for all lands within the designated streamside conservation areas. Develop and adopt regulations establishing standards applicable to Riparian Corridors along designated streams consistent with Policies OSRC-8d and OSRC-8e. Until the regulations are adopted, require that land use and development comply with Policies OSRC-8d and OSRC-8e.*

Policy OSRC-8d: Allow or consider allowing the following uses within any streamside conservation area:

- (1) Timber harvest operations conducted in accordance with an approved timber harvest plan.*
- (2) Streamside maintenance and restoration.*
- (3) Fire fuel management where vegetation removal is limited to the minimum required for fire safety purposes and where there are no feasible alternative development locations or designs that do not require vegetation removal.*
- (4) Road crossings, street crossings, utility line crossings.*
- (5) Mining operations conducted in accordance with the County Surface Mining and Reclamation Ordinance.*
- (6) Stream dams and stream-related water storage approved by applicable agencies.*
- (7) Grazing and similar agricultural production activities not involving structures or cultivation, except as defined by (8) below, and conducted in accordance with water quality protection guidelines of the Agricultural Commissioner, Resource Conservation Districts, or Regional Water Quality Control Boards.*
- (8) Agricultural cultivation and related planting, seeding, fertilizing, weeding, irrigation, and harvesting.*
 - (a) located no closer than 100' from the top of the bank in the "Russian River Riparian Corridor".*
 - (b) located no closer than 50' from the top of the bank in the "Flatland Riparian Corridors" or in upland areas of "Other Riparian Corridors".*

(c) located no closer than 25' from the top of the bank in the "Other Riparian Corridors" not in upland areas.

The upland areas in (b) and (c) above shall be determined using information on streamside slopes from USGS topographic maps and soil types from the Soil Conservation Service "Soil Survey of Sonoma County".

(9) Equipment turnaround and access roads associated with agricultural cultivation, provided that the affected area is the minimum necessary for these turnaround and access roads and that a minimum 25' vegetative filter strip is provided and maintained between the affected area and the top of the bank.

(10) Vegetation removal as part of an integrated pest management program administered by the Agricultural Commissioner.

(11) Creekside bikeways, trails, and parks within Urban Residential, Commercial, Industrial, or Public-Quasi Public land use categories.

(12) Development authorized by exception under Policy OSRC-8e.

Policy OSRC-8e: *Prohibit, except as otherwise allowed by Policy OSRC-8d, grading, vegetation removal, agricultural cultivation, structures, roads, utility lines, and parking lots within any streamside conservation area. Consider an exception to this prohibition if:*

(1) It makes a lot unbuildable and vegetation removal is minimized,

(2) The use involves the minor expansion of an existing structure where it is demonstrated that the expansion will be accomplished with minimum damage to riparian functions,

(3) The use involves only the maintenance or restoration of an existing structure or a non-structural use,

(4) It can be clearly demonstrated through photographs or other information that the affected area has no substantial value for riparian functions, or

(5) A conservation plan is approved that provides for the appropriate protection of the biotic resources, water quality, flood management, bank stability, groundwater recharge, and other applicable riparian functions. Until the County adopts mitigation standards and procedures for specific uses and riparian functions, prior to approving the conservation plan, consult on areas of concern with the Resource Conservation District,

Agricultural Commissioner, and resource agencies that are applicable to the proposed plan.

Policy OSRC-8f: *Develop and/or adopt, where appropriate, revised streamside specific standards, guidelines, and/or best management practices that provide for protection of Riparian Corridors by watershed, stream, or other geographic areas. Once adopted, the revised standards would replace the standards that are in effect at the time.*

Policy OSRC-8g: *Support non-regulatory programs for protection of streams and riparian functions, including education, technical assistance, tax incentives, and voluntary efforts to protect riparian resources.*

Policy OSRC-8h: *Where additional Riparian Corridors are designated in Area Plans, revise such plans and guidelines as needed to provide protection of riparian corridors equivalent to or better than the protection provided by the General Plan.*

Policy OSRC-8i: *As part of the environmental review process, refer discretionary permit applications near streams to CDFG and other agencies responsible for natural resource protection.*

Policy OSRC-8j: *Notify permit applicants of possible Federal and State permit requirements in areas near streams and notify landowners whose property overlaps or touches a designated Riparian Corridor regarding the public hearings on the proposed regulations affecting them.*

Policy OSRC-8k: *In coordination with resource agencies, landowners and the affected public, conduct a comprehensive study of riparian corridors in grazing areas and, if warranted, develop recommendations for County policies that may be needed to ensure appropriate protection of such corridors.*

Policy OSRC-8l: *In coordination with resource agencies, landowners and the affected public, regularly review Riparian Corridor designations, ephemeral drainages, the requests, approvals and required mitigation for setback reductions, any cumulative effect of the approved reductions, and other protection issues and, if warranted, develop recommendations for County policies that may be needed to ensure appropriate protection of riparian corridors.*

Policy OSRC-8m: Apply the SCWA Flood Control Design Criteria creek setback to development along streams where necessary to protect against streambank erosion.

Policy OSRC-8n: Work with the Sonoma County Water Agency and other entities to identify all streams with “bed-and-bank” channels and consider Riparian Corridor designation for all such streams.

Consistency

The Dry Creek Project appears to be consistent with *Sonoma County General Plan 2020* goals, objectives, and policies. While construction and maintenance of the proposed project would result in temporary impacts to riparian and wetland natural communities, operation of the project would be beneficial to these sensitive natural communities because non-native plants will have been removed and replaced with native species, additional wetlands will have been created in backwaters, alcoves, and other areas designed with the intention of slowing water velocities to create fish habitat. Therefore, the project would be consistent with Objective OSRC-7.1 described above. Additionally, the project would be consistent with Policy OSRC-7p described above in that the proposed project encourages voluntary participation of landowners in a large-scale project that would enhance habitat for special-status fish and wildlife, remove non-native plant species from project sites and revegetate project areas with native plant species. The project would also be consistent with Goal OSRC-8 described above because the purpose of the project is to enhance Dry Creek and its associated riparian corridor and improve aquatic and riparian functions and values.

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CHAPTER 3.4 Cultural Resources

3.4.1 Introduction

This chapter describes the existing conditions relating to cultural resources within the Dry Creek Habitat Enhancement Project, Miles 2-6 (Dry Creek Project or proposed project) area. Section 3.4.2, “Environmental Setting” describes the regional and project area environmental setting as it relates to cultural resources, with a focus on prehistoric and ethnographic Native American archaeological sites, historic-period archaeological sites, historic-period buildings and structures, and elements or areas of the natural landscape that have traditional cultural significance. Section 3.4.3, “Regulatory Framework” details the federal, state, and local laws related to cultural resources. Potential impacts to these resources resulting from the proposed project are analyzed in Section 3.4.4, “Impacts and Mitigation Measures” in accordance with the California Environmental Quality Act (CEQA) significance criteria (CEQA Guidelines, Appendix G) and mitigation measures are proposed that could reduce, eliminate, or avoid such impacts.

3.4.2 Environmental Setting

As stated in **Chapter 2, Project Description**, habitat enhancement sites have been identified for Miles 2-3 but specific sites have yet to be determined for Miles 4–6. Projects could occur anywhere along the 14-mile length of Dry Creek from Warm Springs Dam to the Russian River (exclusive of sites already enhanced in Mile 1). Consequently, the environmental setting includes the Dry Creek basin downstream of Warm Springs Dam, including the 14 river miles (RMs) from the dam to the Russian River, adjacent riparian areas, and surrounding floodplains and terraces, either unvegetated or occupied by agricultural or residential land-uses (**Figure 3.4-1**).

Paleontological Resources

Paleontological resources are defined as fossilized remains of plants, animals, and other organisms. Paleontological remains are fairly common in some areas of Sonoma County and range in age from approximately 140 million years to under 8,000 years before the present. Within the county, paleontological remains have been primarily recovered from the following geologic formations (County of Sonoma 2008):

- Franciscan complex (Jurassic), which covers much of the northern part of the county;
- Wilson Grove Formation (Miocene-Pliocene), which is primarily located in western Sonoma County; and

- Sonoma Volcanics (Miocene-Pliocene), which is the formation of the Sonoma Mountains and the Sonoma/Napa Mountains.

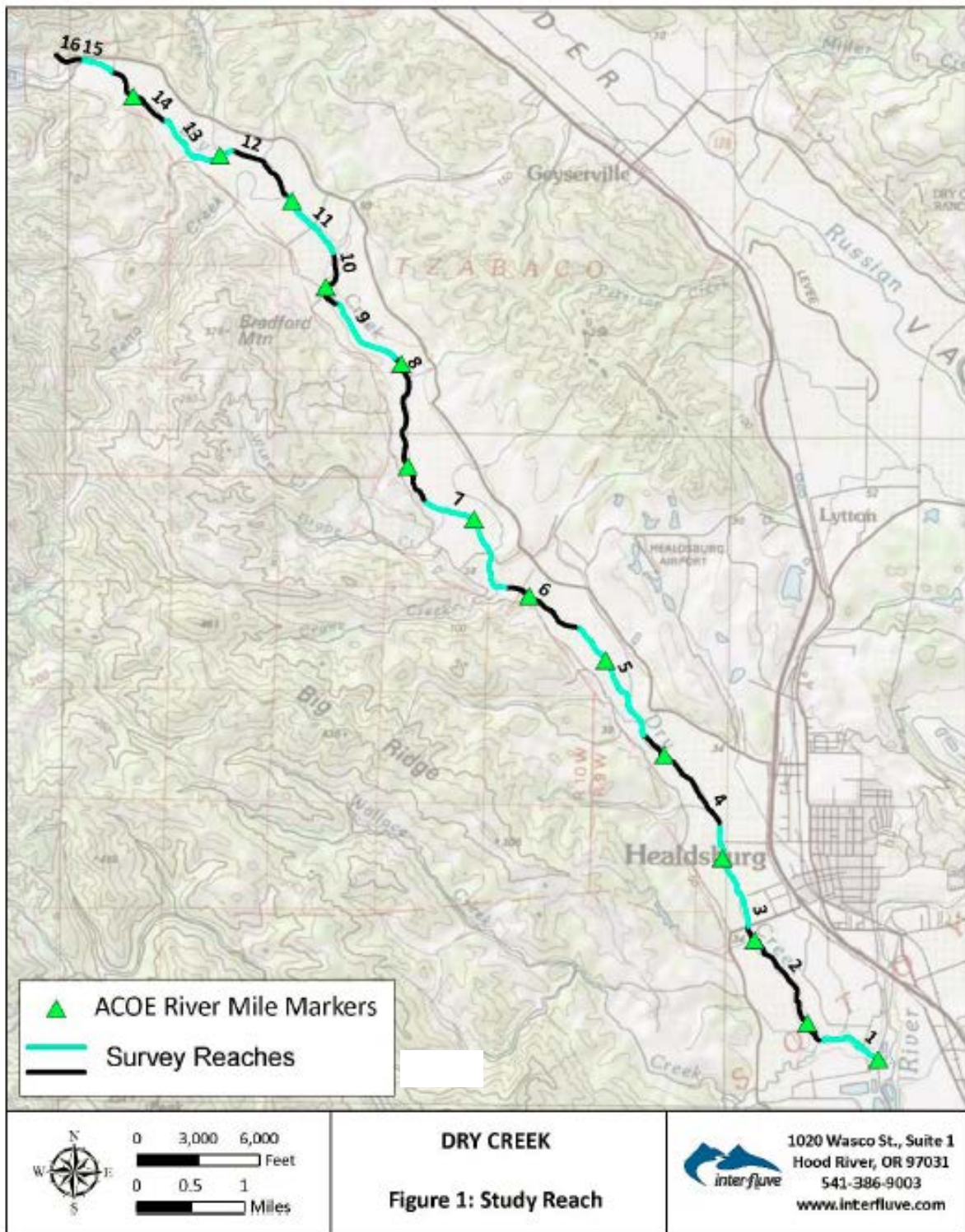


Figure 3.4-1. Dry Creek Study Reaches and River Miles

Source: Inter-Fluve 2013

As described in **Chapter 3.6, Geology, Soils, and Mineral Resources**, the proposed project area is located within the Quaternary Alluvium of the Dry Creek Valley floor. Organisms are fossilized only after being substantially buried for thousands of years. The Quaternary Alluvium of the Dry Creek Valley floor was deposited too recently to contain fossils. A search of the University of California Museum of Paleontology (UCMP) collections database identified that paleontological resources have been discovered in Sonoma County but not in the Dry Creek Valley.

Prehistoric Context

Archaeological evidence indicates that human occupation of California began at least 11,000 years ago. Early occupants appear to have had an economy based largely on hunting, with limited exchange, and social structures based on the extended family unit. Later, milling technology and an inferred acorn economy were introduced. This diversification of economy appears to have arisen along with the development of sedentism and population growth and expansion. Sociopolitical complexity and status distinctions based on wealth are also observable in the archaeological record, as evidenced by an increased range and distribution of trade goods (e.g., shell beads, obsidian tool stone), which are possible indicators of both status and increasingly complex exchange systems (Origer 2015).

At the time of European settlement during the nineteenth century, the proposed project area was included in the territory controlled by the Southern Pomo. The traditional territory of the Southern Pomo is in northern Sonoma County, and encompasses the area from approximately five miles south of Santa Rosa north to nearly the current county line and extending from the Russian River west to Gualala and the border with the Kahaya Pomo. There are seven distinct, but linguistically related, languages that are known as the Pomoan family of languages. Each language was named by early scholars according to its geographic location in relation to the Russian River Valley: Northern, Central, Eastern, Southern, Southwestern, Southeastern, and Northeastern. The Dry Creek and Cloverdale Pomo, also known as the Mihilakawna and Makahmo Pomo, respectively, resided in the area of Dry Creek and what is now Lake Sonoma and were speakers of Southern Pomo (Fredrickson 1984).

The Pomo were hunter-gatherers who lived in rich environments that allowed for dense populations with complex social structures. They settled in large, permanent villages which served as the political, economic, and religious center for the community. Seasonal camps and task-specific sites were distributed around the territory. Primary village sites were occupied continually throughout the year and other sites were visited in order to procure particular resources that were especially abundant or available only

during certain seasons. Sites often were situated near fresh water sources and in ecotones where plant and animal life were diverse and abundant (Origer, 2015).

Pomo social and political organization is quite variable, but Pomo groups shared several traditions and subsistence strategies. For example, the speakers of the seven Pomoan languages, sometimes referred to as tribelets, shared a common tradition of basket-making techniques, with variations by each distinct group. Shamanism was also common among the Pomo. Shamans were professionals who specialized in curing and other ceremonial aspects of Pomo life. Pomo subsistence strategies included a dependence on the acorn as a staple food supply, but other plant resources were also collected including buckeyes, berries, seeds from grasses, seaweed, and kelp. Pomo engaged in individual and communal hunts for deer, elk, antelope, rabbits, squirrels, and a variety of bird species. Marine and freshwater resources (e.g., fish and clams) were also used for food. Pomo built three basic types of structures that included dwelling houses, temporary shelters, and semi-subterranean houses. The overall configuration and materials used in the construction of these structures varied among the different Pomo groups (Fredrickson 1984).

Native American Contact

The State of California's Native American Heritage Commission, Cloverdale Rancheria of Pomo Indians, Dry Creek Rancheria of Pomo Indians, the Federated Indians of Graton Rancheria, Lytton Rancheria of California, the Middletown Rancheria of Pomo Indians, Stewarts Point Rancheria, the Ya-Ka-Ama Indian Education Center, and Suki Waters were contacted in writing. A log of contact efforts is provided in Appendix A of the report entitled, "A Cultural Resources Study for the Dry Creek Habitat Enhancement Project, Miles 2-6," provided in the Draft EIR Appendix 9.7.¹

Historic Background

Historically, the study area is located within both the 15,439-acre Rancho Tzabaco and the 48,837-acre Rancho Sotoyome. The Rancho Tzabaco was granted to José German Piña in 1843. Piña and his family built a one-story adobe dwelling on the Rancho, which was later remodeled by the pioneer D.D. Philips. This building is located at 6630 Dry Creek Road and is approximately ¼-mile east of Reaches nine through 11. Rancho Sotoyome was granted to Henry Fitch in 1841, and was confirmed to his widow, Josefa Carillo Fitch. Ranchos Tzabaco and Sotoyome were also the sites of the disputes jointly

¹ Archaeological site information must be kept confidential pursuant to both federal and state law. Additionally, based on federal and state laws as well as California State Historic Preservation Office (SHPO) guidance, access to archaeological reports is only available to archaeological professionals who meet the Secretary of the Interior standards for an archaeological professional (36 CFR 61). The cultural resources reports included in **Appendices 9.6** and **9.7** have been redacted to preserve confidentiality of archaeological site information.

referred to as the Healdsburg "Squatters War" in 1860, in which court ordered seizures of several properties were met with armed resistance (Origer 2015).

Cultural Resources Studies Performed

Locations considered for habitat enhancements for Miles 2-6 were subject to cultural resources studies performed by Tom Origer & Associates (**Appendices 9.6** and **9.7**). Two separate cultural resources studies were performed: one project-level study which included both archival and field studies for Miles 2-3 and one program-level study for Miles 4-6 which included archival research only because precise enhancement locations have not yet been identified. Project-level field surveys were performed for all sites proposed for inclusion in Miles 2-3 for which access was granted (**Figures 3.4-2 through 3.4-8**).

Archival research included examination of the library and project files at Tom Origer & Associates as well as a records search at the Northwest Information Center (NWIC), Sonoma State University, Rohnert Park (NWIC File No. 14-0682). This work included review of the archaeological site base maps and records, survey reports, and other materials on file at the NWIC. Sources of information included, but were not limited, to the current listings of properties on the National Register of Historic Places, California Historical Landmarks, California Register of Historical Resources, and California Points of Historical Interest as listed in the Office of Historic Preservation's *Historic Property Directory* (OHP 2012). In addition, ethnographic literature that describes appropriate Native American groups, county histories, and other primary and secondary sources were reviewed. Sources reviewed are listed in the "Materials Consulted" section of the cultural resources reports provided in **Appendices 9.6** and **9.7**.

The Office of Historic Preservation has determined that structures in excess of 45 years of age should be considered potentially important historical resources, and former building and structure locations could be potentially important historic archaeological sites. Archival research included an examination of historical maps to gain insight into the nature and extent of historical development in the general vicinity, and especially within the study area. Maps ranged from hand-drawn maps of the 1800s to topographic maps issued by the United States Geological Survey (USGS) and the United States Army Corps of Engineers (USACE).

In addition, ethnographic literature that describes appropriate Native American groups, county histories, and other primary and secondary sources were reviewed. Sources reviewed are listed in the "Materials Consulted" section of the cultural resources reports provided in **Appendices 9.6** and **9.7**.

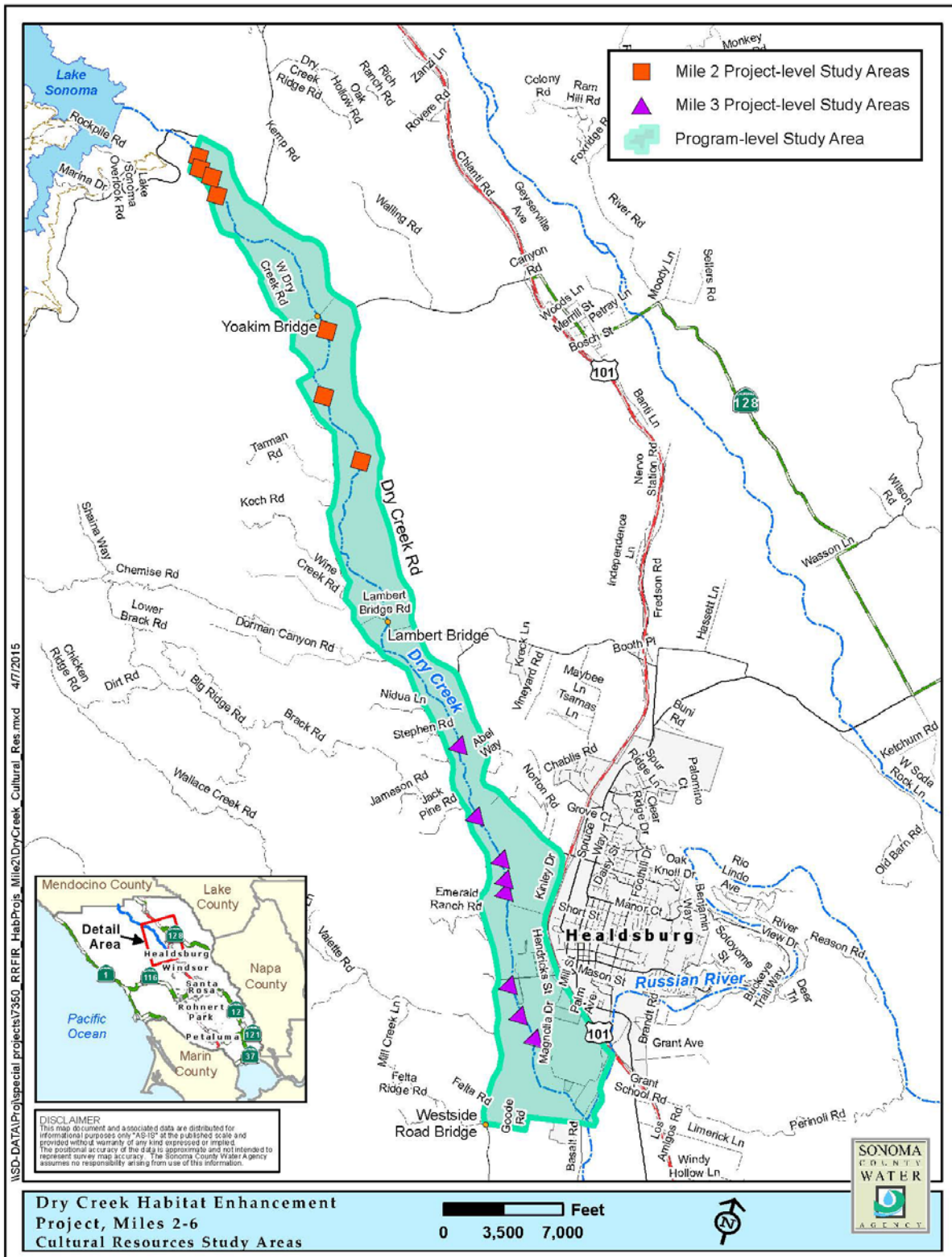


Figure 3.4-2. Cultural Resources Study Areas for the Dry Creek Project, Miles 2-6

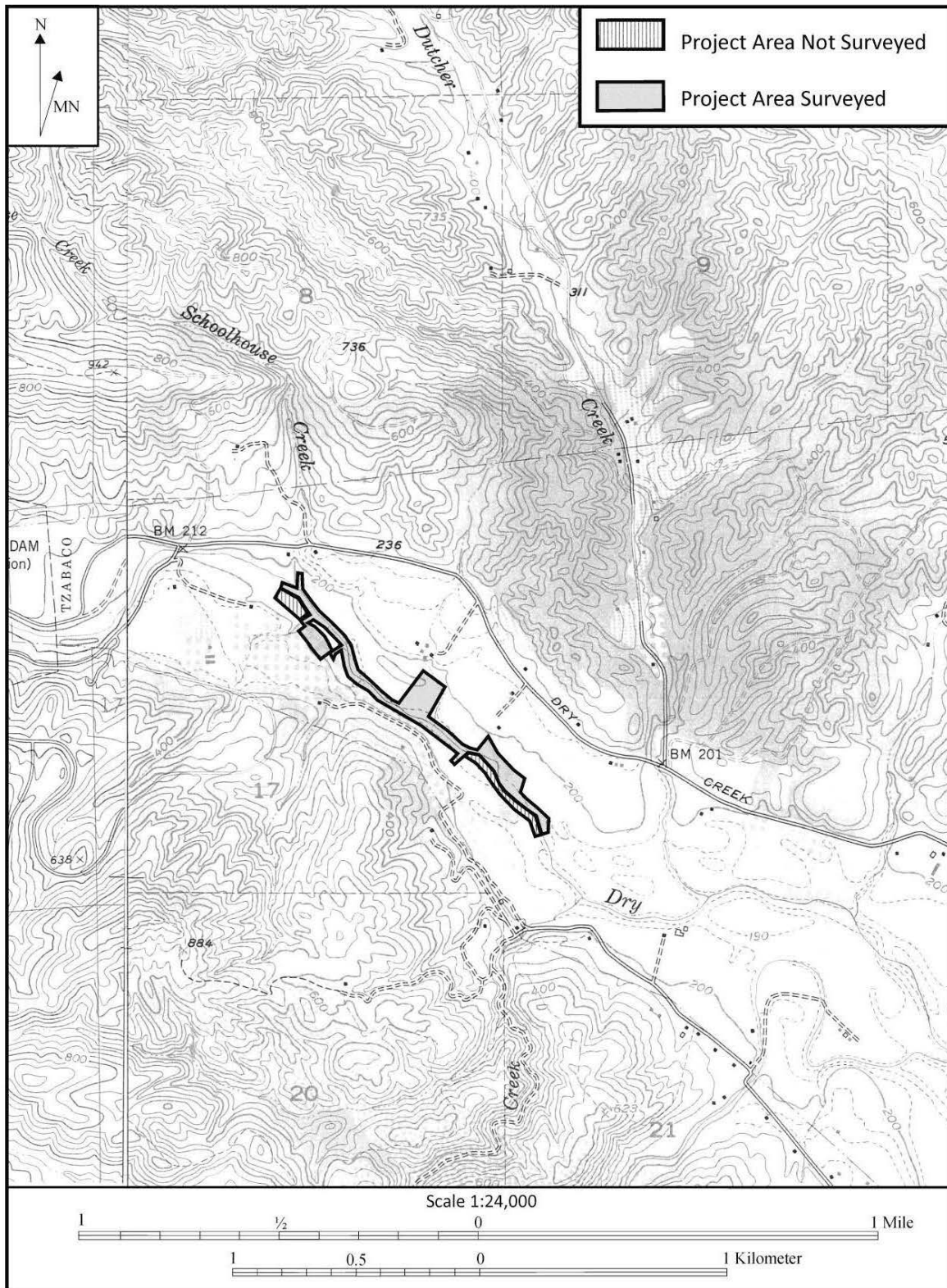


Figure 3.4-3. Reach 14 Project-Level Cultural Resources Study Area for Miles 2-3
 Source: A Cultural Resources Study for the Dry Creek Habitat Enhancement Project, Miles 2-6, Sonoma County, California. 2015. (Map adapted from the 1975 Geyserville USGS 7.5' topographic map)

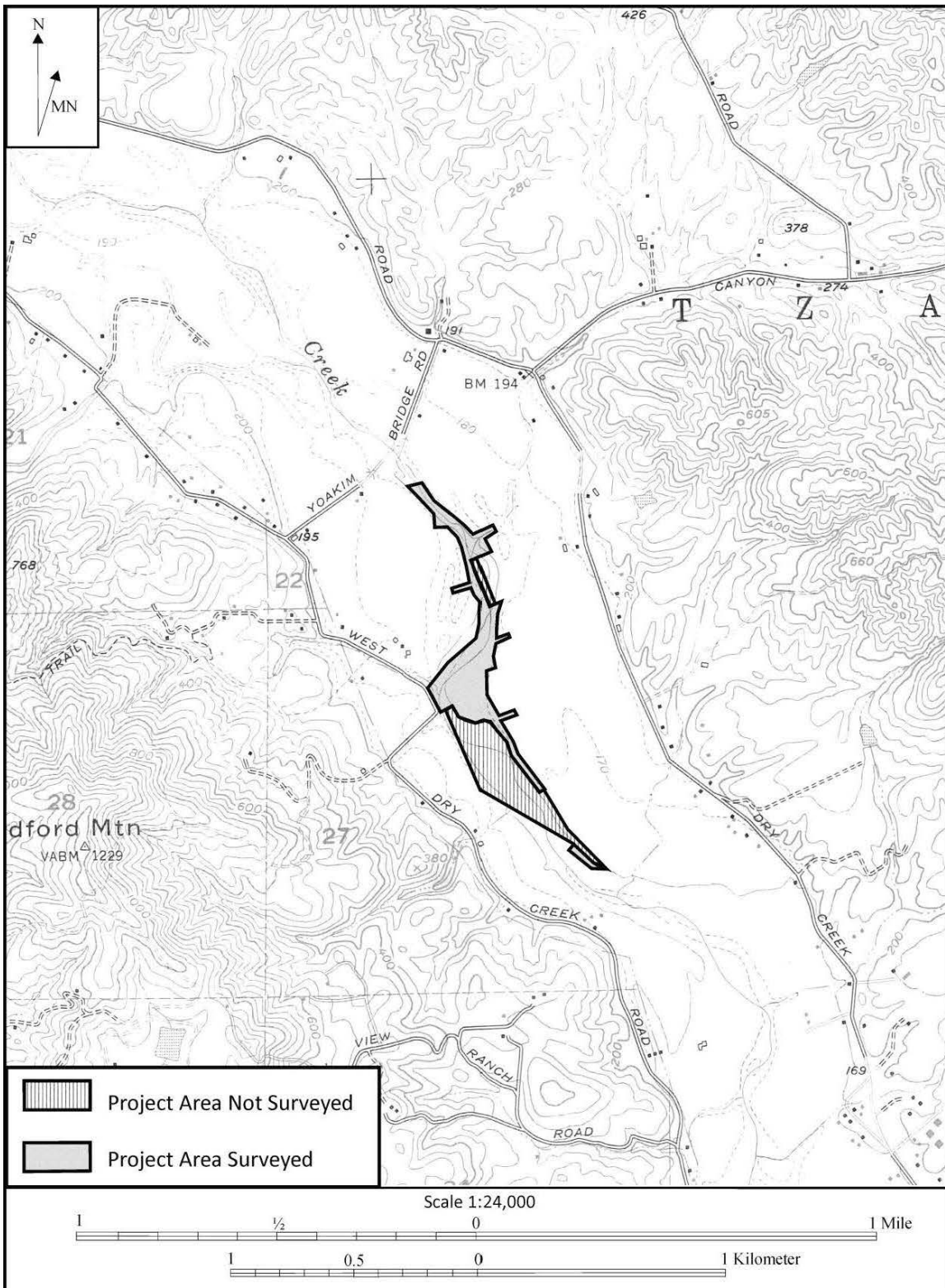


Figure 3.4-4. Reaches 9-11 Project-Level Cultural Resources Study Area for Miles 2-3
 Source: A Cultural Resources Study for the Dry Creek Habitat Enhancement Project, Miles 2-6, Sonoma County, California. 2015. (Map adapted from the 1975 Geyserville USGS 7.5' topographic map)

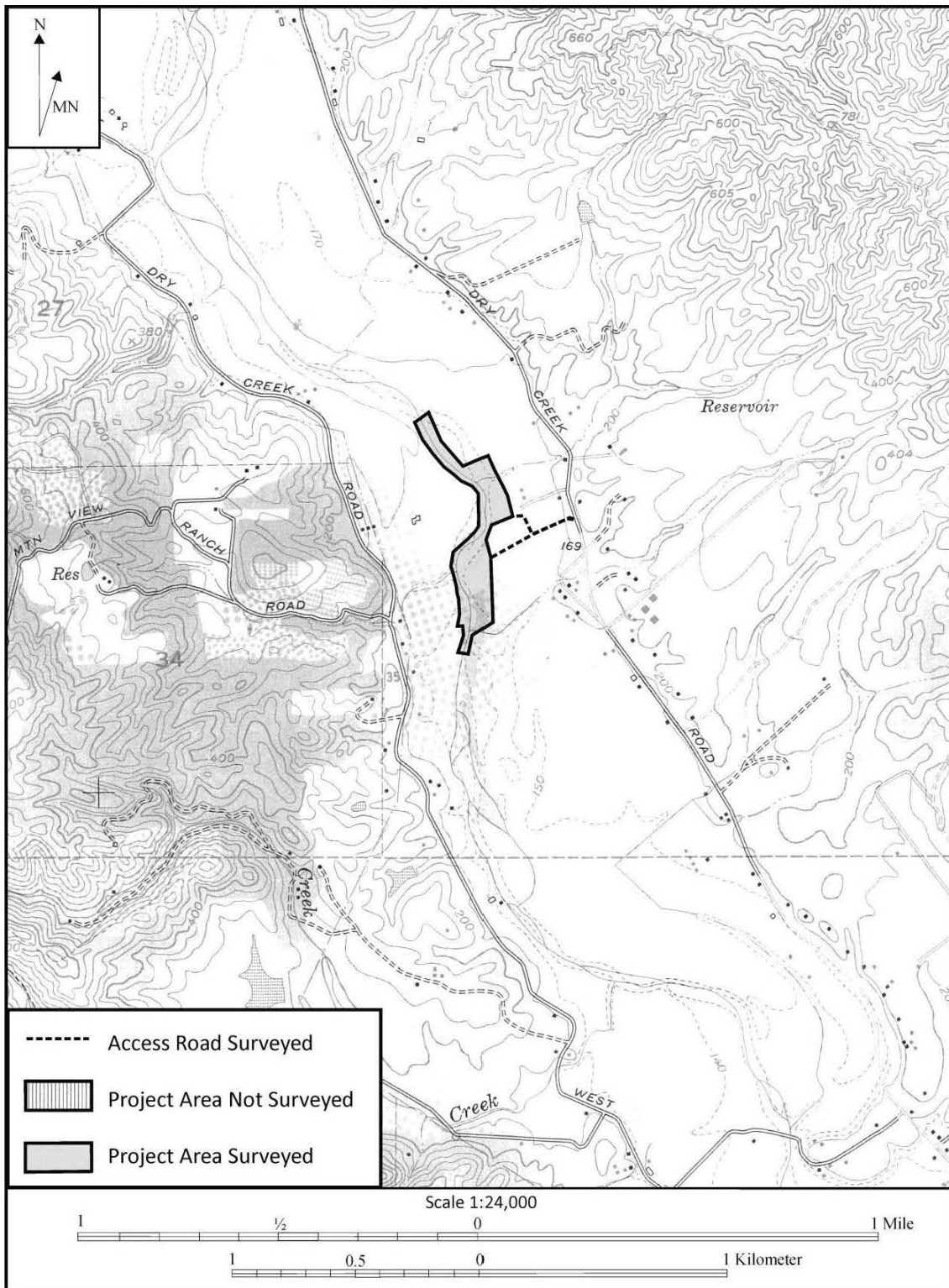


Figure 3.4-5. Reach 8 Project-Level Cultural Resources Study Area for Miles 2-3
 Source: A Cultural Resources Study for the Dry Creek Habitat Enhancement Project, Miles 2-6, Sonoma County, California. 2015. (Map adapted from the 1975 Geyserville USGS 7.5' topographic map)

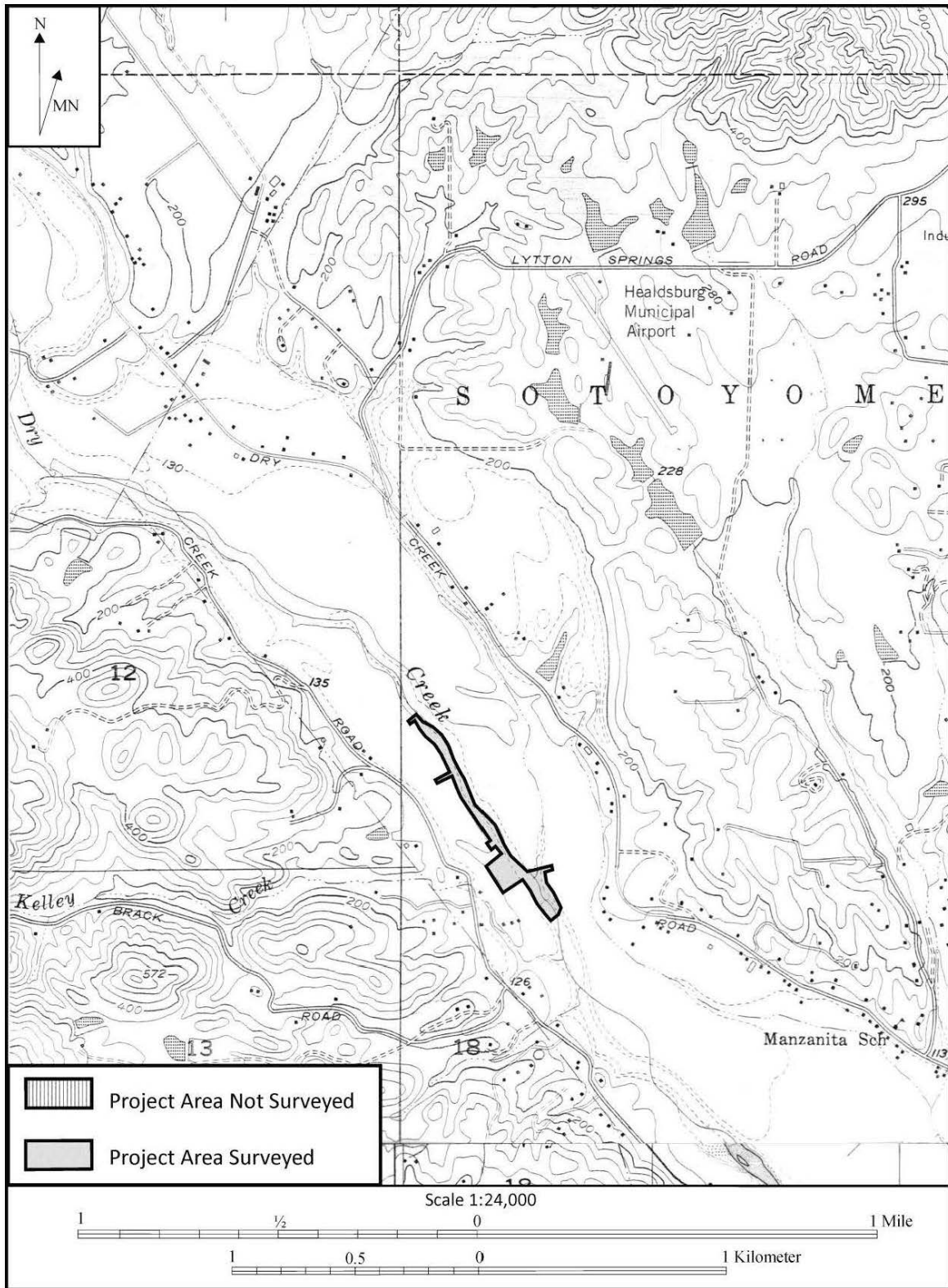


Figure 3.4-6. Reach 5 Project-Level Cultural Resources Study Area for Miles 2-3 *Source:* A Cultural Resources Study for the Dry Creek Habitat Enhancement Project, Miles 2-6, Sonoma County, California. 2015. (Map adapted from the 1975 Geyserville USGS 7.5' topographic map)

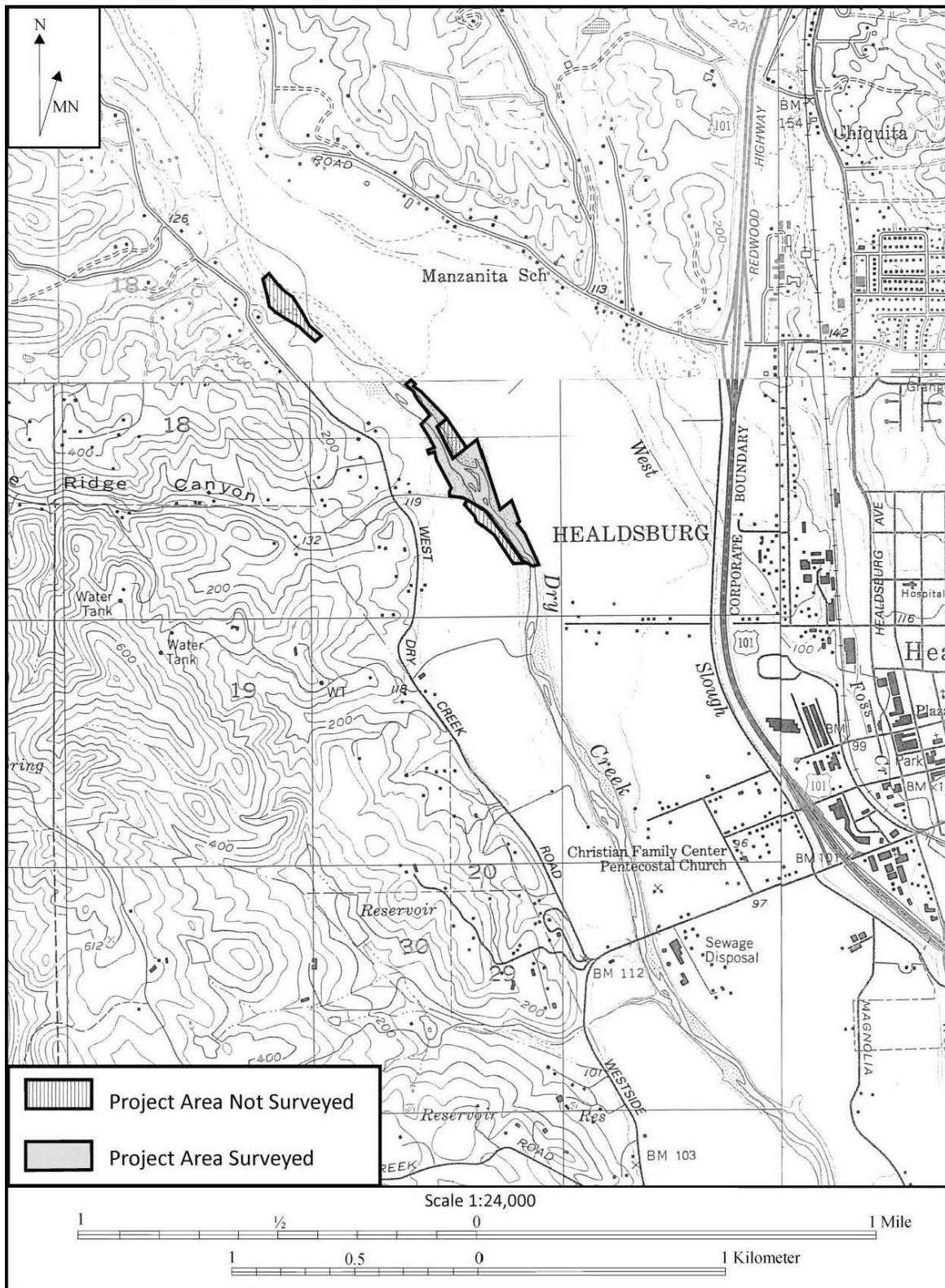


Figure 3.4-7. Reach 4 Project-Level Cultural Resources Study Area for Miles 2-3
 Source: A Cultural Resources Study for the Dry Creek Habitat Enhancement Project, Miles 2-6, Sonoma County, California. 2015. (Map adapted from the 1975 Geyserville USGS 7.5' topographic map)

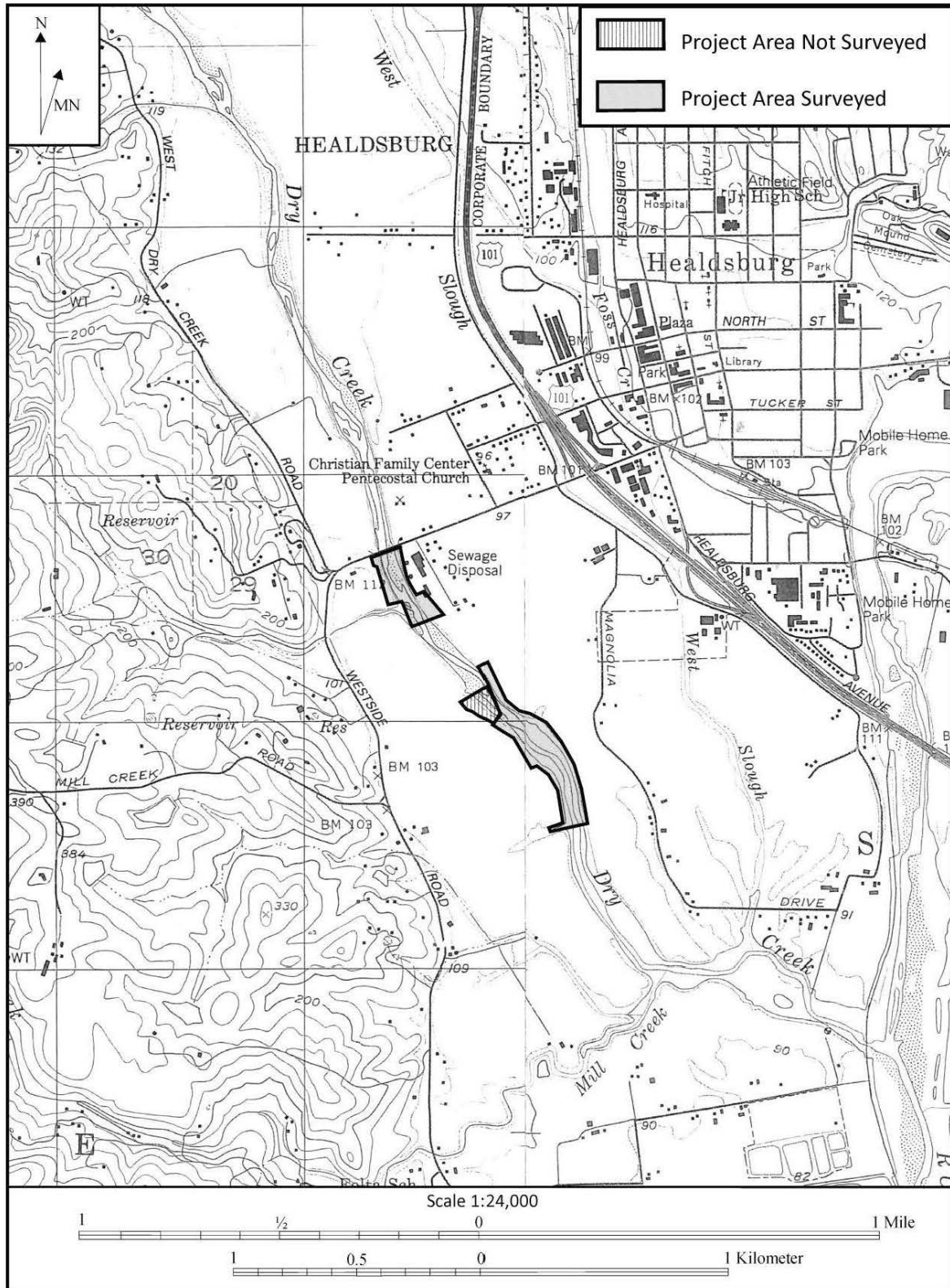


Figure 3.4-8. Reach 2 Project-Level Cultural Resources Study Area for Miles 2-3
 Source: A Cultural Resources Study for the Dry Creek Habitat Enhancement Project, Miles 2-6, Sonoma County, California. 2015. (Map adapted from the 1975 Geyserville USGS 7.5' topographic map)

Miles 2-3 Cultural Resources Study

The cultural resources study area for the Dry Creek Project, Miles 2-3 included all areas considered for project-level habitat enhancement for Miles 2-3, including any potential staging areas, access roads, and ¼ mile of land surrounding these locations (Figure 3.4-2).

Miles 2-3 Archival Studies

Two extensive cultural resources studies of the Dry Creek Valley were conducted for the Warm Springs Dam-Lake Sonoma project; one by Baumhoff in 1976 and the other by Patterson et al. in 1975. Both surveys found Native American archaeological sites throughout the valley. Subsequently, an archaeological district, referred to as the Dry Creek-Warm Springs Valleys Archaeological District, was established and included on the National Register of Historic Places. The district extends from approximately Lytton Springs Road and Nidva Lane northward beyond the study area, overlapping Reaches six through 14 of the proposed project area. In addition to these two studies, several other studies have taken place that overlap the project areas for Miles 2-3. Cultural resources identified by previous studies as possibly in or adjacent to the study area are listed in **Table 3.4-1**.

Table 3.4-1. List and Description of Sites Identified in Previous Cultural Resources Studies that are Located Possibly in or Adjacent to the Dry Creek Project Area, Miles 2-3 Study Area

Site Designation	Site Description
P-49-000580	Prehistoric – Lithic scatter
P-49-000584	Prehistoric – Lithic scatter with possible midden
P-49-000600	Historical – Reported historic era, ethnographic village location

Source: Origer 2015

In addition, there are five reported ethnographic sites within ¼-mile of the proposed project locations for Miles 2 and 3. They are listed in Table 3.4-2.

Table 3.4-2. Ethnographic Sites Potentially Located Within the Dry Creek Project Area, Miles 2-3 Study Area

Village Name	Site Designation	Additional Notes
<i>amalako</i>	P-49-000161	Possibly same as “Big Time Village”
“Big Time Village”	P-49-000600	Information redacted
<i>cawa'kō/shawako</i>	P-49-000582	Possibly same as “Big Time Village”
<i>lū'lr</i>	None	Information redacted
<i>olowicha</i>	P-49-000589	Information redacted

Source: Origer 2015

Reviews of 19th and 20th century maps show historic buildings in the Dry Creek Valley but not adjacent to Dry Creek as most inhabitants likely avoided flood-prone areas. The Yoakim and Westside Road bridges have been assessed by the California Department of Transportation (Caltrans), and neither was determined eligible for inclusion on the National Register of Historic Places.

Miles 2-3 Field Studies

Based on the distribution of known cultural resources, it was anticipated that prehistoric archaeological sites could be found within the proposed project area. Tom Origer & Associates completed field work on properties located within the proposed project area for which access had been granted in December 2014. Surveys included the Dry Creek bank itself, as well as proposed staging areas and access roads. In addition to hand tools used to clear dense vegetation, surveyors used shovels to excavate to a depth of 30 centimeters at P-49-000600 to search for archaeological site indicators.

Prehistoric archaeological site indicators expected to be found in the region included, but were not limited to: obsidian and chert flakes and chipped stone tools; grinding and mashing implements such as slabs and hand-stones, and mortars and pestles; and locally darkened midden soils containing some of the previously listed items plus fragments of bone, shellfish, and fire-affected stones. Historic period site indicators expected to be found generally included: fragments of glass, ceramic and metal objects; milled and split lumber; and structure and feature remains such as building foundations and discrete trash deposits.

No prehistoric or historic cultural resources were found during field surveys at any of the sites. Although archival studies had indicated the possibility of finding “Big Time Village” (P-49-000600), an ethnographic village location reported during historic times, within the proposed project area, no evidence was found during field surveys despite two searches during two separate site visits. Because no evidence of Big Time Village was found during field surveys and because archival research shows that Big Time Village has been described, possibly erroneously, in three separate locations during past surveys, it was concluded that Big Time Village is likely located outside of the areas currently planned for habitat enhancement. Results are summarized in **Table 3.4-3** below.

Miles 4-6 Archival Studies

The study area for Miles 4-6 includes Dry Creek, from one-half mile downstream of Warm Springs Dam to the confluence of Dry Creek and the Russian River, exclusive of areas included in Miles 2-3 and the Dry Creek Habitat Enhancement Demonstration Project (Mile 1). All of the land between West Dry Creek and Dry Creek roads were

Table 3.4-3. Summary of Cultural Resources and their Locations Relative to the Dry Creek Project Area, Miles 2-3 Study Area

Site Designation	Description	In Study Area?
None	Prehistoric. Reported ethnographic village location.	No
P-49-000161	Prehistoric. Reported ethnographic village location. Could be same as “Big Time Village”.	No
P-49-000580	Prehistoric. Lithic scatter.	No
P-49-000582	Prehistoric. Lithic scatter. Reported ethnographic village location. Could be same as “Big Time Village”.	No
P-49-000584	Prehistoric. Lithic scatter with possible midden.	No
P-49-000589	Prehistoric/Historical. Reported ethnographic village location.	No
P-49-000600	Historical. Reported historic era, ethnographic village location. Possible “Big Time Village” location.	Unlikely. There are two other recorded potential locations for this village. No evidence of site was detected during field surveys.

Source: Origer 2015

reviewed as well as all land between West Dry Creek Road and Kinley Drive, and Westside Road and Kinley and Magnolia drives. At the southern end of the study area, Dry Creek turns east away from Westside Road. At this point, the study area was restricted to approximately ¼-mile from each bank of Dry Creek. The study area included all areas that could potentially be considered for habitat enhancement, staging, or access. Please see **Figure 3.4-2** for an illustration of the study area and **Appendix 9.7** for a copy of the archival study for Miles 4-6.

According to the Northwest Information Center’s archaeological base maps, portions of the study area for Miles 4-6 have been subject to prior cultural resources studies. A total of 33 studies covering a total 1,265 acres of the approximately 4,700-acre study area were reviewed. These studies resulted in the finding and recording of 52 cultural resources within the study area. Many of these cultural resources were found during surveys for Warm Springs Dam, prompting the creation of an archaeological district listed on the National Register of Historic Places, described above. Cultural resources identified by previous studies as possibly in or adjacent to the study area are listed in **Table 3.4-4**.

Table 3.4-4. List and Description of Sites Identified in Previous Studies that are Located Possibly in or Adjacent to the Dry Creek Project, Miles 4-6 Study Area

Site Designation	Site Description
P-49-000575	Prehistoric – Midden
P-49-000576	Prehistoric – Midden
P-49-000577	Prehistoric – Reported ethnographic village (acamodot) location; lithic scatter
P-49-000578	Prehistoric – Midden
P-49-000580	Prehistoric – Lithic scatter
P-49-000581	Prehistoric – Lithic scatter
P-49-000582	Prehistoric – Reported ethnographic village (cawa’kō) location; lithic scatter
P-49-000583	Prehistoric – Lithic scatter, 4 shell fragments
P-49-000584	Prehistoric – Lithic scatter with possible midden
P-49-000585	Prehistoric – Lithic scatter
P-49-000586	Information redacted
P-49-000587	Prehistoric – Lithic scatter
P-49-000588	Prehistoric – Reported ethnographic village (catca’lí) location; lithic scatter
P-49-000589	Prehistoric – Reported ethnographic village (olowicha) location; lithic scatter
P-49-000590	Prehistoric – Lithic scatter
P-49-000591	Prehistoric – Lithic scatter
P-49-000592	Prehistoric – Lithic scatter
P-49-000593	Prehistoric – Lithic scatter
P-49-000596	Prehistoric – Lithic scatter
P-49-000600	Historical – Reported historic era, ethnographic village (“Big Time Village”) location
P-49-002870	Lambert Bridge
P-49-003214	Prehistoric – Lithic scatter
P-49-003215	Historical – House and associated outbuildings
P-49-003216	Prehistoric – Lithic scatter
P-49-003217	Prehistoric – Lithic scatter
P-49-003218	Prehistoric – Lithic scatter
P-49-003219	Information redacted
P-49-003965	Historical – House and associated outbuilding
P-49-003967	Historical – House and associated outbuildings
P-49-003973	Historical – House
P-49-003976	Historical – House and associated outbuilding
P-49-003977	Historical – House
P-49-003979	Historical – House and associated outbuildings
P-49-003980	Historical – House and associated outbuilding
P-49-003983	Historical – House
P-49-003984	Historical – House

Table 3.4-4 continued. List and Description of Sites Identified in Previous Studies that are Located Possibly in or Adjacent to the Dry Creek Project, Miles 4-6 Study Area

Site Designation	Site Description
P-49-003985	Historical – House
P-49-003986	Historical – House
P-49-003987	Historical – House
P-49-003995	Historical – House and associated outbuilding
P-49-003997	Historical – Building
P-49-003998	Historical – House and associated outbuilding
P-49-004000	Historical – House and associated outbuildings
P-49-004001	Historical – House and associated outbuildings
P-49-004003	Historical – House and associated outbuilding
P-49-004006	Historical – House and associated outbuildings
P-49-004008	Historical – House and associated outbuildings
P-49-004009	Historical – House and associated outbuilding
P-49-004016	Historical – House and associated outbuilding
P-49-004022	Historical – House and associated outbuildings
P-49-004023	Historical – House and associated outbuildings
P-49-004236	Historical – House and associated outbuildings

Source: Origer 2014

There are eleven reported ethnographic sites that could be located within the Miles 4-6 study area (**Table 3.4-5**). The locations of several of these sites remain unclear.

Table 3.4-5. Ethnographic Sites Potentially Located Within the Dry Creek Habitat Enhancement Project, Miles 4-6, Study Area

Village Name	Site Designation	Additional Notes
<i>amacodot</i>	P-49-000577	Information redacted
<i>ʔam-at'·a yow</i>	None	Location unclear
“Big Time Village”	P-49-000600	Possibly same as amalako or cawako
<i>catca'li</i>	P-49-000588	Information redacted
<i>cawa'kō/shawako</i>	P-49-000582	Possibly same as “Big Time Village”
<i>helwamē'can</i>	None	Information redacted
<i>kabē'tōn</i>	None	Information redacted
<i>kawiñkwit'i man</i>	P-49-000576	Information redacted
<i>lū'li</i>	None	Information redacted
<i>olowicha</i>	P-49-000589	Information redacted
<i>ū'pawanī</i>	None	Information redacted

Source: Origer 2014

There are eleven local, state, or federally recognized historic properties within the Miles 4-6 study area, all of which consist of either a single building or a building complex (**Table 3.4-6**).

Table 3.4-6. Properties listed on the Historic Property Directory within Dry Creek Habitat Enhancement Project, Miles 4-6, Study Area

Description	Historic Resources Inventory #	Status Code*
James Miller Homestead	5448-0168-0000	3S
Bacon House	5448-0160-0000	3S
Rodgers Ranch/Pitts Ranch	5448-0159-0000	3S
Albert Bell Homestead	5448-0157-0000	3S
Gardini Winery/Tin Winery	5448-0156-0000	6Y/5S2
Andrew Gallaway House	5448-0196-0000	5S2
John Peck House	5448-0197-0000	7N
Riverdale Orchard	5448-0146-0000	3S
Melton House	5448-0186-0000	5S2
Melton Carriage House	5448-0187-0000	7N
David Hopper House/Carraro Ranch	5448-0214-0000	7N

* 3s = Appears eligible for National Register or California Register through survey evaluation.
 5S2 = Individual property that is eligible for local listing or designation.
 6Y = Determined ineligible for National Register by consensus through Section 106 process – not evaluated for California Register or local listing.
 7N = Needs to be reevaluated.
 Source: Origer 2014

Miles 4-6 Field Studies

Sites for Miles 4-6 habitat enhancement projects were reviewed at the program-level and no field surveys were conducted. Once locations are proposed for Miles 4-6, additional project-level review would be required under CEQA.

Ethnobotanical Resources

Traditional use of plants for food, medicine, basketry, and other uses continue to be an integral part of Pomo lifeways. While many species of plants were used by the Southern Pomo, one of the most important plants was the basket sedge, *Carex barbarae*, the roots of which were stripped down to fine threads for use in basket making. Pomoan basketry has been recognized as being particularly exceptional. Other plants were also used for weaving baskets, including willow, hazel, and redbud. When Warm Springs Dam was constructed and the area upstream of the dam was inundated, several areas of sedge were transplanted to an ethnobotanical preserve downstream of the dam (Peri, Patterson, & Goodrich, 2nd printing, May 1983). The sedge at the southern extent of this preserve borders and may slightly overlap the northern extent of the habitat enhancements proposed in Reach 14. Culturally significant plants in the vicinity of the proposed project area listed in **Table 3.4-7** (Peri, Patterson, & Goodrich, 2nd printing, May 1983). Section **3.3, Biological Resources** (Vegetation and Wildlife), of this EIR discusses the Dry Creek Project in relation to plant species.

Table 3.4-7. Culturally-Sensitive Plant Species in the Vicinity of the Dry Creek Habitat Enhancement Project, Miles 2-6,

Common Name	Scientific Name	Dry Creek and/or Cloverdale Pomo Usage
Angelica, Woolly Angelica	<i>Angelica tomentosa</i>	Food: Green shoots and immature flowers eaten raw Medicinal: Tea from root used to treat fevers and colds, root scrapings smoked as treatment for colds and rubbed on body to treat pain Ceremonial: Root worn as protective talisman, root rubbed on body as purifier, scrapings smoked by native doctors
Basket Sedge	<i>Carex barbarae</i>	Tools: Basketry
Bay Laurel, California Bay Laurel, Pepperwood	<i>Umbellularia californica</i>	Food: Nuts eaten fresh or roasted and made into flour Medicinal: Leaves boiled and used externally for aches and pains, tea made from new shoots for colds, branches rubbed on body to keep sickness away, leaves used to treat headache, leaves boiled and used externally for rheumatism Ceremonial: Purification, leaves placed above door to deter sickness Tools: Burned nuts used cosmetically for eyebrows
Blackberry	<i>Rubus ursinus</i> <i>R. vitifolius</i>	Food: Berries eaten fresh or dried
Blue Elderberry	<i>Sambucus nigra ssp. caerulea</i>	Food: Berries eaten fresh or cooked Medicinal: Tea made from blossoms treats fever Tools: Musical instruments and game pieces
Bulrush	<i>Scirpus</i> and <i>Schoenoplectus spp.</i>	Tools: Basketry
Buckeye, California buckeye, horse chestnut	<i>Aesculus californica</i>	Food: Nuts made into soup, mush, gruel Ceremonial: Sharpened branches used by bear doctors for slashing participants Tools: Wood used for fire drill
Buckwheat	<i>Eriogonum spp.</i>	Food: Root used as diuretic Medicinal: Seeds used for pinole

Common Name	Scientific Name	Dry Creek and/or Cloverdale Pomo Usage
Beaked Hazelnut	<i>Corylus cornuta ssp. californica</i>	Food: Nuts dried in shell and eaten raw or roasted Tools: Basketry, bows, war clubs
Black Oak	<i>Quercus kelloggii</i>	Food: Nuts made into soup, mush, and bread Tools: Leaves lined underground ovens
Bluedicks, Brodiaea	<i>Brodiaea spp.</i>	Food: Corms eaten raw, parched, or dried, baked and eaten
California Coffeeberry	<i>Frangula californica</i> (JM93: <i>Rhamnus californica</i>)	Medicinal: Tea for stomach troubles
California Fescue	<i>Festuca californica</i>	Tools: Roofing material
California Huckleberry	<i>Vaccinium ovatum</i>	Food: Berries eaten fresh or dried
California Lomatium, Celery Weed	<i>Lomatium californicum</i>	Food: Green shoots and immature flowers eaten raw Medicinal: Tea from root used to treat fevers and colds, root scrapings smoked as treatment for colds and rubbed on body to treat pain Ceremonial: Root worn as protective talisman, root rubbed on body as purifier, scrapings smoked by native doctors
California Maidenhair Fern	<i>Adiantum jordani</i>	Tools: Stem used as earring
California Yerba Santa, Yerba Santa	<i>Eriodictyon californicum</i>	Medicinal: Leaves chewed for cough, mashed leaves on chest for respiratory ailments, tea made from leaves and green shoots for colds and other illnesses
Canyon Live Oak	<i>Quercus chrysolepsis</i>	Food: Nuts made into soup, mush, and bread
Chain fern, Giant chain fern	<i>Woodwardia fimbriata</i>	Tools: Used to wrap acorn bread during baking
Cleavers Bedstraw, Common bedstraw, Goosegrass	<i>Galium aparine</i>	Medicinal: Tea from entire plant used to treat diarrhea
Clover	<i>Trifolium spp.</i>	Food: Leaves and flowers eaten fresh
Coast Live Oak	<i>Quercus agrifolia</i>	Food: Nuts made into soup, mush, and bread
Common Cattail	<i>Typha spp.</i>	Food: Tops, new roots, and shoots eaten raw; immature stalk eaten raw

Common Name	Scientific Name	Dry Creek and/or Cloverdale Pomo Usage
Common Mullein	<i>Verbascum thapsus</i>	Medicinal: Tea used as eye medicine
Common Snowberry	<i>Symphoricarpos albus</i> <i>var. laevigatus</i>	Tools: Arrow shafts, broom
Digger Pine	<i>Pinus sabiniana</i>	Food: Nuts eaten, pitch used as chewing gum Tools: Fuel, roots used in basketry
Douglas Fir	<i>Pseudotsuga menziesii</i>	Food: Nuts eaten Tools: Burned gum used in tattooing
Dove Weed	<i>Croton setigerus</i>	Tools: Leaves used as fish poison
Fremont Cottonwood	<i>Populus fremontii</i>	Tools: Inner bark used to make cordage, limbs used as stakes for fish dams, trunks used to make dugout canoe, silky material from inside bark used for diapering
Hairy Brackenfern, Western Brackenfern	<i>Pteridium equilinum var. pubescens</i>	Food: New fronds eaten raw Tools: Basketry
Horehound, Common Horehound	<i>Marrubium vulgare</i>	Medicinal: Boiled leaves used to make a skin wash
Horsetail	<i>Equisetum spp.</i>	Tools: Stems used as sandpaper
Indian Tobacco	<i>Nicotiana quadrivalvis</i>	Ceremonial: Leaves crushed, dried, and smoked; smoked during ceremonies; doctors smoked before treating patient
Interior Live Oak	<i>Quercus wislizeni</i>	Food: Nuts made into soup, mush, and bread
Kellogg's Yampah, Yampah	<i>Perideridia kelloggii</i>	Tools: Roots and hairs made into a cylindrical brush
Madrone	<i>Arbutus menziesii</i>	Food: Berries parched and eaten or stored for winter Tools: Leaf used to call deer for hunting
Manzanita	<i>Arctostaphylos spp.</i>	Food: Berries eaten fresh or dried, ground into flour for pinole, or used to make a drink Medicinal: Leaves used to make tea for stomach trouble, tea used externally to treat poison oak Ceremonial: Moth cocoons used for rattles Tools: Wood used to make war club, bull-roarer, fish hook, harpoon, bow
Mariposa Lilies	<i>Calochortus spp.</i>	Food: Corms eaten raw or parched
Milkweed	<i>Asclepias spp.</i>	Tools: Twine

Common Name	Scientific Name	Dry Creek and/or Cloverdale Pomo Usage
Mugwort	<i>Artemisia douglasiana</i>	Medicinal: Tea used externally to treat sores and internally for diarrhea, leaves used externally for post-birth recovery for both mother and baby Ceremonial: Leaves rubbed on body for purification Tools: Doll-making, sweat-house thatching, mats
Mulefat	<i>Baccharis salicifolia</i> <i>B. glutinosa</i>	Tools: Shoots woven into fish dam or for fishing pole
Narrowlead Mule Ears, California Compassplant,	<i>Wyethia angustifolia</i>	Food: Stalks eaten raw before plant blooms in spring, seeds eaten in summer Medicinal: Tea made from root used externally to treat poison oak
Oak	<i>Quercus spp.</i>	Food: Nuts made into soup, mush, and bread Tools: Hulls used as dye, acorns used as toys
Oregon Ash	<i>Fraxinus latifolia</i>	Food: Caterpillars collected, roasted and eaten
Oregon Oak	<i>Quercus garryana</i>	Food: Nuts made into soup, mush, and bread Tools: Wood used to make paddle for stirring food
Pacific Rush	<i>Juncus effusus ssp. pacificus</i>	Tools: Strings for hanging clam shells during shaping and polishing
Poison Oak	<i>Rhus diversiloba</i>	Tools: Roots used in basketry, dyeing bulrush roots
Ponderosa Pine	<i>Pinus ponderosa</i>	Food: Nuts eaten
Redwood	<i>Sequoia sempervirens</i>	Tools: Ends of boughs used in leaching acorn meal
Salmonberry	<i>Rubus spectabilis</i>	Food: Berries eaten fresh or dried
Scrub Oak	<i>Quercus dumosa</i>	Food: Nuts made into soup, mush, and bread
Shining Mule Ears, Coast Range Mule Ears, Smooth Mule Ears	<i>Wyethia glabra</i>	Food: Stalks eaten raw before plant blooms in spring, seeds eaten in summer
Soap Plant, Soaproot	<i>Chlorogalum pomeridianum</i>	Tools: Soap, shampoo, baking, fish poison, basketry, adhesive
Spicebush	<i>Calycanthus occidentalis</i>	Tools: Shoots used for arrow shafts
Spreading Dogbane, Bitter Dogbane	<i>Apocynum androsaemifolium L.</i>	Tools: Twine

Common Name	Scientific Name	Dry Creek and/or Cloverdale Pomo Usage
Sticky Monkeyflower, Bush Monkeyflower	<i>Mimulus aurantiacus</i>	Medicinal: Tea made from leaves used as eye medicine
Stinging Nettle, Hoary Nettle	<i>Urtica dioica L. ssp. holosericea</i>	Food: Young leaves boiled and eaten Medicinal: Used as a counter-irritant
Sugar Pine	<i>Pinus lambertiana</i>	Food: Nuts eaten, sap collected and used as sugar
Sunflower	<i>Helianthus spp.</i>	Food: Seeds parched and/or ground for pinole or meal
Tanbark Oak, Tan Oak	<i>Lithocarpus densiflora</i>	Food: Nuts made into soup, mush, and bread Tools: Wood used to make ball for game
Tarweed	<i>Madia spp., Centromadia spp., Holocarpha spp.</i>	Food: Seeds collected, parched, and ground for pinole
Thimbleberry, Western thimbleberry	<i>Rubus parviflorus</i>	Food: Berries eaten fresh or dried
Toyon, Christmas Berry	<i>Heteromeles arbutifolia</i>	Food: Berries baked or roasted and eaten
Valley Oak	<i>Quercus lobata</i>	Food: Nuts made into soup, mush, and bread
Vinegar Weed	<i>Trichostema laxum</i>	Tools: Leaves stored with hides and furs to reduce odors Medicinal: Aromatic leaves used as deodorant
Western Raspberry	<i>Rubus leucodermis</i>	Food: Berries eaten fresh or dried
Western Redbud	<i>Cercis occidentalis</i>	Tools: Basketry
Wild Grape, California Wild Grape, California Grape	<i>Vitis californica</i>	Food: Berries eaten when ripe Tools: Vines used as hoop for baby baskets, vines used as ropes withes for lashing log rafts, leaves used in baking acorn bread
Wild Oat	<i>Avena fatua</i>	Food: Seeds parched and ground into meal or pinole
Wild Strawberry	<i>Fragaria vesca ssp. californica</i>	Food: Berries eaten fresh
Willows	<i>Salix spp.</i>	Tools: Used in construction of fish dams, dwelling and sweathouse frame, and for indoor acorn granary
Willow, Arroyo	<i>Salix lasiolepis</i>	Tools: Shoots used in basketry, roots used for large twined baskets

Common Name	Scientific Name	Dry Creek and/or Cloverdale Pomo Usage
Willow, Sandbar	<i>Salix exigia</i>	Medicinal: Tea made from tender spring shoots used to treat diarrhea Tools: Shoots used in making baskets and fishtraps, shoots used in baby and acorn baskets
Woodbalm, Pitcher Sage	<i>Lepechinia calycina</i>	Medicinal: Tea made from leaves used for treating colds

Source: Peri, David W., Scott M. Patterson, Jennie L. Goodrich. 1983. *Ethnobotanical Mitigation, Warm Springs Dam – Lake Sonoma, California*

3.4.3 Regulatory Framework

Federal Regulations

Archaeological and architectural resources (buildings and structures) are protected through the National Historic Preservation Act (NHPA) of 1966, as amended (16 USC 470f) and its implementing regulations, Protection of Historic Properties (36 CFR Part 800), the Archaeological and Historic Preservation Act of 1974, and the Archaeological Resources Protection Act of 1979.

Prior to implementing an “undertaking” (e.g., issuing a federal permit), Section 106 of the NHPA requires federal agencies (e.g., U.S. Army Corps of Engineers) to consider the effects of the undertaking on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) and the State Historic Preservation Officer (SHPO) a reasonable opportunity to comment on any undertaking that would adversely affect properties eligible for listing on the National Register of Historic Places (National Register). Section 101(d)(6)(A) of the NHPA allows properties of traditional religious and cultural importance to a tribe to be determined eligible for inclusion in the National Register. Under the NHPA, a find is significant if it meets the National Register listing criteria at 36 CFR 60.4, as stated below:

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:

- a. That are associated with events that have made a significant contribution to the broad patterns of our history, or*
- b. That are associated with the lives of persons significant in our past, or*
- c. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction, or*
- d. That have yielded, or may be likely to yield, information important in prehistory or history.*

Federal review of projects is normally referred to as the Section 106 process. The Section 106 process normally involves step-by-step procedures that are described in detail in the implementing regulations (36 CFR Part 800) and summarized here:

1. Establish a federal undertaking;
2. Delineate the Area of Potential Effects;
3. Identify and evaluate historic properties in consultation with the SHPO and interested parties;
4. Assess the effects of the undertaking on properties that are eligible for inclusion in the National Register;
5. Consult with the SHPO, other agencies, and interested parties to develop an agreement that addresses the treatment of historic properties and notify the Advisory Council on Historic Preservation; and
6. Proceed with the project according to the conditions of the agreement.

State Regulations

National Historic Preservation Act

The State of California implements the National Historic Preservation Act (NHPA) of 1966, as amended, through its statewide comprehensive cultural resource preservation programs. The California Office of Historic Preservation (OHP), an office of the California Department of Parks and Recreation, implements the policies of the NHPA on a statewide level. The OHP also maintains the California Historical Resources Inventory. The SHPO is an appointed official who implements historic preservation programs within the State's jurisdiction.

Assembly Bill 52

Assembly Bill 52 (AB 52) was signed by Governor Brown on September 25, 2014 and creates a new category of environmental resources, "tribal cultural resources," to be considered under CEQA. Tribal cultural resources are defined as either:

- "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe" that are included in the state register of historical resources or a local register of historical resources, or that are determined to be eligible for inclusion in the register; or
- Resources determined by the CEQA lead agency to be significant based on the criteria for listing in the state register.

The legislation requires that lead agencies provide notice to tribes in the geographic area of a proposed project if they have requested to be notified. The tribe may request consultation within 30 days of receipt of the notice. This consultation may include the type of environmental review appropriate for the project, the significance of tribal cultural

resources and associated impacts, alternatives and mitigation (State of California, 2014).

California Public Resources Code and Health and Safety Code

Several sections of the California Public Resources Code (PRC) protect cultural resources. Under Section 5097.5, “a person shall not knowingly and willfully excavate upon, or remove, destroy, injure, or deface, any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological, or historical feature, situated on public lands, except with the express permission of the public agency that has jurisdiction over the lands.” Violation of this section is a misdemeanor. Section 5097.98 states that if Native American remains are identified within a project area, the lead agency must work with the Native Americans most likely to be descended from the deceased to develop a plan for the preferred treatment of the human remains and any associated items. These procedures are also addressed in Section 15046.5 of the CEQA Guidelines. California Health and Safety Code Section 7050.5 prohibit disinterring, disturbing, or removing human remains from a location other than a dedicated cemetery. Section 30244 of the PRC requires reasonable mitigation for impacts on paleontological and archaeological resources that occur as a result of development on public lands.

PRC Section 5024.1[a] states that the California Register of Historic Resources (California Register) is “an authoritative listing and guide to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the state and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change.” PRC Section 5024.1[b]) states that the criteria for eligibility to the California Register are based on National Register criteria, and that certain resources are determined by the statute to be automatically included in the California Register, including California properties formally eligible for or listed in the National Register.

Title 14, Section 4307 of the California Code of Regulations also prohibits any person from removing, injuring, defacing or destroying any object of paleontological, archaeological or historical interest or value.

California Environmental Quality Act

CEQA, as codified in PRC Sections 21000 et seq. and implemented via the CEQA Guidelines (14 CCR § 15000 et seq.), is the principal statute governing the environmental review of projects in the State. The CEQA Guidelines define a historical resource as: (1) a resource in the California Register; (2) a resource included in a local register of historical resources, as defined in PRC Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC Section

5024.1(g); or (3) any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the lead agency's determination is supported by substantial evidence in light of the whole record.

The California Register is "an authoritative listing and guide to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the state and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1[a]). The criteria for eligibility to the California Register are based on National Register criteria (PRC Section 5024.1[b]). Certain resources are determined by the statute to be automatically included in the California Register, including California properties formally eligible for or listed in the National Register.

To be eligible for the California Register as a historical resource, a prehistoric or historic-period resource must be significant at the local, State, and/or federal level under one or more of the following criteria as identified in 14 CCR Section 4852(b):

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2. Is associated with the lives of persons important in our past;
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or,
4. Has yielded, or may be likely to yield, information important in prehistory or history.

For a resource to be eligible for the California Register, it must also retain enough integrity to be recognizable as a historical resource and to convey its significance. A resource that does not retain sufficient integrity to meet the National Register criteria may still be eligible for listing in the California Register.

CEQA requires lead agencies to determine if a proposed project would have a significant effect on important archaeological resources, either historical resources or unique archaeological resources. If a lead agency determines that an archaeological site is a historical resource, the provisions of PRC Section 21084.1 and CEQA Guidelines Section 15064.5 would apply. If an archaeological site does not meet the CEQA Guidelines criteria for a historical resource, then the site may meet the threshold of PRC Section 21083 regarding unique archaeological resources. A unique

archaeological resource is “an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
2. Has a special and particular quality such as being the oldest of its type or the best available example of its type.
3. Is directly associated with a scientifically recognized important prehistoric or historic event or person [PRC Section 21083.2 (g)].”

The CEQA Guidelines note that if a resource is neither a unique archaeological resource nor a historical resource, the effects of the project on that resource shall not be considered a significant effect on the environment (CEQA Guidelines Section 15064[c][4]).

Local

For a discussion of local general plan policies related to cultural resources, please refer to 3.4.5, “General Plans and Consistency.”

3.4.4 Environmental Impacts and Mitigation Measures

This section describes the impact analysis relating to cultural resources for the proposed project. It describes the methods used to determine the impacts of the project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany each impact discussion, where applicable.

Approach to Analysis

This EIR includes project-level analysis for the Dry Creek Project, Miles 2-3 and program-level analysis for the Dry Creek Project, Miles 4–6.

Project implementation includes construction, operation, and maintenance of the proposed project. The majority of the ground disturbance would take place during the construction phase of the proposed project and it is anticipated that maintenance activities would primarily consist of vegetation management. However, there is a possibility that maintenance activities would also include activities similar to construction, such as repair to damaged structures or adjustments to structures if they are not functioning properly. Therefore, maintenance activities are considered alongside

construction activities in terms of their potential for impact in the analysis below. Operation of the proposed project is excluded from analysis since operation would not involve any activities that could disturb cultural resources.

The analysis considers direct and indirect impacts on both known cultural and paleontological resources as well as inadvertent discoveries within the proposed project area. Potential impacts on architectural and structural resources are assessed by identifying the activities that could affect the architectural resources that have been identified as historical resources for the purposes of CEQA. While most historic buildings and many historic-period archaeological properties are generally significant because of their association with important events, people, or styles (under California Register Criteria 1, 2, and 3), the significance of most prehistoric and historic-period archaeological properties is usually assessed under Criterion 4. This criterion stresses the potential for discovering human remains regardless of their historical or archaeological importance.

Once a resource has been identified as significant, it must be determined whether the project would “cause a substantial adverse change in the significance” of the resource (CEQA Guidelines 15064.5[b]). A substantial adverse change in the significance of a historical resource or unique archaeological resources means “physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the historical resource would be materially impaired” (CEQA Guidelines Section 15064.5[b][1]). A historical resource is materially impaired through the demolition or alteration of the historical resource’s physical characteristics that convey its historical significance and that justify its inclusion in the California Register (CEQA Guidelines Section 15064.5[b][2][A]).

Archaeological and historical investigations for the project included: a review (NWIC File No. 14-0682) of the archaeological site base maps and records, survey reports, and other materials on file at the Northwest Information Center, Sonoma State University, Rohnert Park to identify previous surveys and previously recorded cultural resources in the project area; examination of the library and project files at Tom Origer & Associates; review of other databases, including the National Register of Historic Places, California Historical Landmarks, California Register of Historical Resources, and California Points of Historical Interest as listed in the Office of Historic Preservation’s *Historic Property Directory* (OHP 2012). In addition, ethnographic literature that describes appropriate Native American groups, county histories, and other primary and secondary sources were reviewed. Sources reviewed are listed in the “Materials Consulted” section of the cultural resources reports provided in **Appendices 9.6** and **9.7**. Pedestrian surveys were also conducted for all proposed locations for project-level habitat enhancements. Paleontological investigations included a search of the University of California Museum of Paleontology collections database. This search did not identify any paleontological

resources in the project area, but did identify that paleontological resources have been discovered in other areas of Sonoma County.

The project is not subject to Senate Bill 18, which requires cities and counties to consult with California Native American tribes before amending or adopting a general plan or specific plan, or designating open space lands, or Assembly Bill 52, which applies to projects for which a notice of preparation of environmental impact report or a notice of intent to adopt a negative declaration is issued on or after July 1, 2015. Regardless, the Water Agency understands the importance of contacting local Tribes and values their participation in the planning process. The Dry Creek Rancheria Band of Pomo Indians was contacted by Water Agency staff as well as by Tom Origer & Associates. On May 7, 2015, Water Agency staff met with a representative of the Dry Creek Rancheria Band of Pomo Indians to discuss the proposed project and share preliminary designs and cultural resources study results. The representative expressed support for the project and for future collaboration (Sonoma County Water Agency, 2015). Additionally, all Native American groups and/or individuals identified by the Native American Heritage Commission were contacted by letter regarding the project by Tom Origer & Associates.

Significance Criteria

Based on the Appendix G of the CEQA Guidelines, project implementation would have significant impacts and environmental consequences on cultural resources if it would result in any of the following:

1. A substantial adverse change in the significance of a historical resource that is either listed or eligible for listing on the National Register of Historic Places, the California Register of Historical Resources, or a local register of historic resources;
2. A substantial adverse change in the significance of a unique archaeological resource;
3. Disturbance or destruction of a unique paleontological resource or site or unique geologic feature; or
4. Disturbance of any human remains, including those interred outside or formal cemeteries.

For the purposes of this analysis, an additional criterion is established to evaluate significant impacts associated with the proposed Dry Creek Project. Project implementation would have a significant impact if it would:

1. Affect the distribution of natural vegetation communities along Dry Creek, such that availability of culturally significant plants is reduced.

Issues Not Discussed Further

The impact analysis for paleontological resources is based on the paleontological potential of the rock units to be disturbed by project-related activities. Impacts to paleontological resources could occur when excavation activities inadvertently disturb or destroy unique or significant fossils. The only excavation activity to occur would be located along Dry Creek within the Quaternary Alluvium of the Valley floor. Organisms are fossilized only after being substantially buried for thousands of years and material excavated during project-related activities would primarily be too recently deposited to contain fossils, thus minimizing the risk of disturbing fossils. A search of the University of California Museum of Paleontology (UCMP) collections database identified that paleontological resources have been discovered in Sonoma County but not in the Dry Creek Valley (University of California Museum of Paleontology, Accessed February 11, 2015). The proposed project is not expected to adversely affect paleontological resources, therefore this issue is not discussed further.

Impact Analysis

The following section presents a detailed discussion of potential impacts associated within cultural resources resulting from the Dry Creek Project. Both program-level and project-level project components are analyzed. Impacts are summarized and categorized as either “less than significant,” “less than significant with mitigation,” or “significant and unavoidable.” Impacts are also identified as applicable to construction, operation, and/or maintenance phases of the project.

Impact 3.4-1: Construction and maintenance of the Dry Creek Habitat Enhancement Project, Miles 2-6, could cause a substantial adverse change in the significance of a historical resource or unique archaeological resource. (Less than Significant with Mitigation)

Combined Analysis for Miles 2–3 and Miles 4–6

The cultural resources study for Miles 2-3 (**Appendix 9.7**) determined that the proposed project locations and associated staging areas and access roads were not likely to contain pre-historic resources, historic resources, or human remains. Additionally, despite archival research showing that the cultural resource designated P-49-000600 and referred to as “Big Time Village” could potentially be located within the footprint of habitat enhancements included in Miles 2-3, field surveys showed no evidence of its presence. Archival research shows that “Big Time Village” has also been described in two other separate locations. Therefore, it is unlikely that “Big Time Village” is located within the proposed project area. As a precaution, however, it is recommended that project activities along Dry Creek at the location of P-49-000600 be monitored by a qualified archaeologist.

Because project components in Reach 5 and in all reaches upstream of Reach 5 are located within the Dry Creek-Warm Springs Valleys Archaeological District, it is possible that ground-disturbing activities associated with the construction and maintenance of the project could disturb culturally significant materials.

During construction- and maintenance-related ground-disturbing activities, items of historical or archaeological interest could be discovered, however implementation of **Mitigation Measures 3.4.1a and 3.4.1b** would reduce this potential impact to less than significant with mitigation.

Mitigation Measure 3.4.1a: A qualified archaeologist or representative from the Dry Creek Rancheria will be present during ground-disturbing activities at the site P-49-0006000.

Mitigation Measure 3.4.1b: A tribal representative will be present during ground-disturbing activities throughout the project area.

In the event that previously unknown cultural materials are found during project construction or maintenance, the following mitigation measures would reduce the impacts to archaeological or historical resources to less-than-significant.

Mitigation Measure 3.4.1c: The project specifications will require the contractor to comply with the Sonoma County Water Agency's Standard Contract Documents regarding the discovery of cultural resources. The Water Agency Construction Inspector and construction personnel will be notified of the possibility of encountering archaeological materials during project construction and maintenance. The project specifications will provide that if discovery is made of items of historical or archaeological interest, the contractor will immediately cease all work activities in the area (within approximately 100 feet) of discovery. Prehistoric archaeological materials may include, but are not limited to, dwelling sites, obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish remains; stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-period materials might include stone, concrete, or adobe footings and walls; filled wells or privies; and deposits of metal, glass, and/or ceramic refuse. After cessation of excavation the contractor will immediately contact the Water Agency. The contractor shall not resume work until authorization is received from both agencies.

1. In the event of unanticipated discovery of archaeological materials occurs during construction, the Water Agency shall retain the services of a

qualified professional archaeologist to evaluate the significance of the items prior to resuming any activities that could impact the site.

2. In the case of an unanticipated archaeological discovery, if it is determined that the find is potentially eligible for listing in the California and/or National Registers, and the site cannot be avoided, the Water Agency shall provide a research design and excavation plan, prepared by a qualified archaeologist, outlining recovery of the resource, analysis, and reporting of the find. The research design and excavation plan shall be approved by the Water Agency. Implementation of the research design and excavation plan shall be conducted prior to work being resumed.

Impact Significance: Less than Significant with Mitigation.

Impact 3.4.2: The Dry Creek Habitat Enhancement Project, Miles 2-6, could disturb human remains, including those interred outside of formal cemeteries. (Less than Significant with Mitigation)

Combined Analysis for Miles 2-3 and Miles 4-6

Ground-disturbing activities associated with construction and maintenance will occur within and directly adjacent to Dry Creek, in areas that would have been unattractive sites for burials due to the frequency of flooding. Consequently, there is a low potential for the discovery of human remains from the construction, operation, and maintenance of the proposed project. However, because ground-disturbing activities would take place within the boundaries of the Dry Creek-Warm Springs Valleys Archaeological District, the possibility exists of discovery. Implementation of **Mitigation Measure 3.4.2** below would further reduce this potential impact to less than significant.

Mitigation Measure 3.4.2: The project specifications will require the contractor to comply with Public Resources Code 5097.98 and Health and Human Safety Code 7050.5 as they pertain to the discovery of human remains. If potential human remains are encountered, the Contractor shall halt work in the vicinity of the find and contact the Water Agency construction inspector and the Sonoma County coroner in accordance with Public Resources Code Section 5097.98 and Health and Safety Code Section 7050.5. If the coroner determines the remains are Native American, the coroner will contact the Native American Heritage Commission (NAHC). As provided in Public Resources Code Section 5097.98, the NAHC will identify the person or persons believed to be most likely descended from the deceased Native American. The Most Likely Descendent (MLD) makes recommendations for means of treating the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98. Work shall cease in the immediate area until the recommendations of the appropriate MLD are concluded.

Impact Significance: Less than Significant with Mitigation.

Impact 3.4.3: Construction and maintenance of Dry Creek Habitat Enhancement Project, Miles 2-6, could adversely affect the distribution of culturally significant plants along Dry Creek. (Less than Significant with Mitigation)

Combined Analysis for Miles 2–3 and Miles 4–6

As discussed in Section 3.3, Biological Resources (Vegetation and Wildlife), the Dry Creek Project, Miles 2-6, would involve the removal of some vegetation in habitat enhancement areas and the installation of other native vegetation in its place. Vegetation removed could include species considered culturally significant, as defined by the 1982 report prepared for the U.S. Army Corps of Engineers, *Ethnobotanical Mitigation: Warm Springs Dam – Lake Sonoma, California*. Additionally, ground-disturbing activities at the northernmost habitat enhancement site could disturb a small area of basket sedge, *Carex barbarae*, along the southern border of the ethnobotanical preserve relocated as mitigation for the construction of Warm Springs Dam. This impact would be less than significant with the implementation of Mitigation Measures 3.4-3a and 3b.

Mitigation Measure 3.4.3a: During construction and pre-construction activities in areas that contain basket sedge, the Water Agency and its contractors will remove, store, and replant basket sedge, *Carex barbarae*, at a 1:1 ratio to ensure its continued presence.

Mitigation Measure 3.4.3b: Prior to finalizing revegetation plans on public lands, Water Agency staff will consult with local tribal interests and prioritize inclusion of high priority species on those lands as well as other project locations, where feasible.

Impact Significance: Less than Significant with Mitigation.

3.4.5 General Plan and Consistency

Sonoma County General Plan 2020

The project area is located within Sonoma County. The following section lists goals, policies and objectives related to cultural resources from *Sonoma County General Plan 2020* and ends with a brief analysis discussing consistency with this plan.

Goal OSRC-19: Protect and preserve significant archaeological and historical sites that represent the ethnic, cultural, and economic groups that have lived and worked in Sonoma County, including Native American populations. Preserve unique or historically significant heritage or landmark trees.

Objective OSRC-19.1: Encourage the preservation and conservation of historic structures by promoting their rehabilitation or adaptation to new uses.

Objective OSRC-19.2: Encourage preservation of historic buildings or cemeteries by maintaining a Landmarks Commission to review projects which may affect historic structures or other cultural resources.

Objective OSRC-19.3: Encourage protection and preservation of archaeological and cultural resources by reviewing all development projects in archaeologically sensitive areas.

Objective OSRC-19.4: Identify and preserve heritage and landmark trees.

Objective OSRC-19.5: Encourage the identification, preservation, and protection of Native American cultural resources, sacred sites, places, features, and objects, including historic or prehistoric ruins, burials grounds, cemeteries, and ceremonial sites. Ensure appropriate treatment of Native American and other human remains discovered during a project.

Objective OSRC-19.6: Develop and employ procedures to protect the confidentiality and prevent inappropriate public exposure of sensitive archaeological resources and Native American cultural resources, sacred sites, places, features, or objects.

Policy OSCR-19a: Designate the County Landmarks Commission to review projects within designated historic districts.

Policy OSCR-19b: Refer proposals for County Landmark status and rezoning to the Historic Combining District to the County Landmarks Commission.

Policy OSCR-19c: The County Landmarks Commission shall review Historic Building Surveys and make recommendations for designation of structures or cemeteries as county landmarks.

Policy OSCR-19d: Include a list of historic structures proposed for designation as County landmarks in Specific or Area Plans or Local Area Development Guidelines and refer the list to the Landmarks Commission for their recommendations.

Policy OSCR-19e: Refer applications which involve the removal, destruction or alteration of a structure or cemetery identified in a historic building survey to the Landmarks Commission for mitigation. Measures may include reuse, relocation, or photo-documentation.

Policy OSCR-19f: Use the Heritage or Landmark Tree Ordinance and the design review process to protect trees.

Policy OSCR-19g: Pursue grant funding for the preparation and updating of historic resource inventories.

Policy OSCR-19h: Designate the County Landmarks Commission to administer a preservation program for stabilization, rehabilitation, and restoration of historic structures.

Policy OSCR-19i: Develop a historic resources protection program that provides for an ongoing process of updating the inventory of historic resources. Such a program should include:

1. Periodic historic building surveys,
2. Formalized recognition of the inventory of historic resources as recommended by the State Office of Historic Preservation, including rezoning to the Historic Combining District, and
3. Procedures for the protection of recognized historic resources for both ministerial and discretionary permits.

Policy OSCR-19j: Develop an archaeological and paleontological resource protection program that provides:

1. Guidelines for land uses and development on parcels identified as containing such resources,
2. Standard project review procedures for protection of such resources when discovered during excavation and site disturbance, and
3. Educational materials for the building industry and the general public on the identification and protection of such resources.

Policy OSCR-19k: Refer applications for discretionary permits to the Northwest Information Center to determine if the project site might contain archaeological or historical resources. If a site is likely to have these resources, require a field survey and preparation of an archaeological report containing the results of the survey and include mitigation measures if needed.

Policy OSCR-19l: If a project site is determined to contain Native American cultural resources, such as sacred sites, places, features, or objects, including historic or prehistoric ruins, burial grounds, cemeteries,

and ceremonial sites, notify and offer to consult with the tribe or tribes that have been identified as having cultural ties and affiliation with that geographic area.

Policy OSCR-19m: Develop procedures for consulting with appropriate Native American tribes during the General Plan adoption and amendment process.

Policy OSCR-19n: Develop procedures for complying with the provisions of State Health and Safety Code Section 7050.5 and Public Resources Code Section 5097.98, if applicable, in the event of the discovery of a burial or suspected human bone. Develop procedures for consultation with the Most Likely Descendant as identified by the California Native American Heritage Commission, in the event that the remains are determined to be Native American.

Consistency

The Dry Creek Project is consistent with *Sonoma County General Plan 2020*. The project would comply with **Goal OSCR-19** listed above for several reasons. First, records reviews with the NWIC were performed and archaeological field surveys were completed to determine potential cultural resources within the project area. Additionally, historic resources would not be impacted by the proposed project. Also, historical, archaeological, and ethnobotanical resources would be protected during ground-disturbing activities through the implementation of **Mitigation Measures 3.4.1a, 3.4.1b, 3.4.1c, 3.4.2, 3.4.3a, and 3.4.3b** which require the presence of a tribal representative and a qualified archaeologist at a known potential cultural resources sites, provide protocols for accidental discovery, and preserve culturally-significant plants in the proposed project area. Additionally, the Water Agency is actively collaborating with the local Tribe during project design.

3.4.6 References

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CHAPTER 3.5 Fisheries Resources

3.5.1 INTRODUCTION

This chapter describes the existing conditions relating to fisheries resources within the Dry Creek Habitat Enhancement Project, Miles 2-6 (Dry Creek Project or proposed project) area. Section 3.5.2, “Environmental Setting,” describes the project area environmental setting, focusing on the fisheries resources occurring therein. Section 3.5.3, “Regulatory Framework,” details the regulatory setting affecting fisheries resources, including federal, state, and local laws related to protected species and habitat conservation. Section 3.5.4, “Impacts and Mitigation Measures,” describes the environmental impacts and mitigation measures, including explanations of the significance criteria used to evaluate and determine impacts, in accordance with the California Environmental Quality Act (CEQA) significance criteria (CEQA Guidelines, Appendix G) and mitigation measures are proposed that could reduce, eliminate, or avoid such impacts.

Other impacts to related resources are addressed in other chapters as follows: impacts to terrestrial plants and animals are addressed in **Chapter 3.3, Biological Resources**; impacts to geology, soil, and mineral resources are addressed in **Chapter 3.6, Geology, Soil, and Mineral Resources**; impacts to hydrology and water quality are addressed in **Chapter 3.8, Hydrology and Water Quality**; and impacts to recreation are addressed in **Chapter 3.12, Recreation**.

3.5.2. Environmental Setting

The environmental setting for fisheries resources includes all areas that could be affected by activities associated with the Dry Creek Project. As stated in **Chapter 2, Project Description**, habitat enhancement sites have been identified for Miles 2-3 but specific sites have yet to be determined for Miles 4–6. Projects could occur anywhere along the 14-mile length of Dry Creek from Warm Springs Dam to the Russian River (exclusive of sites already enhanced in Mile 1, sites already identified for enhancement in Miles 2–3, and areas with existing high quality habitat). Consequently, the environmental setting includes the Dry Creek valley from the creek’s confluence with the Russian River upstream to Warm Springs Dam, including the 14 river miles (RMs) from the dam to the Russian River and adjacent riparian areas. The setting also includes tributaries entering Dry Creek as they are part of the drainage network potentially affected by enhancement activities. A more narrow focus is applied to individual project sites in Miles 2 and 3.

Project Area

In evaluating the feasibility of proposed enhancement techniques, Inter-Fluve (2013) split Dry Creek into three segments based on dominant physical processes and other shared characteristics (Figure 3.5-1). The upper segment is defined as upstream of Peña Creek (RM 11 to 13.7). The middle segment is the longest and is defined as Peña Creek to the grade control sills (RM 3 to 11). The lower segment is defined as the grade control sills to the Russian River confluence (RM 0 to 3). Each segment is described below.

Upper segment (RM 11 to 13.7)

The upper segment begins below Bord Bridge, flows 2.7 mi from the trapezoidal channel at the Warm Springs Dam spillway, and continues downstream to the confluence of Peña Creek. The segment includes Schoolhouse, Fall, Dutcher, and Vince's creeks, and three unnamed tributaries. Characterized by deep pools and riffles with little edge habitat, sediment supply is limited due to the absence of larger tributaries and its location directly below Warm Springs Dam. Controlled water releases from the WSD also results in highly regulated hydrology for the upper segment of Dry Creek.

Middle segment (RM 3 to 11)

The middle segment begins at Peña Creek and continues to United States Army Corps of Engineers (USACE) grade control sills. The segment contains more varied habitat than the upper and lower segments; and includes Canyon Road, Grape, Crane, Kelly, and Pine Ridge Canyon creeks, and fifteen unnamed tributaries. The middle segment has greater sediment supply than the upstream reach due to the unregulated tributaries which enter Dry Creek below Warm Springs Dam.

Lower segment (RM 0 to 3)

The lower segment begins downstream of the USACE grade control sills and continues to the confluence with the Russian River. The lower segment includes Mill Creek and West Slough and one unnamed tributary. Due to the proximity with the Russian River, the hydraulics of the lower segment are influenced by backwater from the Russian River. As a result the lower segment of Dry Creek is more alluvial than the upstream reaches.

Survey Reaches

Inter-Fluve (2010) delineated study reaches in Dry Creek following the protocol for stream segment identification developed by the State of Washington's Timber, Fish and Wildlife Program (Pleus and Shuett-Hames 1998). Delineation of survey reaches relied on geomorphic parameters (relative drainage area, channel gradient and channel confinement) and non-fluvial features (e.g. structures such as bridges). Inter-Fluve (2012) delineated preliminary survey reaches, then performed a field verification to

make adjustments as appropriate. The delineation identified 16 reaches with an average length of 0.9 miles.

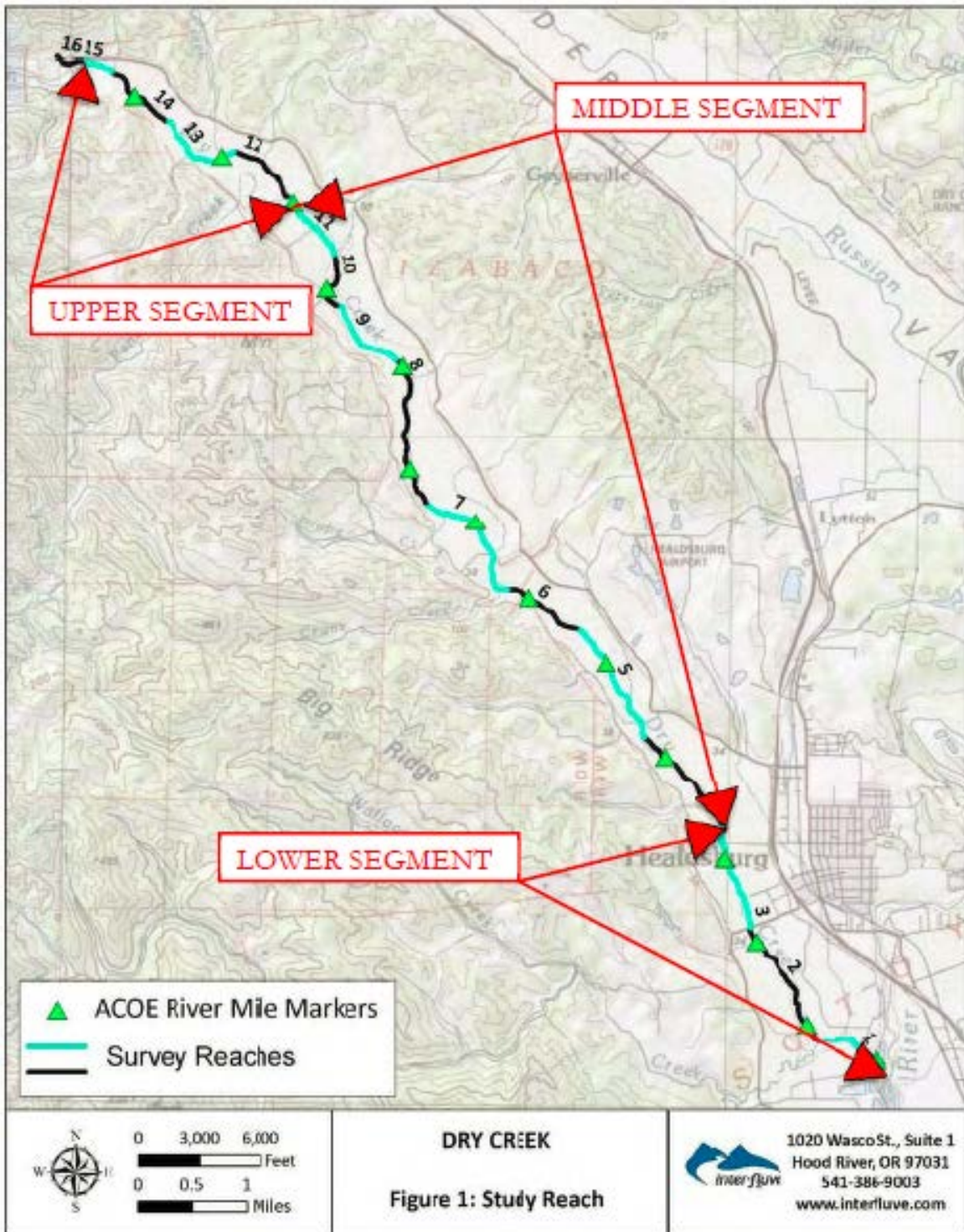


Figure 3.5-1. Dry Creek Study Reaches and Feasibility Segments

Enhancement Sites

Miles 2-3

Mile 2 habitat enhancement sites are located in RM 8.2-8.9 (Study Reach 8; Middle Segment), RM 9.2-10.5 (Study Reaches 9-11; Middle Segment) and RM12.4-13.2 (Study Reach 14; Upper Segment) (Figures 2.14 through 2.16 from Project Description). Concept designs for the Mile 2 sites are shown in Appendix 9.2 (Inter-Fluve 2014). The project sites being evaluated for Mile 3 habitat enhancement work are located at RM 1.0–2.0 (Study Reach 2; Lower Segment), RM 3.0–4.1 (Study Reach 4; Middle Segment), and RM 4.2–5.0 (Study Reach 5; Middle Segment) (Figure 2.17 from Project Description). Concept designs for the Mile 3 sites are shown in Appendix 9.3 (ESA 2014).

The proposed enhancements include combinations of pool and riffle enhancement, off-channel backwater and alcove enhancement and/or creation, side-channel enhancement and/or creation, and enhancement and stabilization of streambanks. Pools may be enhanced with large woody debris which provides places for juvenile coho salmon (*Oncorhynchus kisutch*) and steelhead (*Oncorhynchus mykiss*) to avoid predators, escape high water velocities, and find food. Enhancements of riffles may include expanding existing riffles or constructing new riffles in appropriate locations, which may also enhance pools by slowing pool velocities. Streambank enhancements may address chronic erosion in critical locations and provide additional cover along the channel margins.

Construction activities will vary depending upon structure type and location, but typical activities include work area dewatering, grading, installation of large boulders for anchor material, installation of large wood logs, vegetation planting, and installation of erosion control measures (e.g. fabric, straw, seeding). Some construction activities may consist of working in the active channel of Dry Creek, such as large boulder placement where dewatering the section of creek to place boulders would be more disruptive to the environment. Construction activities will likely require staging areas outside of the footprint of the habitat work, as well as requiring the creation of access routes through the riparian corridor in order to access the habitat work site.

While it is not anticipated that the habitat enhancement structures will require regular maintenance work over the long term, temporary irrigation may be required to maintain newly-installed vegetation and periodic vegetation management may take place in certain locations to enhance fish habitat. Maintenance activities may also include repair to damaged structures or adjustments to structures if they are not functioning as intended.

Miles 4-6

Any area within the 14-mile length from below Warm Springs Dam to the confluence of the Russian River and not already enhanced or providing high quality habitat are under consideration for Miles 4-6 of habitat work in Dry Creek. The proposed enhancements and anticipated construction and maintenance activities are anticipated to be similar as to those described for Miles 2-3.

Hatchery Operations

Hatchery operations in the Russian River watershed include the Don Clausen Fish Hatchery (DCFH) located on Dry Creek below Warm Springs Dam and its satellite facility, Coyote Valley Fish Facility (CVFF), located on the East Fork of the Russian River below Coyote Valley Dam. These production facilities, owned by the USACE and operated by the California Department of Fish and Wildlife (CDFW), are designed to mitigate for the loss of spawning and rearing habitat above the two permanent dams. The DCFH began operations in 1980 with the goal of producing fish to mitigate the loss of spawning habitat for steelhead and coho salmon and to produce returning runs of steelhead, and Chinook (*Oncorhynchus tshawytscha*) and coho salmon. The CVFF began operations in 1992 with the goal of mitigating for the loss of steelhead habitat in the East Fork Russian River (Entrix, Inc., 2004). Prior to the operation of the DCFH and CVFF out-of-basin stocks of steelhead trout, and Chinook and coho salmon were planted into the Russian River basin, including Dry Creek as early as the 1880s (Entrix, Inc., 2004). Adult steelhead that return to the DCFH are spawned and their progeny is raised to maturity and released into Dry Creek as yearlings. The hatchery currently produces an average of 307,000 steelhead annually (email from E McKenna A Pecharich; unreferenced). Chinook salmon populations in Dry Creek are no longer augmented with hatchery populations.

In 2001, a coho salmon broodstock hatchery was established at the DCFH. This coho salmon broodstock hatchery is a part of the Russian River Coho Salmon Captive Broodstock Program (RRCSCBP), which is a multi-agency partnership (including USACE, CDFW, National Marine Fisheries Service (NMFS), University of California Cooperative Extension/California Sea Grant, and the Water Agency) established to breed native Russian River coho salmon and raise them to maturity for release into more than twenty streams that historically supported this species (Manning & Martini-Lamb, 2012). The coho salmon broodstock hatchery is owned and operated by the USACE and is a separate facility from the steelhead hatchery at the DCFH. The RRCSCBP has released coho salmon into Dry Creek and its tributaries Peña, Grape, Palmer, and Mill creeks.

Aquatic habitat

Physical Habitat

Inter-Fluve (2010) conducted an aquatic habitat inventory in the Dry Creek Project Area (exclusive of Reach 16 at the base of Warm Springs Dam). The inventory adapted methods from Bisson et al. (1982), United States Forest Service Region 6 Level II stream survey methods (USFS 2006), and California Department of Fish and Wildlife Salmonid Stream Habitat Restoration Manual (Flosi et al. 1998) to characterize aquatic habitat for comparison to habitat preference criteria from the Russian River Biological Opinion (Table 3.5-1) (Reasonable and Prudent Alternative, Action 3) (NMFS 2008). The inventory began with reach delineation (Figure 3.5-1), then identification and characterization of individual habitat units (main channel pool, scour pool, riffle, flatwater, cascade, alcove, and side-channel), followed by a summary of individual study reaches (reaches 1 through 15). The inventory provided a survey of the existing physical characteristics within Dry Creek to compare against the habitat criteria established in the Russian River Biological Opinion. The inventory occurred in fall 2009 during summer operational discharge conditions of approximately 100 cubic feet per second (cfs) from Warm Springs Dam. The results of the Dry Creek habitat inventory are shown in Table 3.5-2.

Table 3.5-1. Habitat Criteria from Russian River Biological Opinion (NMFS 2008)

Variable	Value
Percent Pools	33–67% of channel length
Pool : riffle	1: 2 to 2:1
Depth	0–2 ft and 2–4 ft
Velocity	<0.5 ft/s ¹
Cover	30% of pool bottom obscured by cover
Shelter Value	80
Pool size	500–2700 ft ²
¹ The target velocity range was expanded from <0.2 cfs to 0.5 cfs during the collaborative development of an adaptive management plan (Porter et al. 2014).	

Table 3.5-2. Results of Inter-Fluve (2010) Dry Creek habitat inventory.

Segment	Lower			Middle								Upper			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
REACH	0-0.7	0.7-2	2.0-3.0	3.0-4.1	4.1-5.4	5.4-6.2	6.2-7.5	7.3-9.0	9.0-9.8	9.8-10.3	10.3-11.0	11.0-11.7	11.7-12.6	12.6-13.3	13.3-13.6
river miles	0-0.7	0.7-2	2.0-3.0	3.0-4.1	4.1-5.4	5.4-6.2	6.2-7.5	7.3-9.0	9.0-9.8	9.8-10.3	10.3-11.0	11.0-11.7	11.7-12.6	12.6-13.3	13.3-13.6
length (miles)	0.7	1.3	1	1.1	1.3	0.8	1.3	1.5	1	0.6	0.7	0.7	0.8	0.7	0.3
<i>main channel pools (% total)</i>	32	16	17	25	26	35	19	19	0	20	13	37	29	25	50
<i>scour pools(% total)</i>	0	8	0	0	0	0	16	13	23	20	7	5	5	13	0
<i>Riffles (% total)</i>	32	14	22	20	16	24	23	26	38	30	33	32	33	38	50
<i>Flatwaters (% total)</i>	37	62	61	50	58	41	39	42	38	30	47	26	33	25	0
<i>cascades(% total)</i>	0	0	0	5	0	0	3	0	0	0	0	0	0	0	0
<i># side channels (% total)</i>	2	3	8	3	1	0	3	0	0	1	1	3	0	1	0
<i># alcoves (% total)</i>	4	6	4	8	2	0	8	1	1	3	1	1	3	2	1
<i>main channel pools (% length)</i>	39	18	25	59	30	60	45	36	0	26	13	49	41	26	97
<i>scour pools (% length)</i>	0	3	0	0	0	0	22	21	49	25	2	7	6	12	0
<i>Riffles (% length)</i>	15	5	6	6	6	12	10	11	15	12	21	19	21	32	3
<i>Flatwaters (% length)</i>	47	73	69	34	64	28	22	32	37	38	64	25	33	30	0
<i>Cascade (% length)s</i>	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0
<i>wetted channel width (ft)</i>	45.6	45.6	47.7	51.9	48.4	48.6	47.7	45.8	51.1	47.6	46.5	46	43.5	48.1	39
<i>active channel Width (ft)</i>	62.5	68	82	52	69	n/a	58.5	58.5	57	78	56.6	54	41	65	45
<i>Floodprone (width Ft)</i>	137.5	140	110	112	86.5	n/a	81	70.5	95	87	78	93	62	139	126
<i>avg. active channel depth</i>	2.1	2	1.35	2.15	1.8	n/a	2.5	2.4	2.8	2.4	2.6	2.6	2.3	2.6	2.9
<i>width:depth</i>	30	40	48	19	39	n/a	24	24	21	32	22	21	18	25	15
<i>entrenchment</i>	2.2	2.02	1.4	2.2	1.3	n/a	1.6	1.2	1.7	1.1	1.4	1.7	1.5	2.1	2.8
<i>pools max depth (ft)</i>	4	4.3	4.6	5.3	4.9	5.5	4.8	4.7	4.2	6.3	5.1	5.5	5.7	5.7	7

Table 3.5-2. Results of Inter-Fluve (2010) Dry Creek habitat inventory.

Segment	Lower			Middle							Upper				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
REACH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>river miles</i>	0-0.7	0.7-2	2.0-3.0	3.0-4.1	4.1-5.4	5.4-6.2	6.2-7.5	7.3-9.0	9.0-9.8	9.8-10.3	10.3-11.0	11.0-11.7	11.7-12.6	12.6-13.3	13.3-13.6
<i>length (miles)</i>	0.7	1.3	1	1.1	1.3	0.8	1.3	1.5	1	0.6	0.7	0.7	0.8	0.7	0.3
<i>pools residual depth (ft)</i>	2.7	2.8	2.4	3.8	3.4	4	3.5	3.4	3	5	4.3	3.9	3.8	4.4	4.5
<i>Rifflevdepth (ft)</i>	1.1	0.9	1.1	1.2	1	0.9	1	1	0.9	1.1	1	1.4	1.2	1.1	2
<i>Flatwater depth (ft)</i>	1.4	1.5	1.4	1.3	1.5	1.5	1.4	1.4	1.5	1.9	1.8	2	2.2	2.3	
<i>Cascade depth (ft)</i>				0.9			1.1								
<i>side channel (depth ft)</i>	0.6	1.3	1.8	0.9	0.5		0.8			0.3	1	1.6		1.1	
<i>alcove max</i>	1	2	1.4	1.7	1		2	2	1.5	2.6	2.3	2.5	2.2	3.5	3
<i>% cover (mainstem habitats)</i>	17	26	24	22	24	23	26	18	20	25	19	24	19	20	19
<i>complexity value (mainstem habitats)</i>	2.1	2.7	2.7	2.5	2.6	2.6	2.6	2.6	3	3	3	2.8	2.7	2.7	2
<i>shelter rating (mainstem habitats)</i>	35	69	65	55	61	59	67	47	59	74	56	67	51	54	37
<i>edge habitat frequency (mainstem habitats)</i>	38%	39%	60%	58%	40%	29%	43%	47%	31%	36%	12%	26%	33%	19%	33%
<i>LWD pieces per mile</i>	96.9	141.9	165.4	184.9	233.9	195.6	190.5	193.6	192.8	361.8	269	176.6	159.9	117	62.9
<i>% live wood</i>	42%	50%	43%	37%	31%	38%	34%	23%	19%	17%	29%	37%	51%	66%	70%
<i># pieces S, M, L</i>	41, 14, 9	158, 71, 13	174, 54, 30	177, 66, 15	229, 47, 20	110, 29, 15	231, 57, 8	233, 55, 8	124, 22, 9	171, 55, 9	132, 52, 12	122, 36, 3	100, 35, 6	64, 29, 0	13, 7, 0
<i># pebble counts</i>	1	1	2	1	2	1	4	1	1	1	2	1	1	2	1
<i>spawning gravels (11.4 to 128 mm)</i>	84%	79%	81%	89%	80%	84%	80%	82%	81%	69%	73%	77%	83%	69%	67%
<i>fry rearing gravels (32 to 128 mm)</i>	39%	33%	42%	49%	41%	45%	36%	53%	36%	45%	33%	51%	55%	37%	37%

Inter-Fluve compared the results of the habitat inventory to criteria listed in the Russian River Biological Opinion (NMFS 2008) and found that habitat conditions (as observed in fall 2009) did not meet several key standards:

- **Total pools.** Total pools (main-channel pools and scour pools) represented 30% of all habitat units, less than the 33-67% suggested by NMFS (2008)
- **Pool:riffle.** Pool:riffle ratios fell within the 0.5 – 2.0 range specified by NMFS (2008). But, riffles composed only 12% of the length of Dry Creek, highlighting the proportional deficit of this habitat type
- **Pool depth.** The average residual depth of 3.6 feet for pools in lower Dry Creek fell within the specified range (2 – 4 ft)
- **Large woody debris.** NMFS (2008) specified the presence of ample large woody debris. The habitat inventory found a moderate amount of large woody debris compared to regional values
- **Availability of off-channel habitat.** Inter-Fluve (2010) found an average of 4.7 (n=71) off-channel habitats per reach, including alcove, side-channel pool/riffle/flatwater units, although five reaches had no off-channel habitats
- **Percent cover and cover complexity.** The inventory found main channel percent cover and main channel shelter complexity ratings less than habitat standards
- **Water velocity.** Estimated pool velocities exceeded NMFS (2008) criteria

The habitat inventory concluded that the availability of existing rearing habitat was limited in Dry Creek, particularly for coho salmon (Inter-Fluve 2013). Instream rearing habitat was limited primarily by the presence of swift velocities in the Dry Creek main channel and relatively limited habitat structure and complexity. The primary instream rearing habitat was associated with overhanging and emergent vegetation along the margins of the channel in select sub-reaches. The purpose of the Dry Creek Project is to provide habitat in Dry Creek, particularly for coho salmon, that is currently not present as identified by the Russian River Biological Opinion and as documented in the habitat inventory.

Enhancement Sites

Miles 2 and 3

Mile 2 habitat enhancement sites occur from RM 8.2-8.9 (Study Reach 8; Middle Segment), RM 9.2-10.5 (Study Reaches 9–11; Middle Segment) and RM12.4-13.2 (Study Reach 14; Upper Segment). The project sites being evaluated for Mile 3 habitat enhancement work are located at RM 1.0–2.0 (Study Reach 2; Lower Segment), RM 3.0–4.1 (Study Reach 4; Middle Segment), and RM 4.2–5.0 (Study Reach 5; Middle Segment). Throughout all of Dry Creek, riparian vegetation and small woody debris along the stream banks is abundant. Where alcoves occur, aquatic vegetation with small woody debris provide abundant cover.

Mile 2 sites are located in the upper and middle segments of Dry Creek. At the upper end (Reach 14), just below Warm Springs Dam, this section receives little sediment from upstream due to the absence of tributary inputs and the discontinuity in sediment transport resulting from the installation of Warm Springs Dam (Inter-Fluve 2012). The creek at the upper end is characterized by a relatively narrow active floodplain, and a channel geometry that lacks sinuosity due to the history of incision in Dry Creek. Moving downstream in this section, Dry Creek begins to be characterized by increasing influence of tributaries (most notably Pena Creek), but also expressing the effects of substantial regulation and land use impacts, resulting in variability from reach to reach (Inter-Fluve 2013, 2015). Towards the lower end of the Mile 2 section (Reach 8), Dry Creek begins to have a more significant sediment supply due to the influence of unregulated tributaries (Inter-Fluve 2012).

Mile 3 sites are located in the middle and lower segments of Dry Creek. At the upper end of Mile 3 sites (Reaches 4 and 5), this section is characterized by banks that are armored in many places with concrete slabs, riprap, and car bodies. The active floodplain tends to be narrow, with 10- to 15-foot banks adjacent to the main channel which limit the degree of channel migration, as do bank stabilization projects. As with other middle segment sections of Dry Creek, this section is characterized by the increasing influence of tributaries and sediment inputs. The lower end of Mile 3 sites (Reach 2) are located in the lower segment of Dry Creek where the influence of the Russian River backwater controls the routing of sediment and fluvial processes (Inter Fluve 2012).

Miles 4 through 6

Enhancement site locations for Miles 4 through 6 have not been identified. They would likely be spread throughout the upper, middle, or lower segments of Dry Creek, just as with the Miles 2 and 3 sites and the existing setting would be similar as described above.

Water Quality

Temperature

Water temperature affects chemical and physical process rates and critically influences the survival, behavior, and production of aquatic biota. Impacts of high water temperatures on salmonids includes acute effects, such as decreased enzyme function, and chronic effects, such as increased metabolic rates and reduced immune system function that can reduce growth rates and overall production (Stillwater Sciences 2008). The North Coast Water Regional Water Quality Control Board (NCRWQCB) (2001) suggest maximum weekly average temperatures (MWATs, the highest average temperature for any seven day flow rolling average) below 64°F (18°C) and 66°F (19°C) for coho salmon and steelhead juveniles, respectively. NCRWQCB (2001) also suggest a daily maximum temperature of 75°F (24°C) as the upper lethal limit for salmonids. Although NCRWQCB (2001) does not address Chinook salmon, this analysis assumes standards similar to coho salmon and steelhead.

Temperature data collected in Dry Creek before regulation by Warm Springs Dam show distinct patterns. Before dam installation, seasonal daily maximum and minimum water temperatures in Dry Creek regularly exceeded 68°F (20°C) and occasionally exceeded 77°F (25°C) (Dry Creek near Geyserville stream gage (USGS gage #11465200), period of record: January 1965 to September 1984). Daily maximum temperatures above 68°F (20°C) typically occurred between May and October, with seasonal maxima occurring in June and July, and occasionally August and September (USGS gage #11465200). Dam completion and the consequent filling and operation of Lake Sonoma Reservoir, transformed Dry Creek from a seasonal stream with high peak flows in the winter and little or no discharge in the summer to a perennial stream with muted peak flows and consistent summer flows. Temperature data collected from 1982 to 1994 (Dry Creek below Warm Springs Dam [USGS gage # 11465000]) show unregulated temperature patterns from 1982 to 1984 (similar to patterns described above) followed by a significant reduction in seasonal maxima water temperatures after 1984. After dam installation, seasonal daily maximum and minimum water temperatures regularly exceeded 59°F (15°C), but never reached above 68°F (20°C). Recent temperature data collected in 2012, 2013 and 2014 show maximum temperatures ranging from 54°F (12°C) to 62°F (17°C) from May through October (Dry Creek below Lambert Bridge stream gage [USGS gage # 11465240]). Although these data are not MWATs, as used in NCRWQCB (2001), a week of the highest observed daily maximum temperature of 62°F (17°C) would not result in an MWAT exceeding standards for coho salmon or steelhead of 64°F (18°C) and 66°F (19°C), respectively. See **Chapter 3.8 Hydrology and Water Quality** for additional discussion on water quality and temperature in Dry Creek.

Fish Community Composition

Surveys of the fish community in Dry Creek during the 1950s found only native fish species. Prior to Warm Springs Dam construction, Dry Creek flows fluctuated seasonally, typically peaking in winter (February, 940 cubic feet per second (cfs) median mean monthly flow, USGS gage # 11465200; 1959-1984 period of record) and nearly disappearing from summer to early fall (June to October, 0.5–20 cfs median monthly flow). Most fish (84%) were warm water species, such as California roach (*Lavinia symmetricus*), Sacramento sucker (*Catostomus occidentalis*), and Sacramento pikeminnow (*Ptychocheilus grandis*). Surveys also recorded hardhead (*Mylopharodon conocephalus*), unidentified sculpins (family Cottidae), three-spine stickleback (*Gasterosteus aculeatus aculeatus*), steelhead (*O. mykiss*), and Russian River tule perch (*Hysterocarpus traskii pomo*) (Pintler & Johnson, 1958). In the 1950s, the California Department of Fish and Game (now the California Department of Fish and Wildlife) attempted to increase trout populations in the Russian River and its tributaries by chemically eradicating other fish species using pesticide (rotenone). This action eradicated nearly all fish in Dry Creek and major tributaries, but within a few years most salmonid species returned to Dry Creek (Pintler & Johnson, 1958).

The construction of the Warm Springs Dam brought substantial hydrologic changes (see **Chapter 3.8 Hydrology and Water Quality**) and changed the fish species composition in Dry Creek. Water temperatures decreased due to releases from Lake Sonoma, which rarely exceed 60° F (15.6°C) (Entrix, Inc., 2004). Changes to the flow and temperature of Dry Creek (see **Chapter 3.8 Hydrology and Water Quality**) resulted in a shift in species composition from warm water to cold water species, mainly salmonids. Water Agency downstream migrant trapping data have recorded native species including California roach, Chinook salmon (*O. tshawytscha*), coho salmon (*O. kisutch*), hardhead, hitch (*Lavinia exilicauda*), Pacific lamprey (*Lampetra tridentata*), prickly sculpin (*Cottus asper*), riffle sculpin (*C. gulosus*), Russian River tule perch, Sacramento pikeminnow, Sacramento sucker, steelhead, three-spine stickleback, and western brook lamprey (*Lampetra richardsoni*) (SCWA unpublished data 2009-2014). The data also show non-native species, such as American shad (*Alosa sapidissima*), bluegill (*Lepomis macrochirus*), channel catfish (*Ictalurus punctatus*), fathead minnow (*Pimephales promelas*), golden shiner (*Notemigonus crysoleucas*), green sunfish (*Lepomis cyanellus*), largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), and white catfish (*Ameiurus catus*) (SCWA unpublished data 2009-2014) (Table 3.5-3). Overall, fish captured in Dry Creek downstream migrant traps are primarily salmonids: coho salmon and Chinook salmon, and steelhead. These three species made up between 87% and 98% of the trap catch from 2009 to 2014 (SCWA unpublished data). The species composition from the Dry Creek downstream migrant trap likely over represents migratory species such as salmonids since it captures

downstream moving fish. Nonetheless, electrofishing surveys in Dry Creek show similar species composition.

Table 3.5-3. The fish species observed at a downstream migrant trap operated by the Water Agency in the spring and summer months in Dry Creek from 2009 to 2014.

	Common Name	Scientific Name
Native	California roach	<i>Lavinia symmetricus</i>
	Chinook salmon	<i>Oncorhynchus tshawytscha</i>
	coho salmon	<i>Oncorhynchus kisutch</i>
	hardhead	<i>Mylopharodon conocephalus</i>
	hitch	<i>Lavinia exilicauda</i>
	Pacific lamprey	<i>Lampetra tridentata</i>
	prickly sculpin	<i>Cottus asper</i>
	rifle sculpin	<i>Cottus gulosus</i>
	Russian River tule perch	<i>Hysterothorax traskii pomo</i>
	Sacramento pikeminnow	<i>Ptychocheilus grandis</i>
	Sacramento sucker	<i>Catostomus occidentalis</i>
	steelhead	<i>Oncorhynchus mykiss</i>
	three-spine stickleback	<i>Gasterosteus aculeatus aculeatus</i>
western brook lamprey	<i>Lampetra richardsoni</i>	
Non-Native	American shad	<i>Alosa sapidissima</i>
	bluegill	<i>Lepomis macrochirus</i>
	channel catfish	<i>Ictalurus punctatus</i>
	fathead minnow	<i>Pimephales promelas</i>
	golden shiner	<i>Notemigonus crysoleucas</i>
	green sunfish	<i>Lepomis cyanellus</i>
	largemouth bass	<i>Micropterus salmoides</i>
	smallmouth bass	<i>Micropterus Dolomieu</i>
	white catfish	<i>Ameiurus catus</i>

Special-Status Species

There are four special-status fish species and their critical habitat that occur in the project area (Table 3.5-4) (CDFW 2015). Critical habitat is defined as specific areas within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to conservation, and those features that may require special management considerations or protection; and specific areas outside the geographical area occupied by the species if the agency (NMFS)

determines that the area itself is essential for conservation (NMFS 1999). These species include federally and state endangered Central California Coast (CCC) coho salmon, federally threatened California Coastal (CC) Chinook salmon and Central California Coast (CCC) steelhead trout, and Russian River tule perch which the CDFW considers a species of special concern (Moyle, Yoshiyama, Williams, & Wikramanayake, 1995) (California Department of Fish and Wildlife, n.d.).

Table 3.5-4. Threatened or Endangered Fish Species, and Associated Critical Habitat, potentially occurring within the Project area

Scientific Name	Common Name	Status ¹	Critical Habitat in or near Project Area?
<i>Oncorhynchus tshawytscha</i>	California Coastal Chinook salmon	FT	Yes
<i>Oncorhynchus kisutch</i>	Central California Coast coho salmon	FE	Yes
<i>Oncorhynchus mykiss</i>	Central California Coast steelhead	FT	Yes
<i>Hysterocarpus traski pomo</i>	Russian River tule perch	SSC	---

¹ FE= Federally Endangered, FT = Federally Threatened, SSC = California Species of Special Concern

California Coastal Chinook Salmon

Status

Chinook salmon in the Dry Creek watershed are part of the California coastal ESU, the CC Evolutionarily Significant Unit (ESU)¹ includes coastal watersheds from Redwood Creek in the north (Humboldt County) down to and including the Russian River basin (Bjorkstedt, et al., 2005). Dry Creek is identified as critical habitat for recovery of this ESU (National Marine Fisheries Service, 2005). Chinook salmon in the CC ESU are currently all fall-run; however, historical information suggests that spring-run Chinook salmon existed in the northern part of their range (Bjorkstedt, et al., 2005).

Life History

Adult Chinook salmon migrate into the Russian River beginning as early as August and spawn in the mainstem and tributary streams through January (Chase, Manning, Cook, & White, 2007). Chinook salmon die after spawning, completing their life cycle. Fry emerge from the spawning redds beginning in late winter or spring and most juveniles begin migrating to the sea soon after; although some individuals may remain in streams through the summer, moving into estuaries in the fall or winter (Bjorkstedt, et al., 2005). Because Chinook salmon are not typically found in the Dry Creek system

¹ Historically, NMFS used the concept of ESUs to define “species” in its administration of the ESA for anadromous salmon populations. For purposes of conservation under the ESA, an ESU is a distinct population segment that is substantially reproductively isolated from other population units and represents an important component in the evolutionary legacy of the species (NMFS 2008).

through the summer, the Russian River Biological Opinion did not find that the existing high summer velocities in Dry Creek were a limiting factor for the Russian River Chinook salmon population (NMFS 2008, p. 177). Ocean residency varies, but for most California Chinook salmon it lasts two to three years, but some young males (jacks) return to freshwater at age two years (Bjorkstedt, et al., 2005).

Status of the Species in the Project Area

Historical records indicate that since 1881 over eight million Chinook salmon were planted in the Russian River watershed; most of these from out-of-basin stocks including the Sacramento, Mad and Klamath rivers. From 1980 to 1989 only 15% of the Chinook salmon juveniles planted in the Russian River watershed were from adults returning to the DCFH at Warm Springs Dam. The DCFH began operation in 1980 to mitigate for the loss of spawning and rearing habitat for anadromous salmonids in upper Dry Creek following the construction of Warm Spring Dam. Beginning in 1990 only locally returning fish were used for hatchery spawning. The enhancement goal for Chinook salmon returns at the DCFH was set at 1,750 adult/year, however return rates of 0-765 fish from 1980-1999 fell short of the goal (Entrix, Inc., 2004). The DCFH no longer produces Chinook salmon broodstock and since 2002 all fish returning to the DCFH are naturally produced in the Dry Creek watershed (Chase, Manning, Cook, & White, 2007).

From 2000 to 2013 the minimum number of Chinook salmon returning to the Russian River ranged from 1,125 to 6,696 (Martini-Lamb & Manning, 2014). Based on spawning surveys, approximately one-third of the spawning activity occurs in Dry Creek (Cook D., Chinook salmon spawning study Russian River fall 2002-2007, 2008). Beginning in 2014, the Water Agency has operated an underwater video camera and DIDSON (dual-frequency identification sonar) camera on Dry Creek to count adult salmonids as they enter Dry Creek. Adult salmonids have been observed on the DIDSON from September to February. The majority of salmonids entering Dry Creek from September through December were identified as Chinook salmon based on the paired underwater video imagery (SCWA unpublished data).

Redd surveys have been conducted on Dry Creek from 2002 to 2013. Chinook salmon spawn throughout lower Dry Creek, but typically most spawning activity occurs above RM 6 (Cook D., Chinook salmon spawning study Russian River fall 2002-2007, 2008). The peak number of Chinook salmon redds observed from 2002 to 2013 ranged from 201 to 362 redds during annual surveys of Dry Creek (Martini-Lamb & Manning, 2014).

Migration of juvenile Chinook salmon typically begins late March to early April, peaks in May and ends in July (Manning & Martini-Lamb, 2012) (Martini-Lamb & Manning, 2014). The estimated total number of Chinook salmon that emigrate from Dry Creek ranges from approximately 56,000 to 225,000 smolts (Martini-Lamb & Manning, 2014). Electrofishing surveys conducted in August and October of 2010 through 2013 have only observed a total of 2 chinook smolts indicating that nearly all Chinook salmon leave Dry Creek and do not spending time rearing in the Dry Creek system over the summer (SCWA unpublished data).

California Central Coast Coho Salmon

Status

Coho salmon within the Russian River basin are part of the central California coast (CCC) Evolutionary Significant Unit (ESU) and are listed as endangered under the federal ESA and by the California ESA (NMFS 2005a, CDFG 2009). The CCC ESU includes coastal drainages from Punta Gorda in northern California, south to, and including, the San Lorenzo River in central California, the drainages of San Francisco and San Pablo bays, excluding the Sacramento-San Joaquin River basin (NMFS 2005a). Critical habitat for CCC coho salmon encompasses all river reaches and estuarine areas accessible to coho salmon within the ESU's geographic area, including the Dry Creek watershed (NMFS 1999). Spence et al. (2008) categorized the CCC ESU and CCC coho salmon within the Russian River basin as having at least a high risk of extinction. Historical records indicate that coho salmon are native to the Russian River basin and spawned in Dry Creek, although it only provided marginal habitat compared to other tributaries closer to the coast (Hopkirk & Northen, 1980).

The CCC Coho Salmon Recovery Plan (NMFS 2010) places CCC coho salmon within the North-Central California Recovery Domain and identifies the Russian River basin (including Dry Creek) coho salmon as an historically functionally independent population within the Coastal diversity stratum.² The CCC Coho Salmon Recovery Plan (NMFS 2010) lists the greatest threats to coho salmon in the Russian River basin as those related to urban development and water diversion and impoundment. The Dry Creek basin is identified as a Core Area, which has the highest priority for near-term restoration projects and threat abatement actions.

Life History

Adult coho salmon return to their natal streams to spawn after rearing at sea for two years (Shapovalov and Taft 1954). In the Russian River, they generally enter fresh

² A functionally independent population is one with a high likelihood of persisting over 100-year time-scales due to population size and relatively independent dynamics (Bjorkstedt 2005). Functional independence does not reflect the current or predicted fate of a population, but rather it indicates whether a population's probability of extinction is dependent on the presence of other populations.

water from November through January, cued by increases in stream flow resulting from fall and winter storms (Entrix, Inc. 2004). Migrating adult coho salmon need access to tributary streams with suitable habitat for spawning and egg incubation (California Department of Fish and Game, 2004). During migration coho salmon require frequent deep pools to rest while avoiding predation. Riparian vegetation and undercut banks are necessary for refugia in shallow stream sections (California Department of Fish and Game, 2004).

In California, spawning mainly occurs from November to January although it can extend into February and March if drought conditions are present (Shapovalov and Taft 1954). Females tend to select spawning sites near the heads of riffles just below pools, where water flow and quality, and spawning substrate are ideal for incubation of the eggs (CDFG 1994). After spawning the adult coho salmon die, completing their life cycle. Coho salmon embryos develop and hatch after 8-10 weeks of incubation, from February through April, depending on water temperature and the time of spawning (CDFG 1994). After emergence, coho salmon fry move out of the main channel and congregate in shady backwaters, side channels and small creeks. Deep dark pool habitats with large wood debris (LWD) and complex structures are ideal for rearing (California Department of Fish and Game, 2004).

As they grow older, the schools break up and the juveniles (parr) establish individual territories. They move progressively into deeper water and expand their territories until July and August, when they are found in the deepest pools (CDFG 1994). The more productive juvenile habitats are found in smaller streams with low-gradient alluvial channels containing abundant pools formed by LWD. Juvenile coho feed primarily on macroinvertebrates suspended in the water column or at the surface and their ability to feed is reduced as turbidity increases (California Department of Fish and Game, 2004). Dry Creek has an abundance of high quality, cool water that is ideal for salmonids; however, existing rearing habitat in Dry Creek is limited, especially for coho salmon, due to swift velocity in the main channel and limited habitat structure and complexity. Off-channel rearing habitat is limited with alcoves and side channel found in lower half of study area and most were small (80% less than 100 feet) 34% less than 50 feet (Inter-Fluve, 2010).

Smoltification (physical changes in the fish in preparation for moving to saltwater) typically occurs after the first summer and winter spent in freshwater (Age 1+), but in some years, a significant proportion of smolts are Age 0+ fish (young-of-the-year). Most smolts migrate downstream to estuarine habitat in April and May and sometimes as late as June (CDFG 1994).

Status of the Species in the Project Area

The DCFH produced an average of 70,000 coho salmon annually between 1980 and 1998 (Entrix, Inc., 2004). Broodstock sources for hatchery coho salmon included the Noyo, Klamath, Eel and Russian rivers, and some out-planting of coho salmon from Oregon and Washington into the Russian River occurred (Entrix, Inc., 2004). Returns of adult coho salmon to the DCFH did not meet the enhancement goal of 1,000 fish per year leading to the termination of the program in 1998.

The Russian River Coho Salmon Captive Broodstock Program (RRCSCBP) formed in 2001 with the goal of re-establishing self-sustaining runs of coho salmon in tributary streams of the Russian River (Obedzinski, Pecharich, Davis, Lewis, & Olin, 2008). The program captures wild juvenile coho salmon, rears them to adulthood and spawns them at DCFH, releasing their progeny into streams that historically supported coho salmon. In 2004, the RRCSCBP began releasing progeny into three streams in the Russian River basin: Mill (a tributary of lower Dry Creek) Ward, and Sheephouse creeks (Conrad, Obedzinski, Lewis, & Olin, 2006). Currently, the RRCSCBP releases coho salmon juveniles into mainstem Dry Creek, and several of its tributaries Grape, Peña, Mill and Palmer creeks (M. Obedzinski pers. com.).

The Water Agency began monitoring downstream migrating salmonids in Dry Creek in 2009. The number of coho salmon captured in downstream migrant traps and the number originating from RRCSCBP increased from 10 coho salmon (7 originating from the RRCSCBP) in 2009 to 214 (113 originated from the RRCSCBP) in 2011 and most recently 780 juvenile coho salmon (760 originated from the RRCSCBP) in 2013 [(Manning & Martini-Lamb, Russian River Biological Opinion Status and Data Report Year 2009-10., 2011) (Manning & Martini-Lamb, 2012) (Martini-Lamb & Manning, 2014)].

California Central Coast Steelhead

Status

Steelhead found in the Dry Creek basin belong to the Central California Coast Distinct Population Segment (CCC DPS)³ (NMFS 1997), which includes coastal drainages from the Russian River to Aptos Creek and the drainages of San Francisco and San Pablo bays, excluding the Sacramento-San Joaquin River watershed. The CCC DPS is federally listed as threatened under the Endangered Species Act (NMFS 2000). Dry Creek is identified as critical habitat for the recovery of the CCC DPS (National Marine

³ NMFS recently delineated steelhead populations as distinct population segments rather than ESUs. A DPS is a group of organisms that are discrete from other populations and are significant to their taxon (species or subspecies). A group of organisms is discrete if they are markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, and behavioral factors (NMFS 2008).

Fisheries Service, 2005). Steelhead are native to the Russian River basin, however stocking of out-of-basin fish has occurred since the 1890s and continued until 1982 (Entrix, Inc., 2004).

Life History

Steelhead are the anadromous form of *O. mykiss* (the freshwater resident form is the coastal rainbow trout) and all steelhead in the CCC DPS are winter-run (Bjorkstedt, et al., 2005). Adult steelhead migrate into the Russian River beginning in September, although most likely enter in January, with the run ending by April (see Status of the Species in the Project Area, below). They spawn in tributary streams from December through March. Unlike other Pacific salmonids not all adults will die after spawning; between 10% and 20% will return to the ocean and spawn a second time, fewer (less than 5%) will spawn a third or fourth time (Bjorkstedt, et al., 2005). Steelhead generally migrate from the ocean to their natal streams to spawn at four to five years of age (Shapovalov and Taft 1954). The needs of migrating adult steelhead are similar to those described for coho salmon. Adult steelhead spawn in small tributary streams, although steelhead prefer higher gradients and will often spawn further upstream of preferred coho habitat (Bjorkstedt, et al., 2005).

Spawning takes place in small tributaries with gradients ranging from 2-7% (Bjorkstedt et al. 2005). Steelhead prefer substrate for spawning similar to coho (Inter-Fluve, 2010). Females construct nests (redds) in gravels ranging from (0.5 to 5.0 inches [10.4 to 127.0 mm]), in pool tailouts, heads of riffles, or in isolated patches that allow intragravel flow to deliver dissolved oxygen to embryos and remove metabolic waste from the egg pocket (Barnart 1986, Kondolf and Wolman 1993, Kondolf 2000). Eggs incubate for 25 to 30 days, depending on water temperatures (warmer temperature will decrease incubation time), then remain in the gravel for an additional 2 to 5 weeks after hatching, depending on temperature, before emerging in spring or early summer (Shapovalov and Taft 1954, Barnhart 1986). Following emergence, steelhead juveniles (fry) move to feeding stations in shallow, low-velocity areas such as stream margins and low-gradient riffles, then move to faster, deeper water as they increase in size (Bjorkstedt et al. 2005). Juvenile steelhead will congregate in pools, however they are able to tolerate faster flowing riffle habitats and may be found there when the water temperature in pools become too warm, or when they are out-competed by more aggressive coho juveniles (Bjorkstedt, et al., 2005). Juvenile steelhead may even prefer the higher velocity areas of riffle and run type habitats (Inter-Fluve, 2010). During winter as water temperatures decrease and flows increase, juveniles seek hydraulic refuge within pools, interstitial spaces in cobble and boulder substrates, or near large woody debris. Juvenile steelhead will remain in freshwater streams between one and four years.

Juvenile steelhead emigrate to the ocean in spring; most steelhead smolt migration from Dry Creek likely occurs before March (Shapavolov and Taft 1954, Bjorkstedt et al. 2005,

(Manning & Martini-Lamb, 2012) (Martini-Lamb & Manning, 2014).). Ocean survival to escapement (returning as an adult) is likely more dependent upon size (14 to 21 cm) at ocean entry than age (Shapavolov and Taft 1954, Barnhart 1986, Bond 2006). The period of freshwater residency ranges from one to four years, with longer residence times in northern latitudes, but most CCC DPS steelhead migrate to sea after two years (two summers and two winters) in freshwater (Barnhart 1986, Bjorkstedt et al. 2005).

Status of the Species in the Project Area

The timing and magnitude of the steelhead run in Dry Creek are unclear. The Water Agency does not operate monitoring equipment during the time of year adult steelhead likely migrate into the Russian River and in Dry Creek. The Water Agency operates a video camera at an inflatable dam along the Russian River at the Mirabel water supply facility to record adult salmonid migration into the Russian River (Chase, Manning, Cook, & White, 2007). The camera operates typically from the end of August until hydrologic conditions force the seasonal lowering of the dam (i.e., until flows become too high), typically in early- to mid-December. Steelhead likely enter the Russian River as early as September, but video monitoring data suggest that the bulk of the run occurs after December. An extended 2013/2014 monitoring season (due to drought conditions) showed that 90% of steelhead migrated past the Mirabel dam after January 21 (Martini-Lamb & Manning, 2014). Data from the DCFH show a similar trend, with steelhead first arriving at Warm Springs Dam in December, but most appearing between January and March. The adult run is likely complete by April (CDFW unpublished data). While these counts are of hatchery steelhead, it is likely that wild steelhead have similar run timing. Angler report cards indicate a similar trend in both hatchery and wild steelhead (California Department of Fish and Game, 2007), although the sample size for this report is small and likely biased by variations in angler effort and efficiency.

Steelhead spawn in Dry Creek tributaries from December through March and parr occur throughout the summer in mainstem Dry Creek (Obedzinski, Pecharich, Davis, Lewis, & Olin, 2008) (Obedzinski, et al., 2009). A downstream migrant trap operated by the Water Agency at the mouth of Dry Creek from March through June captured between 2,082 and 5,422 juvenile steelhead per year over the past five years (Martini-Lamb & Manning, 2014). While the Water Agency finds steelhead smolts in the downstream migrant trap, most steelhead smolt migration likely occurs before trap installation in March (Manning & Martini-Lamb, 2012) (Martini-Lamb & Manning, 2014).

Russian River Tule Perch

Status

The Russian River tule perch (*Hysterothorax traski pomo*) is a sub-species of the tule perch and is a State Species of Special Concern (CDFG 2009, Moyle 2002). Reasons for this designation include limited distribution, short lifespan, and low abundance (Cook 2010). The tule perch (*H. traski*) is the only freshwater member of the surfperch family (Embiotocidae). Three subspecies are recognized in 3 central California drainages, including Clear Lake basin (*H. t. lagunae*), the Sacramento-San Joaquin drainage system (*H. t. traski*), and the Russian River basin (*H. t. pomo*) (Cook 2010). Tule perch inhabit lowland waterways with complex submerged cover and prefer water temperatures below 22° C (Moyle 2002). Although this species is a freshwater resident, it can tolerate salinities approaching pure seawater (Moyle 2002). The lifespan of Russian River tule perch is short with few living longer than 2 years, while other subspecies may live as long as 8 years (Cook 2010).

Life History

Tule perch occur in lowland habitat ranging from lakes, sloughs, and clear streams and rivers (Moyle 2002). Although deep-bodied, tule perch can forage in fast water by using cover as refuge, and are often associated with heavy cover elements such as aquatic plants, large woody debris, overhanging vegetation and riprap. They generally require cool oxygenated water and are rarely found in water >25 C for extended periods of time. Tule perch feed on small invertebrates gleaned from substrate or plants, including midge larvae of mayflies.

Breeding males begin to actively court females in the late-summer, and may even defend small territories in nearshore cover, such as overhanging branches or plants. Adult tule perch spawn from July through September, but fertilization does not occur immediately as female store sperm until January before fertilizing the eggs (Moyle, 2002, pp. 424-428). Tule perch are viviparous, giving birth to live young (as opposed to laying eggs), and Russian River tule perch typically birth 12 to 45 live young in the spring. Juveniles grow rapidly from an average of 1.5-4.5 inches their first year (Cook, Chase, & Manning, 2010). Females can reproduce their first year and mate several times (Moyle, 2002, pp. 424-428). In the Russian River few tule perch live to be older than two years of age (Moyle, 2002, pp. 424-428) (Cook, Chase, & Manning, 2010).

Status of the Species in the Project Area

Russian River tule perch presently inhabit the mainstem Russian River and the lower reaches of the larger tributaries. In the mainstem Russian River they prefer slow moving water with abundant cover (Cook 2010). The construction of the Warm Springs Dam and the conversion of lower Dry Creek from a warm water stream to a cold water stream may have changed the distribution of tule perch in Dry Creek (Cook et al. 2010).

Moyle (2002) notes that they seem to be less abundant than in the early 1970s. Historically Russian River tule perch were well distributed throughout Dry Creek, but in low numbers (Pintler & Johnson, 1958). There are records of tule perch in lower Dry Creek from the 1990s (Cook, Chase, & Manning, 2010). However more recent surveys indicate that there are likely few in Dry Creek. There are no records of Russian River tule perch captured during electrofishing surveys from 2009-2014, but non-salmonids are often not recorded in these surveys. There are only four records of Russian River tule perch captured in the Dry Creek downstream migrant trap from 2009-2014.

3.5.3 Regulatory Setting

Federal Regulations

Federal Endangered Species Act

The Secretary of the Interior (represented by the USFWS) and the Secretary of Commerce (represented by the NMFS) have joint authority to list a species as threatened or endangered under the Federal Endangered Species Act (FESA) [United States Code (USC), Title 16, Section 1533(c)]. FESA prohibits the “take” of endangered or threatened fish, wildlife, or plants species in areas under federal jurisdiction or in violation of state law, in addition to adverse modifications to their critical habitat. Under FESA, the definition of “take” is to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct (U.S. Fish & Wildlife Service 2013).” The USFWS and NMFS also interpret the definition of “harm” to include significant habitat modification that could result in the take of a species.

If an activity would result in the take of a federally-listed species, one of the following is required: an incidental take permit under Section 10(a) of FESA, or an incidental take statement issued pursuant to federal interagency consultation under Section 7 of FESA. Such authorization typically requires various measures to avoid and minimize species take, and to protect the species and avoid jeopardy to the species’ continued existence.

Pursuant to the requirements of Section 7 of FESA, a federal agency reviewing a proposed project, which it may authorize, fund, or carry out, must determine whether any federally listed threatened or endangered species, or species proposed for federal listing, may be present in the project area and determine whether implementation of the proposed project is likely to affect the species. In addition, the federal agency is required to determine whether a proposed project is likely to jeopardize the continued existence of a listed species or any species proposed to be listed under FESA or result in the destruction or adverse modification of critical habitat proposed or designated for such species [16 USC §1536(3), (4)].

Generally, the USFWS implements FESA for terrestrial and freshwater fish species and the NMFS implements FESA for marine and anadromous fish species. USFWS and/or NMFS must authorize projects where a federally listed species is present and likely to be affected by an existing or proposed project. Authorization may involve a letter of concurrence that the project will not result in the potential take of a listed species, or may result in the issuance of a Biological Opinion that describes measures that must be undertaken to minimize the likelihood of an incidental take of a listed species. A project that is determined by USFWS or NMFS to jeopardize the continued existence of a listed species cannot be approved under a Biological Opinion.

Where a federal agency is not authorizing, funding, or carrying out a project, take that is incidental to the lawful operation of a project may be permitted pursuant to Section 10(a) of FESA through approval of a habitat conservation plan (HCP).

FESA requires the federal government to designate “critical habitat” for any species it lists under the Endangered Species Act. “Critical habitat” is defined as: (1) specific areas within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to the species conservation, and those features that may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species if the regulatory agency determines that the area itself is essential for conservation.

State Regulations

California Endangered Species Act (California Fish and Game Code, Section 2080)

Pursuant to the California Endangered Species Act (CESA) and Section 2081 of the California Fish and Game Code, a permit from the CDFW is required for activities that could result in the take of a state-listed threatened or endangered species (*i.e.*, species listed under CESA). The definition of “take” is to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill (Fish and Game Code Section 86).

Unlike the federal definition of “take,” the state definition does not include “harm” or “harass”. As a result, the threshold for take under CESA is typically higher than that under FESA. Section 2080 of the Fish and Game Code prohibits the taking of plants and animals listed under the authority of CESA, except as otherwise permitted under Fish and Game Code Sections 2080.1, 2081, and 2835. Under CESA, the California Fish and Game Commission retains a list of threatened species and endangered species (Fish and Game Code Section 2070). The California Fish and Game Commission also maintains two additional lists:

1. Candidate species (CDFW has issued a formal notice that the species is under review for addition to either the list of endangered species or the list of threatened species); and
2. Species of special concern (which serves as a watch list)

A lead agency reviewing a proposed project within its jurisdiction must determine whether any state-listed threatened or endangered species may be present in a project area and determine whether the proposed project may take a listed species, consistent with the requirements of CESA. If a take would occur, an incidental take permit would be required from the CDFW, including a mitigation plan that provides measures to minimize and fully mitigate the impacts of the take. The measures must be roughly proportional in extent to the impact of the taking and must be capable of successful implementation. Issuance of an incidental take permit may not jeopardize the continued existence of a state-listed species. For species that are also listed as threatened or endangered under the FESA, CDFW may rely on a federal incidental take statement or incidental take permit to authorize an incidental take under CESA.

California Fully Protected Species and Species of Special Concern

The classification of “fully protected” was the CDFW’s initial effort to identify and provide additional protection to those animals that were rare or faced possible extinction. Lists were created for fish, amphibian and reptiles, birds, and mammals. Most of the species on these lists have subsequently been listed under CESA and/or FESA. The California Fish and Game Code sections (fish at Section 5515, amphibian and reptiles at Section 5050, birds at Section 3511, and mammals at Section 4700) dealing with “fully protected” species state that these species “...may not be taken or possessed at any time and no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected species,” although take may be authorized for necessary scientific research. This language makes the “fully protected” designation the strongest and most restrictive regarding the “take” of these species. In 2003, the code sections dealing with fully protected species were amended to allow the CDFW to authorize take resulting from recovery activities for state-listed species.

Species of special concern are broadly defined as animals not listed under the FESA or CESA, but which are nonetheless of concern to the CDFW because the species are declining at a rate that could result in listing or historically occurred in low numbers and known threats to their persistence currently exist. This designation is intended to result in special consideration for these animals by the CDFW, land managers, consulting biologists, and others, and is intended to focus attention on the species to help avert the need for costly listing under FESA and CESA and cumbersome recovery efforts that might ultimately be required. This designation also is intended to stimulate collection of

additional information on the biology, distribution, and status of poorly known at-risk species, and focus research and management attention on them. Although these species generally have no special legal status, they are given special consideration under the CEQA during project review.

Section 1600 of the California Fish and Game Code

Under the California Fish and Game Code Sections 1600-1607, CDFG is authorized to develop mitigation measures and enter into Streambed Alteration Agreements with applicants whose projects would obstruct the flow of, or alter the bed, channel, or bank of a river or stream in which there is a fish or wildlife resource, including intermittent and ephemeral streams. All diversions, obstructions, or changes to natural flow or bed, channel, or bank of any river, stream or lake in California are subject to the regulatory authority of CDFG pursuant to sections 1600 through 1607 of the State Fish and Game Code. California Fish and Game Code Sections 1600-1607 require notification to the CDFG of any activity that could affect the bank or bed of any stream that has value to fish and wildlife. Upon notification, the CDFG has the responsibility to prepare a Streambed Alteration Agreement, in consultation with the project proponent.

Local Regulations

Sonoma County General Plan 2020

Local policies established in the *Sonoma County General Plan 2020* (PRMD 2008) are summarized in Section 3.5.5, “General Plans and Consistency,” below.

The proposed project is located within the jurisdiction of *Sonoma County General Plan 2020*. Please refer to Section 3.5.5, “General Plans and Consistency” for a detailed discussion of goals, policies, and objectives related to fisheries resources that are applicable to the project.

3.5.4. Environmental Impacts and Mitigation Measures

Approach to Analysis

This EIR includes program- and project-level analysis. The Project Description (Chapter 2) does not identify discrete potential enhancement sites that may occur within Miles 4–6, rather stating that enhancement could occur anywhere along the 14 mi length of Dry Creek from Warm Springs Dam to the Russian River (exclusive of sites already enhanced in Mile 1, sites already identified for enhancement in Miles 2–3, and areas with existing high quality habitat). Effects of potential enhancement within Miles 4–6 will be analyzed at the program-level. The Dry Creek Project Description identifies discrete

potential enhancement sites within Miles 2–3. As such, these activities will be analyzed at the project-level, focusing on individual project sites, the type of enhancement, and potential effects on hydrology and water quality. Effects of potential enhancement sites in Miles 2–3 will be analyzed at the project-level using the program-level analysis of effects for Miles 4–6 as guidance to determine presence or absence of impacts. If potential impacts are identical at the program- and project-level, the analyses of both levels are combined into one impact statement. The effects analyses also differentiate between construction impacts (i.e., effects during construction) and operation and maintenance impacts (effects from intended operation and expected maintenance).

Analysis of potential impacts is based on existing information on aquatic habitat and fisheries resources of the Dry Creek Project Area. Direct impacts on existing fisheries resources were evaluated by comparing the quantity and quality of habitats present in the project area under baseline conditions to anticipated conditions after implementation of the enhancement measures. For this evaluation, direct and indirect impacts on fish species were assessed based on the potential for the species or their habitat to be disturbed during construction, operation or maintenance activities. Aquatic species considered for evaluation are special-status aquatic species that are known to occur within the project area or are known to use the projects as a migratory corridor. These species are described above and include coho salmon and Chinook salmon, and steelhead.

Project implementation includes construction, operation, and maintenance of the proposed project. The majority of the ground disturbance would take place during the construction phase of the proposed project and it is anticipated that maintenance activities would primarily consist of vegetation management. However, there is a possibility that maintenance activities would also include activities similar to construction, such as repair to damaged structures or adjustments to structures if they are not functioning properly. Therefore, maintenance activities are considered alongside construction activities in terms of their potential for impact in the analysis below.

Significance Criteria

The criteria used to determine the significance of an impact are based on the environmental checklist in Appendix G of the CEQA Guidelines. For this analysis, implementation of the proposed Dry Creek Project would be considered to have a significant impact associated with fisheries resources if it would:

1. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFG, NMFS, or USFWS

2. Interfere substantially with movement of any native resident or migratory fish or impede the use of native wildlife nursery sites
3. Conflict with any applicable local policies protecting biological resources
4. Conflict with the provisions of an adopted Habitat Conservation Plan (HCP), Natural Communities Conservation Plan (NCCP) or other approved local, regional or state habitat conservation plan

Although the significance criteria are for mandatory findings under CEQA, actual determination of fish population and fish community response is not possible with the information available for Dry Creek. Therefore, this assessment assumes that a substantial reduction in fish habitat or interference with migratory behavior would directly reduce fish population abundance (and is an indicator of negative fish population response) and alter fish communities leading to significant impacts on aquatic resources.

Impacts and Mitigation Measures

The following section presents a detailed discussion of potential impacts associated within fisheries resources resulting from the Dry Creek Project. Both program-level and project-level project components are analyzed. Impacts are summarized and categorized as either “less than significant,” “less than significant with mitigation,” or “significant and unavoidable.” Impacts are also identified as applicable to construction, operation, and/or maintenance phases of the project.

Impact 3.5.1: Construction, operation, and maintenance of the Dry Creek Project could adversely affect movement of adult or juvenile special-status fisheries species. (Less than Significant with Mitigation)

Combined Analysis for Miles 2–3 and Miles 4–6

Construction and Maintenance

Construction of instream enhancement measures could potentially affect the movement of adult or juvenile coho salmon, Chinook salmon and steelhead through the work area. Depending upon the construction method and feature being constructed, construction activities could temporarily restrict fish movements into the project site. Construction in or near the streambed would occur during the months of June through October during summer low-flows. Adult Chinook salmon have the potential to be present in the project area; however, the proposed construction period is in the early portion of the Chinook salmon run in Dry Creek and instream work would be complete before the peak migration period. Juvenile steelhead, coho salmon, and to a lesser degree Chinook salmon, could potentially be present within the project area during these months.

Russian River tule perch could be present in the lower reaches of Dry Creek. Other native fish species, such as hardhead and Pacific lamprey, could also be present during the construction period.

Expected flows in Dry Creek during the construction time period would be approximately 100 to 120 cfs and would need to be isolated from the construction work area by using some type of imported barrier or material (water filled bladders, gravel cofferdams, sheet pile cofferdams, etc.). In some instances, such as placement of instream boulders, work in the flowing stream may occur if the work itself would be less disruptive than isolating the work area from the flowing stream. For most of the proposed features, the work area would be isolated and the creek flow would be allowed to continue flowing adjacent to the isolated work area. In some cases it may be necessary to completely isolate the creek from bank to bank. In this case, bypassing creek flows from the upstream end of the work area to the downstream end of the work area would occur. Bypassing flows would result in a section of the Dry Creek being dewatered during construction and remain unavailable to fish for the duration of construction. Any portions of the creek isolated during construction would require rescue of fish from the work area. The following mitigation measure is incorporated into the project to minimize impacts to special-status fish species as a result of temporary loss of habitat availability during construction activities through the removal of fish species to appropriate habitat outside of the project site. This temporary impact is considered less than significant because the restriction is temporary, would not likely occur during a critical life stage for passage, would occur in a relatively small portion of the entire creek during any one construction season, and the fish habitat in the project area is anticipated to improve as a result of the project. If maintenance activities require in-stream construction activities, the same potential impact and mitigation of those activities as described above for construction would occur. The potential construction and maintenance-related impact to movement would be reduced to less than significant with implementation of **Mitigation Measures 3.5.1**.

Mitigation Measure 3.5.1: During dewatering activities, fish located within the project site would be removed and relocated to appropriate habitat downstream of the project site. Qualified fisheries biologists, using methods approved by the National Marine Fisheries Service and California Department of Fish and Wildlife, would perform the fish rescue and relocation.

Impact Significance: Less than Significant with Mitigation

Operation

After project completion, operation of the project would not adversely affect the upstream migration of adult salmonids. While not the intended function, instream and off-channel enhancement features would likely assist with migration of anadromous fish

during moderate to high flows by providing hydraulic and escape cover. The structures would provide resting places for upstream migrating adult salmonids where no resting places currently exist, likely improving migration success within and through the project area to potential spawning habitat in Dry Creek and in tributaries. These structures would provide a benefit to upstream migrating adult coho salmon and Chinook salmon, and steelhead.

Impact Significance: Beneficial

Impact 3.5.2: Construction, operation, and maintenance of the Dry Creek Project could adversely affect CCC coho salmon, CC Chinook salmon, or CCC steelhead spawning habitat usage and quality. (Less than Significant)

Combined Analysis for Miles 2–3 and Miles 4–6

Construction and Maintenance

Construction of instream enhancement measures, such as constructed riffles, boulder fields and gardens, log jams, large woody debris structures, and bank stabilization structures, would temporarily restrict access for fish to the portion of the creek within the work area as described above in Impact 3.5.1. The primary work window would be outside of the primary adult upstream migration periods for coho salmon, Chinook salmon, and steelhead in the areas under construction. In addition, only a small portion of potential spawning habitat within Dry Creek would be within the construction work area during any given year, and the proposed features is expected to result in an expansion of potential spawning habitat in Dry Creek. Therefore, the potential for the Dry Creek Project to adversely affect coho salmon, Chinook salmon, or steelhead spawning habitat usage and quality is less than significant. If maintenance activities require in-stream construction activities, the same potential impact of those activities as described above for construction would occur. This potential impact would be reduced to less than significant with implementation of **Mitigation Measures 3.5.1**.

Impact Significance: Less than Significant with Mitigation

Operation

After project completion, operation of the project would not adversely affect coho salmon, CC Chinook salmon, or CCC steelhead spawning habitat usage and quality. While not the intended function, instream and off-channel enhancement features would likely assist with migration of anadromous fish during moderate to high flows by providing hydraulic and escape cover. The structures would provide resting places for upstream migrating adult salmonids where no resting places currently exist, likely improving migration success within and through the project area to potential spawning habitat in Dry Creek and in tributaries. These structures would provide a benefit to spawning habitat usage by adult coho salmon and Chinook salmon, and steelhead.

Additionally, in-channel enhancements are designed and intended to create hydraulic refuge by reducing velocity. The reduction in velocity may encourage deposition of gravel suitable for Chinook salmon, coho salmon, and steelhead spawning where none existed prior to enhancement activities.

Impact Significance: Beneficial

Impact 3.5.3: Construction, operation, and maintenance of the Dry Creek Project could adversely affect CCC coho salmon, CC Chinook salmon, or CCC steelhead rearing habitat. (Beneficial)

Combined Analysis for Miles 2–3 and Miles 4–6

Construction and Maintenance

Construction of instream enhancement measures, such as constructed riffles, boulder fields and gardens, log jams, large woody debris structures, and bank stabilization structures, would temporarily restrict rearing access for fish to the portion of the creek within the work area as described above in Impact 3.5.1. The primary work window would coincide with juvenile rearing periods for coho salmon and steelhead in the areas under construction. Because Chinook salmon do not rear over the summer in the Dry Creek system, construction activities are not expected to result in any impacts to juvenile Chinook salmon. However, the project area currently provides limited rearing habitat for coho salmon and steelhead. The majority of enhancement features proposed are in areas adjacent to the existing active summer flow area of the creek; therefore, the total area of existing rearing habitat that may not be available as a result of construction in any given year is relatively minor compared to all of the existing rearing habitat area within Dry Creek. In addition, the project is a requirement of the Reasonable and Prudent Alternatives of an Endangered Species Act Section 7 Biological Opinion issued by the National Marine Fisheries Service in 2008 with the intent of restoring rearing habitat by increasing shelter and moderating flow conditions in Dry Creek. If maintenance activities require in-stream construction activities, the same potential impact of those activities as described above for construction would occur. This potential impact would be reduced to less than significant with implementation of **Mitigation Measures 3.5.1**.

Impact Significance: Less than Significant with Mitigation

Operation

The purpose of the project is to improve summer rearing and winter refuge habitat for juvenile coho salmon and steelhead. After project completion, operation of the project would improve rearing habitat for rearing coho salmon and steelhead juveniles.

Although Chinook salmon juveniles spend a relatively short time (compared to coho salmon and steelhead) rearing in freshwater before migrating to the ocean, they would

likely benefit from habitat enhancement as well due to the increased shelter opportunities the habitat features would provide for juvenile Chinook salmon as they move downstream and out of Dry Creek in the spring. Operation of the Dry Creek Project would be a benefit to coho salmon and steelhead rearing habitat in Dry Creek

Impact Significance: Beneficial

Impact 3.5.4: Construction, operation, and maintenance of the Dry Creek Project could adversely affect water temperature during for CCC coho salmon, CC Chinook salmon, or CCC steelhead juveniles. (No Impact)

Combined Analysis for Miles 2–3 and Miles 4–6

Construction and Maintenance

Construction of instream enhancement measures, such as constructed riffles, boulder fields and gardens, log jams, large woody debris structures, and bank stabilization structures could require the clearing of riparian vegetation that provides shade over the stream channel. Construction activities will vary depending upon structure type, installation, and location, but typically include grading and vegetation removal to prepare the site. Further, construction activities will likely require staging areas outside of the footprint of the habitat work, as well as requiring the creation of access routes through the riparian corridor in order to access the habitat work site. Such activities may result in the removal of overhanging riparian vegetation shading the stream channel and could affect stream temperature.

But, as noted above (“Water Quality”), recent temperature data show that after dam installation, seasonal daily maximum and minimum water temperatures regularly exceeded 15°C, but never reached above 20°C (). These data show Warm Springs Dam releases substantially reduced lower Dry Creek water temperatures and appears to control water temperatures in the Project Area. Construction of the Dry Creek Demonstration Project occurred over three seasons from June to October 2012, 2013, and 2014 (during the late-spring, summer and early fall rearing period [May through October] of Chinook salmon, coho salmon, and steelhead), in Reach 7 upstream and downstream of Lambert Bridge. Temperature data from the Dry Creek below Lambert Bridge stream gage (USGS gage # 11465240), which is within the Dry Creek Demonstration Project area, showed maximum daily temperatures ranging from 12 to 17°C (), which is consistent with the typical post-dam water temperatures in Dry Creek. Given the volume of cold water coming out of Lake Sonoma, the minimal and temporary loss of riparian screening during construction or maintenance is not anticipated to have any impacts on water temperatures in Dry Creek.

Impact Significance: No impact

Operation

The purpose of the project is to improve summer rearing (and winter refuge) habitat for juvenile coho salmon and steelhead. After project completion, operation of the project would improve rearing habitat for rearing coho salmon and steelhead juveniles.

Although Chinook salmon juveniles spend a relatively short time (compared to coho salmon and steelhead) rearing in freshwater before migrating to the ocean, they would likely benefit from habitat enhancement as well.

Off-channel habitat enhancement measures, such as side-channels, backwater channel and alcoves will likely have similar water temperature to mainstem Dry Creek. Side-channels run parallel to and connect with the mainstem at both ends, even during the summer. Flow would be split between the two waterways, but side-channels would have a perennial surface water connection to the main channel. Water velocity through the side channel would be rapid enough to prevent nuisance sedimentation and potential failure of the enhancement feature. As such, travel time through side-channels would be similar to the mainstem, preventing increased water temperatures due to greater exposure to thermal radiation. Backwater channels and alcoves are connected to the mainstem at the downstream end, with no surface water connection at the upstream end. Still, backwater channels and alcoves would be hyporheically connected (i.e., connected through groundwater inputs) to Dry Creek. Hyporheic inputs are typically cooler than surface flow in rivers and streams, and often provide thermal refuge for aquatic species. Due to the likely configuration of backwater channel and alcoves (oriented parallel to flow with the outlet at the downstream end), hyporheic inputs are likely to originate from the upstream end, cooling the surface water as it flows to the outlet.

Impact Significance: No Impact.

Impact 3.5.5: Construction, operation, and maintenance of the Dry Creek Project could adversely affect local policies protecting biological resources or conflict with the provisions of an adopted HCP, Natural Communities Conservation Plan (NCCP) or other approved local, regional or state habitat conservation plan. (No Impact)

Combined Analysis for Miles 2–3 and Miles 4–6

Construction, Operation, and Maintenance

Construction, operation, and Maintenance of the Dry Creek Project would not conflict with any Habitat Conservation, Natural Community Conservation, or any other conservation plans within the project area. The project would support the goals of the NMFS's Recovery Plan for the Evolutionary Significant Unit of Central California Coast Coho Salmon and the California Department of Fish and Game's Recovery Strategy for

California Coho Salmon. The project also supports the goals of the NMFS's Russian River Biological Opinion.

Impact Significance: No Impact.

3.5.5 General Plan and Consistency

The Sonoma County General Plan 2020 includes goals addressing the preservation of biotic habitats and riparian corridors in the region. The Open Space and Resource Conservation Element of the Sonoma County General Plan 2020 contains the following biotic resource goals, objectives, and policies that would be applicable to the proposed project.

GOAL OSRC-7: Protect and enhance the County's natural habitats and diverse plant and animal communities.

Objective OSRC-7.1: Identify and protect native vegetation and wildlife, particularly occurrences of special-status species, wetlands, sensitive natural communities, and areas of essential habitat connectivity.

Objective OSRC-7.3: Establish development guidelines to protect designated Biotic Habitat Areas and assure that the quality of these natural resources is maintained.

Objective OSRC-7.4: Where appropriate, support regulatory efforts by other agencies to protect biotic habitat.

Objective OSRC-7.5: Maintain connectivity between natural habitat areas.

GOAL OSRC-8: Protect and enhance riparian corridors and functions along streams, balancing the need for agricultural production, urban development, timber and mining operations, and other land uses with the preservation of riparian vegetation, water resources and habitat functions and values.

Objective OSRC-8.1: Designate all streams shown on USGS 7.5 minute quadrangle topographic maps as of March 18, 2003, as riparian corridors and establish streamside conservation areas along these designated corridors.

Objective OSRC-8.2: Provide standards for land use and development in streamside conservation areas which protect riparian vegetation, water resources and habitat values while considering the needs of residents, agriculture, businesses and other land users.

Objective OSRC-8.3: Recognize and protect riparian functions and values during review of discretionary projects.

The Sonoma County General Plan 2020 includes policies addressing the preservation of biotic habitats and riparian corridors in the proposed project area. Proposed project elements would be consistent with GOAL OSRC-7 and -8 and the supporting objectives and policies because the project would enhance five miles of a riparian corridor and its associated habitat functions.

3.5.6 References

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CHAPTER 3.6 Geology, Soils, and Mineral Resources

3.6.1 Introduction

This chapter describes the existing conditions relating to geology, soils, and mineral resources within the Dry Creek Habitat Enhancement Project, Miles 2-6 (Dry Creek Project or proposed project) area. Section 3.6.2, “Environmental Setting” describes the regional and project area environmental setting, focusing on the geologic conditions occurring therein and evaluates potential impacts to resources related to geology, soils, and minerals as a result of the proposed project. Section 3.6.3, “Regulatory Framework” details the federal, state, and local laws related to geologic resources, and soils. Potential impacts to these resources resulting from the proposed project are analyzed in Section 3.6.4, “Impacts and Mitigation Measures” in accordance with the California Environmental Quality Act (CEQA) significance criteria (CEQA Guidelines, Appendix G) and mitigation measures are proposed that could reduce, eliminate, or avoid such impacts.

Other impacts to related resources are addressed in other chapters as follows: the effect of changes in topography to visual quality is addressed in **Chapter 3.1, Aesthetics**; impacts to cultural resources are addressed in **Chapter 3.4, Cultural Resources**; and changes in streamflows and potential impacts to water quality are addressed in **Chapter 3.8, Hydrology and Water Quality**.

3.6.2 Environmental Setting

The environmental setting for geology and soils includes all areas that could be affected by activities associated with the Dry Creek Project. As stated in **Chapter 2, Project Description**, habitat enhancement sites have been identified for Miles 2-3 but specific sites have yet to be determined for Miles 4–6. Projects could occur anywhere along the 14-mile length of Dry Creek from Warm Springs Dam to the Russian River (exclusive of sites already enhanced in Mile 1). Consequently, the environmental setting includes the Dry Creek basin downstream of Warm Springs Dam, including the 14 river miles (RMs) from the dam to the Russian River, adjacent riparian areas, and surrounding floodplains and terraces, either unvegetated or occupied by agricultural or residential land-uses.

Project Area

Inter-Fluve (2010) delineated study reaches in Dry Creek following the protocol for stream segment identification developed by the State of Washington’s Timber, Fish and

Wildlife Program (Pleus and Schuett-Hames 1998). Delineation of study reaches relied on geomorphic parameters (relative drainage area, channel gradient and channel confinement) and non-fluvial features (e.g., structures such as bridges). Inter-Fluve (2013) delineated preliminary study reaches, then performed a field verification to make adjustments as appropriate. The delineation identified 16 reaches with an average length of 0.9 mile (Table 3.6-1 and Figure 3.6-1).

Table 3.6-1. Dry Creek Study Reaches.

Reach	DS ¹ end RM ²	DS end landmark	US ³ end RM	US end landmark	Length (ft)
1	0.0	Mill Creek Mouth	0.7	Mill Creek	3,550
2	0.7	Mill Creek	2.0	Westside Road	7,000
3	2.0	Westside Road	3.0	Fault lineament 1,150 ft downstream USACE Sill 1	5,450
4	3.0	Fault lineament 1,150 ft ⁴ downstream USACE Sill 1	4.1	1,600 ft upstream USACE Sill 3	5,880
5	4.1	1,600 ft upstream USACE Sill 3	5.4	Fault lineament 150 ft downstream of Kelley Creek	6,640
6	5.4	Fault lineament 150 ft downstream of Kelley Creek	6.2	Bedrock outcrop, 950 ft upstream of Crane Creek	4,150
7	6.2	Bedrock outcrop, 950 ft upstream of Crane Creek	7.5	Bedrock outcrop, 950 ft downstream of Grape Creek	6,940
8	7.5	Bedrock outcrop, 950 ft downstream of Grape Creek	9.0	Change in relative confinement	7,700
9	9.0	Change in relative confinement	9.8	Change in relative confinement and fault lineament	4,220
10	9.8	Change in relative confinement and fault lineament	10.3	Tributary location	3,040
11	10.3	Tributary location	11.0	Pena Creek	3,755
12	11.0	Pena Creek	11.7	Gradient shift, 700 ft downstream of Dutcher Creek	3,700
13	11.7	Gradient shift, 700 ft downstream of Dutcher Creek	12.6	Steep riffle	4,345
14	12.6	Steep riffle	13.3	Schoolhouse Creek confluence	3,930
15	13.3	Schoolhouse Creek confluence	13.7	Bord Bridge	1,680
16	13.7	Bord Bridge	13.9	Dam outlet	1,340

¹ DS = downstream

² RM = river mile

³ US = upstream

⁴ ft = feet

Source : Inter-Fluve 2010

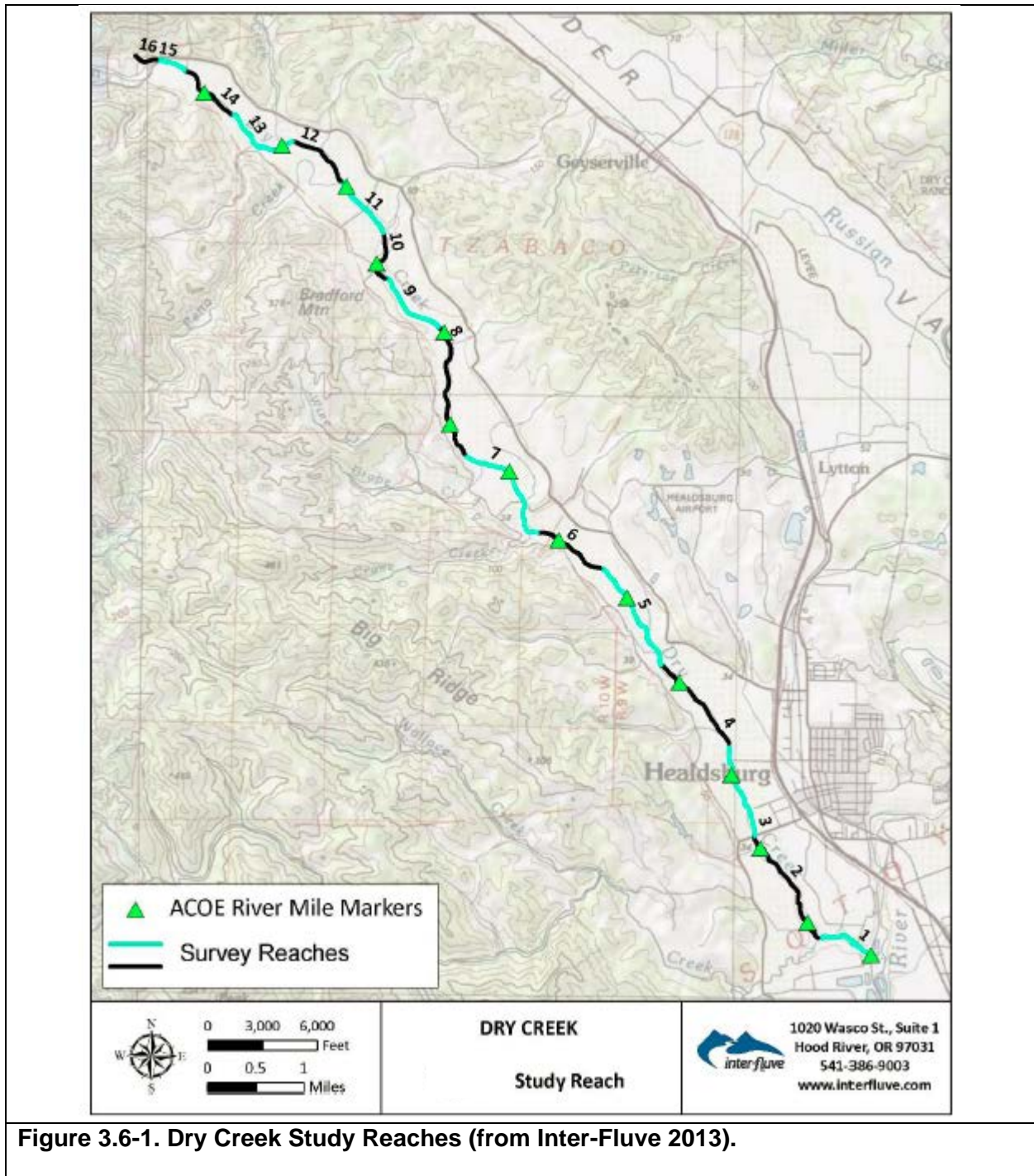


Figure 3.6-1. Dry Creek Study Reaches (from Inter-Fluve 2013).

Geology

California Coast Range

The regional geologic setting is characterized by conditions typical of the Coast Ranges geomorphic province of California (California Geological Survey 2002). The Coast Ranges are northwest trending mountain ranges (ranging in elevation from 2,000 to 6,000 ft) with intervening valleys. These ranges run nearly parallel to the right-lateral,¹ strike-slip² San Andreas Fault, which extends over 600 miles from northern California to the Salton Sea, and is located at the juncture of the North American and Pacific plates.³ San Francisco Bay separates the northern and southern ranges. The northern range is dominated by Franciscan Complex, a suite of primarily marine sedimentary (and some volcanic) rocks that have undergone low-grade metamorphism. These rock formations became folded and faulted by tectonic subduction during the period from about 140 to 28 million years ago (Blake et al. 2002).

Sonoma County

The geologic setting of Sonoma County (County) is a reflection of the tectonic forces creating the San Andreas Fault and the perpetual erosion of the landscape by rivers and streams. East of the San Andreas Fault, "basement" bedrock of the Franciscan Assemblage underlies approximately 40 to 50 percent of the County (Blake et al. 2002). The Franciscan Complex is comprised of shattered rocks, high instability, and extensive landslides, and contributes greatly to these hazards in the County (Huffman and Armstrong 1980). The Franciscan Complex is comprised of a number of rock types that formed in different environments and were subsequently brought together by tectonic events. The base of the complex is the upper part of the ancient ocean crust that was pushed under the North American Plate and became basaltic lava flows and pillow lava, or pillow basalt (Sloan 2006). The marine sediment that was deposited on top of the ocean crust became radiolarian chert (Sloan 2006). Sediment that eroded off the North American Plate was deposited on top of the marine sediments in a trench at the subduction zone and became greywacke⁴ and shale when it hardened. Franciscan rocks were moved under the North American Plate where pressure caused them to be altered, or metamorphosed. These rocks were brought to the surface east of the San Andreas Fault by subsequent uplifting and are now referred to as the Franciscan

¹ If one were standing on a right-lateral fault and looking along its length, the right block would move toward the observer and the left block would move away.

² A strike-slip fault is a nearly vertical fracture where the adjacent blocks move horizontally alongside each other.

³ Plate tectonics is a concept of modern geology indicating that the earth's outer shell comprises several large plates that are in motion relative to one another and to the earth's core.

⁴ Greywacke is a type of sandstone.

Assemblage. The action of these forces on the Franciscan rocks caused them to be highly sheared and fractured (Sloan 2006).

During the last 10,500 years, sedimentation of the older valleys has created extensive deposits of Quaternary alluvium. Because of their loosely consolidated nature, the younger bay sediments and Quaternary alluvium present a significantly higher risk from the hazards of earthquake ground shaking and liquefaction than adjacent bedrock areas. Heavy winter rains induce landslide movement and cause erosion in the mountain canyons and deposition of some of the products as sediment on the floodplains (Huffman and Armstrong 1980).

Aside from the San Andreas itself, the potentially active faults in the County are subordinate members of the San Andreas system; the direction of movement is generally the same as that of the master fault. The San Andreas Fault system has experienced repeated horizontal movements for at least the past 25 million years. In that span of time, cumulative offsets have moved some points on the west side of the fault about 200 miles northwestward with respect to those on the east side, juxtaposing two widely different geologic regions (Huffman and Armstrong 1980). This fault system, and its northwest-trending folds and faults, determines much of the geologic structure within the northern Coast Ranges.

Project Area

The project area is a structurally-controlled valley bordered by the Great Valley Complex (Healdsburg terrane) to the east and Coast Range ophiolite and metamorphic rock units of the Franciscan Complex to the west (Table 3.6-2; Figure 3.6-2) (Inter-Fluve 2010). The sedimentary (Great Valley Complex) and volcanic and intrusive rock (Coast Range ophiolite) formations lie beneath the Quaternary alluvium of the lower Dry Creek floodplain. These alluvial deposits include the most recent stream channel and floodplain deposits and up to three terrace deposits dating back approximately 1,000 years (Harvey and Schumm 1985). The presence of intrusive and volcanic rock of the Coast Range ophiolite within the Dry Creek Valley is thought to be caused from depositional contact with the sedimentary rock of the Great Valley Complex, and is limited to the western flank of the valley. Therefore, it can be assumed that underneath the alluvial deposits the bedrock of the Dry Creek Valley is composed of sedimentary rock associated with the Great Valley Complex (Harvey and Schumm 1985).

Table 3.6-2. Geology of Dry Creek study reaches

Reach	DS ¹ end RM ²	US ³ end RM	Length (ft)	Enhancement segment ⁴	Potential underling rock types adapted from (Inter-Fluve 2010)	Geologic Unit Affiliation adapted from (Inter-Fluve 2010)
16	13.7	13.9	1,340	USACE	na ⁵	
15	13.3	13.7	1,680	Miles 4-6	graywacke sandstone	Great Valley Complex
14	12.6	13.3	3,930	Mile 2	diabase, gabbro, diorite, serpentine and graywacke sandstone	Coast Range ophiolite, Great Valley Complex
13	11.7	12.6	4,345	Miles 4-6	diabase, gabbro and diorite	Coast Range ophiolite
12	11.0	11.7	3,700	Miles 4-6	na	
11	10.3	11.0	3,755	Mile 2	na	
10	9.8	10.3	3,040	Mile 2	na	
9	9.0	9.8	4,220	Mile 2	diabase, gabbro and diorite	Coast Range ophiolite
8	7.5	9.0	7,700	Mile 2	sandstone, siltstone, shale and basalt	Great Valley Complex, Coast Range ophiolite
7	6.2	7.5	6,940	Demo	sandstone, siltstone and shale	Great Valley Complex
6	5.4	6.2	4,150	Miles 4-6		
5	4.1	5.4	6,640	Mile 3	graywacke sandstone, greenstone, basalt, diabase, gabbro, diorite, serpentine	Franciscan Complex, Coast Range ophiolite, Great Valley Complex
4	3.0	4.1	5,880	Mile 3	graywacke sandstone, greenstone and chert	Franciscan Complex
3	2.0	3.0	5,450	Miles 4-6		
2	0.7	2.0	7,000	Mile 3	metagraywacke sandstone	Franciscan Complex
1	0.0	0.7	3,550	Miles 4-6	na	

¹ DS = downstream
² RM = river mile
³ US = upstream
⁴ Enhancement segment = Completed or proposed enhancement segments. USACE refers to the U.S. Army Corps of Engineers project site; Demo is the first mile of habitat enhancement completed by the Water Agency; Mile 2 and Mile 3 are proposed segments for enhancement described to the project level and Miles 4-6 are proposed segments for enhancement described to the program level.
⁵ na = Not applicable

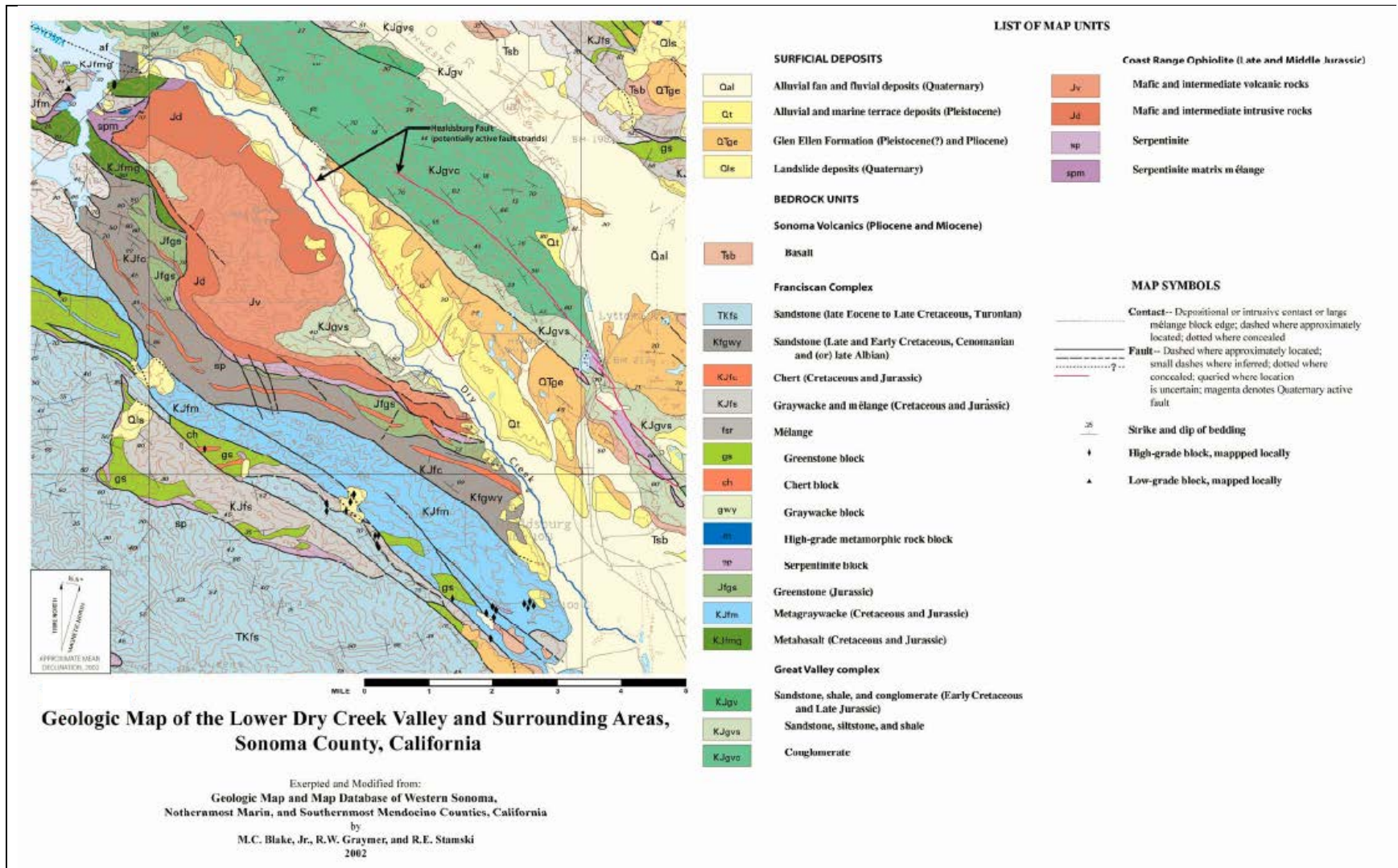


Figure 3.6-2. Geologic Map of the Dry Creek Project Area (Adapted from Blake et al. 2002 and Inter-Fluve 2010).

Alluvium along the valley floor is unconsolidated to semi-consolidated clay, silt, sand, and gravel deposited by tributary streams. Other alluvial and marine terrace deposits found in the southeast portion of Dry Creek are comprised of gravels, cobbles and boulders within a sandy matrix formed on flat surfaces cut into bedrock. These terrace deposits were lifted above younger alluvial formations by regional tectonic uplift (Blake et al. 2002).

Formations from the central and eastern belt of the Franciscan Complex are found along the west side of Dry Creek Valley. The Franciscan Complex is comprised of beds of greywacke, pillow basalt, radiolarian chert, shale, metamorphic rocks such as greenstone and serpentinite, and large areas of mélange.⁵ These materials formed on the ocean floor and then mixed and accumulated along faults as the oceanic plate slid under the continental plate. Consequently, they are highly fractured. The Franciscan Complex is considered to be from the Jurassic-Cretaceous epochs (100 to 190 million years ago) (Sloan 2006). Components of the central belt include sandstone and chert from the Cretaceous period and greenstone from the Jurassic period (Blake et al. 2002). Components of the eastern belt include a large belt of metagraywacke from the Skaggs Springs schist dating from the Jurassic and Cretaceous periods (Blake et al. 2002).

Components of the Great Valley Complex flank both sides of the Dry Creek basin. The Great Valley Complex, located along northern Lake Sonoma to the Town of Windsor area, includes Coast Range ophiolite and marine sedimentary rocks deposited on the ophiolite. The ophiolite forms the base of the Complex and includes plutonic rocks of the upper mantle, basaltic volcanic rocks of the ocean crust, rocks that are transitional between the mantle and crust rocks, and serpentinite. The marine sedimentary rocks deposited on the ophiolite are the Great Valley Sequence. This sequence is generally very thick and includes layers of sandstone, shale, and conglomerate of Jurassic and Cretaceous age (Sloan 2006). Sandstone, siltstone, shale and conglomerate are found along the northeast portion of the basin. Mafic, volcanic and intrusive rocks of the late and middle Jurassic dominate northwest portion of the basin (Blake et al. 2002).

The Glen Ellen Formation consists of siltstone, sandstone, conglomerate and tuff. Coarse clasts include various pyroclastic and volcanic samples including obsidian and pumice. The Glen Ellen Formation is located along the southeastern side of the valley and is aged at 3.1 million years ago or younger.

⁵ Mélange generally consists of a soft crushed shale or serpentinite matrix with blocks of other rocks mixed in.

Soils

Sonoma County

The soils of Sonoma County are separated into two major groups: those that developed in hilly or mountainous areas and those that developed in flat areas. Soils of the high terraces, foothills, uplands, and mountains generally developed on bedrock terrains or on bedrock thinly overlain by unconsolidated material. Characterization of these soils varies from nearly level to very steep and poorly drained to excessively drained. These soils consist of gravelly, very gravelly, or stony sandy loams to clay loams. They formed in material weathered from rock such as volcanic tuff, rhyolite, serpentine, sandstone, shale, and metamorphosed schist, as well as basic igneous⁶ rock (Miller 1972). Soils in the basins, tidal flats, floodplains, terraces, and alluvial fans developed from the unconsolidated alluvium of sedimentary and volcanic materials deposited in the valleys and along the shores. Characterization of these soils varies from level to steep and excessively drained to poorly drained. These soils consist of very gravelly, sandy loams to clays and were formed in the eastern part of the County in alluvium from sedimentary and volcanic material. Elevations of these soils ranges from two feet below sea level up to 1,200 feet above sea level and are used extensively for agriculture (Miller 1972).

Dry Creek Valley

The Dry Creek Project area, Dry Creek Valley below Warm Springs Dam, has been shaped into an incised, perennial alluvial gravel bed stream by the human activities of the past 150 years. The soils found in the lower Dry Creek alluvial terraces and channels are sand, gravel and cobbles of varying types originating from tributaries and the adjacent deposits from Coast Range ophiolite, Great Valley Complex, and Franciscan Complex assemblages (Inter-Fluve 2010).

Soil Associations

Soils in Sonoma County are identified and mapped as associations, which are a broad grouping of soils with common characteristics such as similar management uses or slope steepness (Miller 1972). Soils associations found in the high terraces, foothills, uplands, and mountains of the Dry Creek area include the Yorkville-Suther, Los Gatos-Henneke-Maymen, and Hugo-Josephine-Laughlin associations. The Yolo-Cortina-Pleasanton Association is the soil association found within Dry Creek Valley (Miller 1972). Surficial soils exhibit various characteristics dependent on location, slope, parent rock, climate, and drainage. Certain soils may have characteristics that could be problematic to buildings and infrastructure if not appropriately engineered. These characteristics include low permeability or susceptibility to expansion or soil erosion.

⁶ Igneous - consolidated rocks formed from the cooling and crystallizing of magma (molten rock).

The United States Department of Agriculture (USDA) defines the following major soil associations underlying the project area (Miller 1972):

- The soils of the Yorkville-Suther association are found in the southwestern slopes of the Dry Creek Valley. Slopes range from 5 to 75 percent with elevations from 300 to 3,000 feet. Soils in this association are moderately well-drained, moderately sloping to very steep sloping loams to clay loams. Soils in this association are primarily used for pasture and range.
- The soils of the Los Gatos-Henneke-Maymen association are found in the eastern slopes of the Dry Creek Valley. Slopes range from 5 to 75 percent with elevations from 600 to 3,500 feet. Soils in this association are well-drained to excessively drained, moderately sloping to very steep sloping loams, gravelly loams and gravelly sandy loams. Soils in this association are primarily used as watershed and for wildlife habitat and recreation.
- The soils of the Hugo-Josephine-Laughlin association are found in the north-western slopes of the Dry Creek Valley. Slopes range from 2 to 75 percent with elevations from 600 to 3,000 feet. Soils in this association are well-drained, gently sloping to very steep gravelly loams and loams. Soils in this association are primarily used for commercial timber production (Hugo and Josephine) and range and pasture (Laughlin).
- The soils of the Yolo-Cortina-Pleasanton association underlie the Russian River and Dry Creek valleys in the north-central part of the County on floodplains, alluvial fans, and low terraces. Slopes range from 0 to 9 percent. Soils in this association are well-drained to excessively drained, nearly level to very steep sloping, and very gravelly sandy loams to clay loams.

Soil Types

The proposed project would occur along the Dry Creek Valley floor, which is largely comprised of soils in the Yolo-Cortina-Pleasanton Association (Miller 1972). About 60 percent of this association is made up of Yolo soils, 15 percent is made up of Cortina soils, and another 15 percent is made up of Pleasanton soils (**Table 3.6-3**). The remaining 10 percent is generally made up of the Arbuckle, Manzanita, Pajaro, Poitas, and Zamora soils. Soils in the active channel also include sandy alluvial land and riverwash. Soils of the Yolo series are well-drained loams underlain by alluvium derived from sandstone and shale occurring on low gradient (<5 percent) floodplains and terraces. Cortina series soils are gravelly and sandy loams that are excessively drained and formed from recently deposited alluvium of sedimentary and parent rock types.

They occur on slopes less than (<) two percent. Pleasanton soils are well-drained gravelly loams with a clay-loam subsoil.

Table 3.6-3. Major soil types found within the Dry Creek Project Area.

Soil Type ^a	Capability class ^b	Erosivity ^c	Shrink-swell ^d
Yolo loam, 0-2 percent (%) slopes (YnA)	I-1	Slight	Low
Yolo loam, overwash, 0-5% slopes (YoB)	IIw-2	Slight to moderate	Low
Yolo sandy loam, 0-2% slopes (YIA)	I-1	---	Low
Yolo gravelly loam, 0-5% slopes (YrB)	IIe-1	Slight to moderate	Low
Yolo silt loam, 0-2% slopes (YsA)	I-1	---	Low
Yolo clay loam, 0-2% slopes (YtA)	I-1	---	Low
Cortina very gravelly loam, 0-2% slopes (CsA)	IVs-4	---	Low
Cortina very gravelly sandy loam, 0-2% slopes (CrA)	IVs-4	---	Low
Pleasanton gravelly loam, 2-5% slopes (PgB)	IIe-1	Slight	Low
Pleasanton loam, 0-2% slopes (PeA)	I	---	Low
Pleasanton loam, 2-9% slopes (PeC)	IIe-1	Slight to moderate	Low
Pleasanton clay loam, 2-5% slopes (PhB)	IIe-1	---	Low
Pleasanton gravelly clay loam, 2-9% slopes (PkC)	IIe-1	Slight to moderate	Low
Pleasanton-Haire complex, 0-9% slopes (PIC)	IIIe-3	Slight to moderate	Moderate
Pleasanton-Haire complex, 9-15% slopes (PID)	IVe-3	High	Moderate
Riverwash (RnA)	VIIIw-4	---	NA

^a Taken from Miller VC (1972).
^b Capability classes show generally the suitability of soils for most kinds of common crops. The ratings are determined by limitations of the soils. Capability Classes are denoted by Roman numerals I through VIII. Class I soils have the fewest limitations while Class VIII have the most limitations. Capability subclasses are soil groups within a class and are denoted by a lower case letter. For example, "e" indicates a risk of erosion unless close-growing plant cover is maintained and "w" indicates that water in or on the soil interferes with plant growth or cultivation. Capability units are soil groups within the sub-classes used to further describe the soils. Soils denoted by "1" are soils with an actual or potential erosion hazard.
^c Erosivity as noted in general description of soil type taken from Miller (1972). Erosivity is not mentioned in soils occurring on low (0-2%) slopes. "---" indicates the occurrence of such cases.
^d The tendency of a soil to shrink and swell varies with depth.
 Source: Miller 1972.

Agricultural Soils

The State Department of Conservation periodically prepares a list of soils that are candidates for Prime Farmland and Farmland of Statewide Importance status. Many of these soils occur in valley floors and adjacent low hills throughout the County.

Several Yolo and Pleasanton soils in the Russian River and Dry Creek valleys are categorized as Prime Farmland Soils (California Department of Conservation 1995). Please see **Chapter 3, Land Use, Planning, and Agriculture Resources** for more information regarding prime farmland.

Seismicity and Seismic Hazards

The seismic environment in Northern California and the San Francisco Bay Area is characterized by the San Andreas Fault system, which formed at the boundary between the Pacific Plate and the North American Plate. The Pacific Plate is moving an average

of two inches per year northwestward relative to the North American Plate, causing earthquakes along the fault. Portions of the fault remain “locked” and quiet over time as strain builds up; great earthquakes occur as the strain is released. Other portions seem to allow more constant creep, preventing larger earthquakes (Schulz and Wallace 2013). The 1997 Uniform Building Code locates the project area and the greater San Francisco Bay Area within Seismic Risk Zone 4; areas within Zone 4 are expected to experience maximum magnitudes and damage in the event of an earthquake (ICBO 1997).

Regional Faults

Many active, potentially active, and inactive faults are located within the County. The criteria for these classifications were developed by the California Geological Survey for the Alquist-Priolo Earthquake Fault Zoning Program. An active fault, as defined by the State Geologist, has experienced surface displacement within Holocene time (approximately the last 11,000 years). A potentially active fault is one that has demonstrated surface displacement of Quaternary age deposits (last 1.6 million years). Inactive faults have experienced no movement in the last 1.6 million years (Bryant and Hart 2007). Faults located in the County are associated with the San Andreas Fault system and are considered strike-slip faults.⁷ The major active faults in the vicinity of the project area include the aforementioned San Andreas Fault, as well as the Rodgers Creek, Healdsburg, and Maacama faults (Figure 3.6-3).

⁷ Most faults in California are “strike-slip” faults. This type of fault primarily experiences movement in a horizontal direction as the two plates slide past each other.



Figure 3.6-3. Regional faults adjacent to the Dry Creek Project Area.

The two most recent major earthquakes along the San Andreas fault include the San Francisco earthquake of 1906, measuring approximately magnitude⁸ 7.8,⁹ and the Loma Prieta earthquake of 1989, measuring magnitude 6.9 (Brocher et al. 2014). The 1906 earthquake likely created a “stress shadow”¹⁰ by relaxing stress on all of the Bay Area faults that form the San Andreas Fault system. However, there appears to be an increase in earthquake activity in the last two decades, suggesting that the Bay Area may be emerging from the 1906-induced stress shadow. Therefore, faults that have been quiet during the past century may become more seismically active in the near future (MMI and InfraTerra 2012). In 2007, the U.S. Geological Survey (USGS) Working Group on California Earthquake Probabilities estimated that there is a 21 percent chance of the northern portion of the San Andreas Fault experiencing an earthquake of magnitude 6.7 or greater during the next 30 years (Field and Milner 2008).

The Rodgers Creek fault is considered a northern extension of the Hayward fault and is capable of causing significant ground shaking from Vallejo to north of Healdsburg. The last major earthquake on the Rodgers Creek fault (estimated Richter magnitude 6.7) was generated in 1898 with an epicenter near Mare Island at the north margin of San Pablo Bay. The most recent significant earthquake on this fault occurred on October 1, 1969. On this date, two earthquakes of Richter magnitude 5.6 and 5.7 occurred in an 83-minute period and caused serious damage to buildings in the City of Santa Rosa. Creep along this fault may be up to five millimeters (mm) per year (Brocher et al. 2008). In 2007, the USGS Working Group on California Earthquake Probabilities estimated that there is a 31 percent chance of the Rodgers Creek fault (when considered together with the Hayward fault) experiencing an earthquake of magnitude 6.7 or greater during the next thirty years. This is the highest probability of all San Francisco Bay faults (Field and Milner 2008). The expected ground shaking generated by a seismic event on the Rodgers Creek fault is anticipated to cause significant damage and interruption of service for transportation (e.g., highways, railroads, and marine facilities) and lifeline (e.g., water supply, communications, and petroleum pipelines) facilities throughout the County (MMI and InfraTerra 2012) .

⁸ The Richter magnitude scale, or local magnitude M_L scale, measures the magnitude of an earthquake on a logarithmic scale in terms of the energy released, the amplitude of ground oscillations and the waves they produce on a seismograph.

⁹ The 1906 Earthquake was originally estimated by Richter to be 8.3 on the Richter magnitude scale. It has more recently been modeled and current estimates range from 7.7 to 7.9 on the Richter scale.

¹⁰ A stress shadow is a reduction in seismic activity due to the relief of stress along a fault following a seismic event.

The Healdsburg fault is also connected to the Rodgers Creek fault through a step-over¹¹ and is often referred to as the Healdsburg-Rodgers Creek fault. The 1969 Rodgers Creek earthquakes originated near the southern extent of the Healdsburg fault.

The Maacama fault, like the Rodgers Creek fault, is considered a northern extension of the Hayward fault system, and is separated from the Rodgers Creek fault by a right step-over (Hecker et al. 2006). It has a creep rate of approximately 5.7 millimeters per year (Prentice et al. 2014). Recent seismic activity in the Maacama Fault Zone includes an earthquake measuring magnitude 4.8 centered near Willits in 1977 (Warren et al. 1985).

Project Area Faults

Several strands of the Healdsburg fault are located within and immediately adjacent to Dry Creek (Bryant 1982). The Healdsburg fault system is a northwest trending, 1-2 km wide extension of the Rodgers Creek fault to the south and is connected to the Maacama fault to the east by a lateral step-over (McLaughlin and Sarna-Wojcicki 2003). While the Healdsburg fault is not listed as active under the California Alquist-Priolo (AP) Earthquake Fault Zoning Act (Bryant and Hart 2007), both the Rodgers Creek and Maacama systems are zoned as active. Based on the evidence of structural relationship of the Healdsburg fault and the Rodgers Creek and Maacama fault systems, it should be considered potentially active¹² (Inter-Fluve 2010).

Based on stereoscopic analysis of the aerial photos and digital imagery of the Dry Creek basin Inter-Fluve (2010) found that one or more reaches of Dry Creek may be structurally controlled along traces of the Healdsburg fault or other features inferred to be associated with the fault. Several sections of lower Dry Creek have unusually low sinuosity for a stream in a dominantly alluvial drainage and Inter-Fluve interpreted these reaches to coincide with and/or parallel to mapped strands of the Healdsburg fault (Figure 3.6-4). In the upper segment, reaches 10–12 have portions located on or along the projected trace of a mapped fault strand and reaches 13–15 are generally aligned along a linear trend that parallels mapped strands of the Healdsburg fault. In the middle segment, low sinuosity portions of reaches 3–5 and 8–9 are also aligned parallel to the mapped strands of the Healdsburg fault (Inter-Fluve 2010).

¹¹ A step-over, or fault step, occurs where a fault line is interrupted by either a left or right lateral shift, creating a gap. The geology of these gaps may include underground linkages between faults.

¹² Active faults are defined as those exhibiting either surface ruptures, topographic features created by faulting, surface displacements of Holocene (younger than about 11,000 years old) deposits, tectonic creep along fault lines, and/or close proximity to linear concentrations or trends of earthquake epicenters.

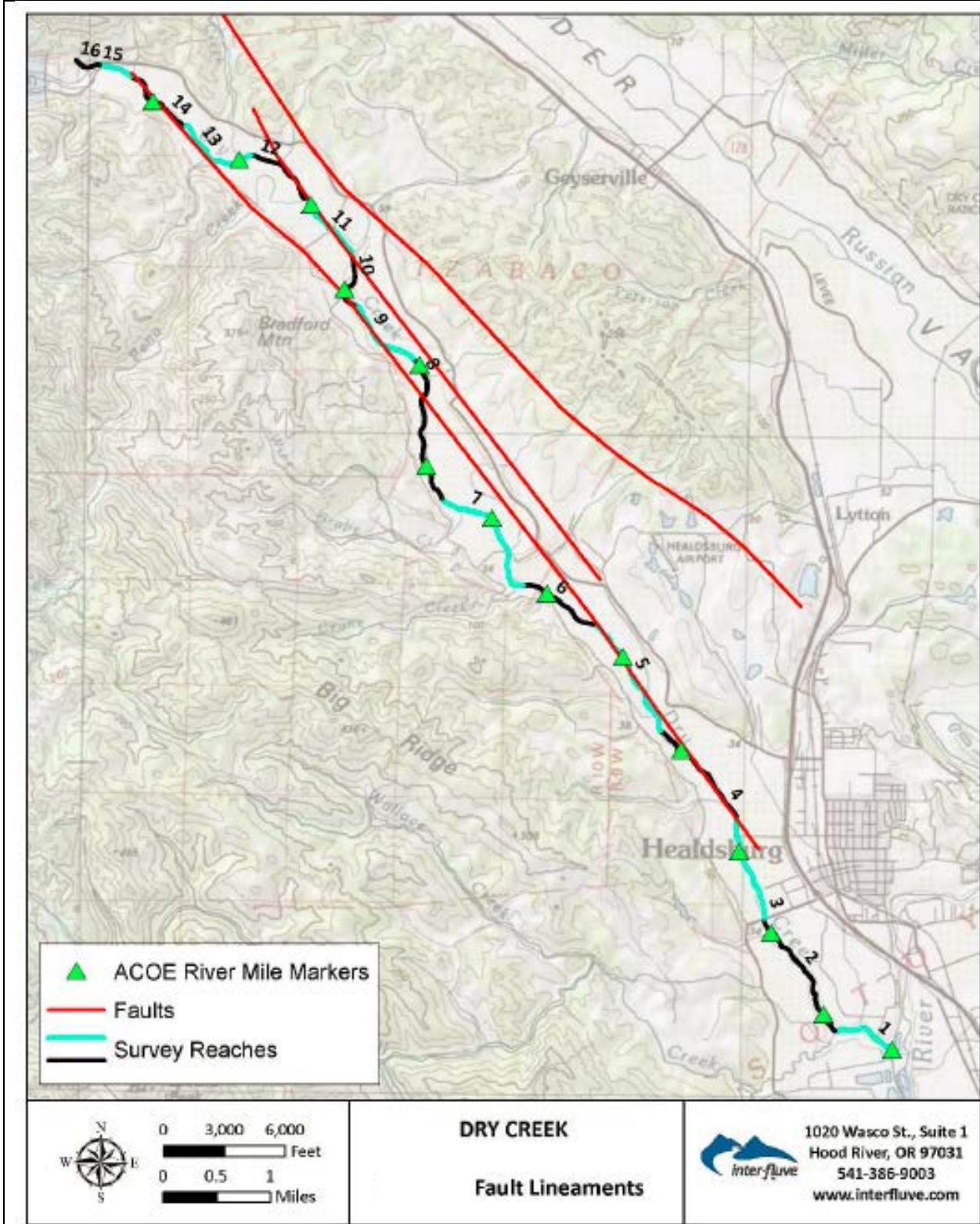


Figure 3.6-4. Lineaments of the Healdsburg fault along the Dry Creek Project Area (from Inter-Fluve 2013).

Ground Shaking

The severity of an earthquake is described in terms of magnitude and intensity. Magnitude is a measure of the amount of energy released by an earthquake and is based on the amplitude of waves measured on a seismograph. Intensity, on the other hand, is a measure of the observable effects of an earthquake on people, buildings, and natural features. Intensity varies depending on many factors, including distance from the epicenter (USGS 2013).

The Richter magnitude scale, or local magnitude M_L scale, measures the magnitude of an earthquake on a logarithmic scale in terms of the energy released, the amplitude of ground oscillations and the waves they produce on a seismograph. Values range from 2.0 and below (microearthquakes that are very common and generally not felt) to 8.0 and higher (very large and rare earthquakes) (USGS 2013).

Intensity, or shaking intensity, is a measure of the effects of the ground shaking at a particular location that occurs during an earthquake. The modified Mercalli Intensity (MMI) Scale (Table 3.6-4) is commonly used to express the intensity and damage severity of earthquakes (ABAG n.d). It expresses ground shaking relative to actual physical effects observed by people and therefore is a useful scale for comparing different seismic events. MMI values range from I (earthquake not felt) to XII (damage nearly total). Earthquakes on the various active and potentially active San Francisco Bay Area fault systems can produce a wide range of ground shaking intensities within the proposed project area. Intensity varies depending on the overall magnitude, distance to the fault, focus of earthquake energy, and type of geologic material underlying a particular area.

Modeled ground shaking intensities from a magnitude 7.0 earthquake on the Rodgers Creek fault or a repeat of the 1906 San Andreas fault earthquake would measure violent (IX) to strong (VII) (ABAG, 2015). Conservative reports estimate that, during the 1906 earthquake, MMI values reached IX to X at four sites, including parts of Santa Rosa (USGS, 2005).

There is a high probability for the project area to experience moderate to strong ground shaking during a major earthquake on the San Andreas, Maacama, Rodgers Creek, or other nearby (active) faults. An earthquake of similar magnitude to the 1906 earthquake along the San Andreas fault (magnitude 7.9) would bring strong (VII) to very strong (VIII) shaking along Dry Creek (Table 3.6-4) (ABAG, c2013). A magnitude 7.2 quake along the Rodgers Creek fault would result in moderate (VI), strong (VII), and very strong (VIII) shaking, particularly in and around Healdsburg. A magnitude 7.4 quake along the Maacama fault would result in strong (VII) and very strong (VIII) shaking. No estimates exist for the Healdsburg fault, but due to its proximity to the project area and potential activity (see above), shaking would likely be moderate to very strong during a

large earthquake. The intensity of ground shaking at enhancement sites will depend on the characteristics of the generating fault, the distance to the earthquake epicenter, the magnitude and duration of the earthquake, and specific site geologic conditions (SAGE 2011).

Table 3.6-4. Earthquake Intensity Values, Modified Mercalli Intensity Scale

Intensity Value	Summary Damage Description Used on Maps	Description of Shaking Severity	Intensity Description
I	Not mapped	Not mapped	Not felt.
II	Not mapped	Not mapped	Felt only by people sitting or on upper floors on buildings.
III	Not mapped	Not mapped	Felt by almost all indoors. Hanging objects swing. Vibration like passing of light trucks. May not be recognized as an earthquake.
IV	Not mapped	Not mapped	Vibration felt like passing of heavy trucks. Stopped cars rock. Hanging objects swing. Windows, dishes, doors rattle. Glasses clink. In the upper range of IV, wooden walls and frames creak.
V	Light	Pictures move	Felt outdoors. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing. Pictures move. Pendulum clocks stop.
VI	Moderate	Objects fall	Felt by all. People walk unsteadily. Many frightened. Windows crack. Dishes, glassware, knickknacks, and books fall off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster, adobe buildings, and some poorly built masonry buildings cracked. Trees and bushes shake visibly.
VII	Strong	Nonstructural damage	Difficult to stand or walk. Noticed by drivers of cars. Furniture broken. Damage to poorly built masonry buildings. Weak chimneys broken at roof line. Fall of plaster, loose bricks, stones, tiles, cornices, unbraced parapets and porches. Some cracks in better masonry buildings. Waves on ponds.
VIII	Very Strong	Moderate damage	Steering of cars affected. Extensive damage to unreinforced masonry buildings, including partial collapse. Fall of some masonry walls. Twisting, falling of chimneys and monuments. Wood-frame houses moved on foundations if not bolted; loose partition walls thrown out. Tree branches broken.
IX	Violent	Heavy damage	General panic. Damage to masonry buildings ranges from collapse to serious damage unless modern design. Wood-frame structures rack, and, if not bolted, shifted off foundations. Underground pipes broken.
X	Very Violent	Extreme damage	Poorly built structures destroyed with their foundations. Even some well-built wooden structures and bridges heavily damaged and needing replacement. Water thrown on banks of canals, rivers, lakes, etc.
XI	Not mapped because these intensities are typically limited to areas with ground failure.		Rails bent greatly. Underground pipelines completely out of service.
XII	Not mapped because these intensities are typically limited to areas with ground failure.		Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into the air.

Source: Association of Bay Area Governments Resilience Program: Modified Mercalli Intensity Scale. Available online at <http://www.abag.ca.gov/bayarea/eqmaps/doc/mmi.html>. Accessed March 2015. Intensity descriptions are from: Richter, C.F., 1958. Elementary Seismology. W.H. Freeman and Company, San Francisco, pp. 135-149; 650-653.

Surface Fault Rupture

An earthquake occurs when a fault ruptures and suddenly slips. When this rupture reaches the surface of the earth and may be seen, it is referred to as a surface fault rupture (ABAG 2015). The nature of fault rupture can vary for different faults or even along different portions of the same fault. Ground rupture is considered more likely along active faults.

In response to extensive damage from surface fault ruptures during the 1971 San Fernando Earthquake, the Alquist-Priolo Earthquake Fault Zoning Act was passed in California in 1972. This Act (discussed in more detail in the Regulatory Setting below) required that fault zones be established around the surface traces of active faults. The Rogers Creek Fault Zone is an approximately 0.25-mile wide band that runs northwestward along the Rogers Creek fault in the hills just east of the cities of Petaluma and Rohnert Park, the neighborhoods just east of downtown Santa Rosa, and the hills just east of Windsor (Bryant and Hart 2007). Surface fault rupture is much less likely in areas outside of established Alquist-Priolo Earthquake Fault Zones.

Earthquake-related ground surface rupture could occur along portions of the project area. The Healdsburg fault is structurally related to the Rodgers Creek fault to the south and is connected to the Maacama fault to the east by a lateral step-over (McLaughlin and Sarna-Wojcicki 2003). As such, during a major earthquake along the Rodgers Creek, Maacama, or other regionally active faults (e.g., San Andreas Fault), there is potential for ground surface rupture along traces of the Healdsburg fault (and the project area). Although not zoned as active under the Alquist-Priolo Act, the Healdsburg fault also should be considered potentially active with potential to cause ground surface rupture during an earthquake. As noted above, aerial photographic analysis showed that low sinuosity reaches (13–15, 10–12, 8–9, and 3–5) are likely structurally controlled by traces of the Healdsburg fault (Figure 3.6-4).

Liquefaction

During an earthquake, unconsolidated or sandy materials that are saturated with water can act like a liquid rather than like solid ground. Liquefaction¹³ typically occurs in areas characterized by water-saturated, cohesionless, granular materials at less than 40 feet below the surface. Saturated, unconsolidated alluvium with earthquake intensities greater than VIII on the MMI Scale may be susceptible to the effects of liquefaction. The most vulnerable regions are generally areas covered by fill, along stream channels, and in floodplains. Liquefaction can cause ground displacement and ground failure such as

¹³ Liquefaction refers to the changing of soil and sediments into a water mixture immediately after an earthquake. This phenomenon increases the movement of the ground immediately following an earthquake.

lateral spreads¹⁴ and flows. Damage resulting from liquefaction is generally not as significant as that resulting from shaking, but it can cause extensive damage to underground pipelines, airports (especially runways), harbor facilities, buildings with shallow foundations, levees, and road or highway surfaces (Perkins 2001).

There is potential for liquefaction along portions of the project area (Figure 3.6-5). Enhancements within the project area will be constructed along the Dry Creek Valley floor within floodplains or terraces comprised of loose, semi-consolidated and unconsolidated alluvium derived from surrounding tributary streams. The cohesionless nature of the alluvium and water saturation from the relatively high water table due to the proximity to Dry Creek and consistent flow releases from Warm Springs Dam leads to the potential for liquefaction to occur (SAGE 2011). Recent maps of quaternary deposits and their susceptibility to liquefaction show a very high susceptibility directly adjacent to the Dry Creek channel, moderate within floodplain and terrace deposits and very low in the adjacent hills (Knudsen et al. 2000a, 2000b; ABAG, 2006).

¹⁴ Lateral spreads are essentially landslides on nearly flat ground.

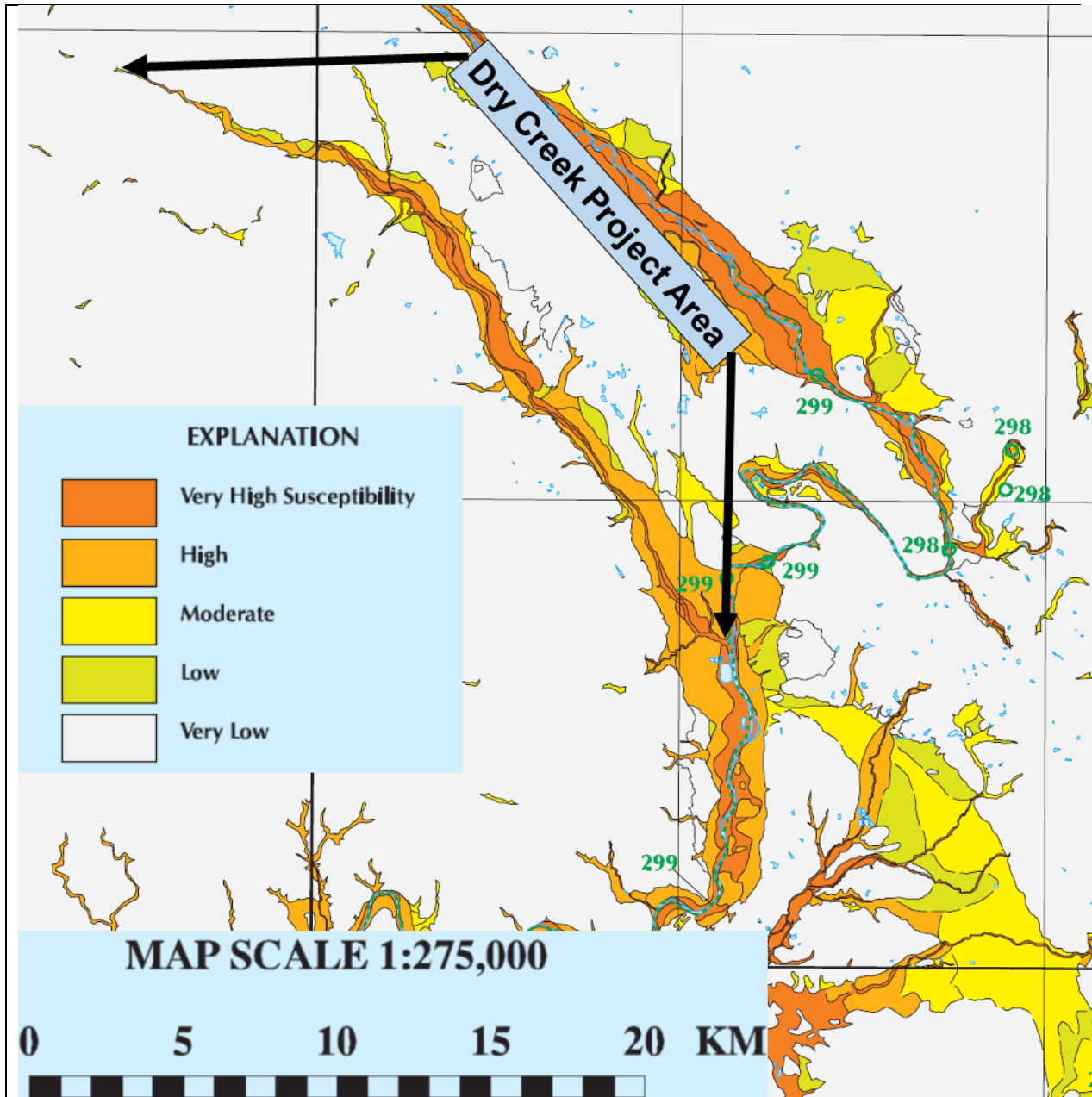


Figure 3.6-5. Liquefaction susceptibility of the Dry Creek Project Area.

Geologic Hazards

Slope Instability and Landslides

A landslide is a mass of rock, soil, and/or debris displaced down-slope by sliding, flowing, or falling. The susceptibility of land (slope) failure is dependent on the slope and geology, as well as the amount of rainfall, excavation, or seismic activities. Seismically-induced landslides typically occur in upland areas with slopes greater than 25 percent, but can occur in steeper slopes with only slight ground shaking. Factors that affect the

likelihood that slope movement will occur include pore water pressure,¹⁵ material changes, and structure. Additionally, the removal of the upper portion (the toe) of a slope increases the likelihood of collapse (Wentworth et al. 1997; Ellen et al. 1997).

The Dry Creek Valley is classified as being an area of greatest relative stability due to low slope inclination (less than 15 percent). Much of the adjacent hillsides, however, have the following classifications: 1) areas of relatively unstable rock and soil units, on slopes greater than 15 percent, containing abundant landslides; 2) areas of relatively stable rock and soil units, on slopes greater than 15 percent, containing few landslides; and 3) locally level areas within hilly terrain that may be underlain or bounded by unstable or potentially unstable rock materials (Huffman and Armstrong 1980, plate 2A).

Soil Erosion

Erosion is the detachment and movement of soil or rock by water, wind, ice, or other natural or anthropogenic agents. Soil erodibility is an estimate of the susceptibility of soils to erode based on the physical characteristics of each soil, including infiltration rates, levels of organic matter, and structure (USDA 2014). Clay materials, with some exceptions, are less likely to be eroded because the particles tend to stick together while coarse materials are less likely to be eroded because they require higher fluid speeds to be moved. However, clay is easily transported once it is suspended. Therefore silt, very fine sand, and certain clay-textured soils are more likely to be eroded (Roose 1996).

The erosivity of soils in the project area varies with soil type and slope, but is generally slight to moderate (Table 3.6-3). The risk of erosion of Yolo soils varies from slight to moderate. The risk of erosion of Pleasanton soils is described as slight to moderate in areas of 0-9 percent slope, where areas of greater slope (9-15 percent) exhibit high erosion hazard. The erosivity of Cortina soils is slight (Miller 1972).

Expansive Soils

Expansive soils possess a shrink-swell characteristic¹⁶ that can result in damage to structures over a long period of time. Expansive soils are largely comprised of silicate clays, which expand in volume when water is absorbed and shrink when dried. Highly expansive soils can cause damage to foundations and roads (ESA 2006). Extent of shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking

¹⁵ Pore water pressure refers to the pressure of groundwater in the gaps between particles of soil or rock.

¹⁶ Shrink-swell is the cyclical expansion and contraction that occurs in fine-grained clay sediments from wetting and drying. Structures located on soils with this characteristic may be damaged over a long period of time, usually as the result of inadequate foundation engineering.

and swelling of soils causes much damage to building foundations, roads and other structures.

The soil types in the project area have low levels of clay and correspondingly low, and sometimes moderate, shrink-swell potential (Table 3.6-3). Enhancement sites occur on soils classified as Riverwash with adjacent lands primarily part of the Yolo, Cortina, and Pleasanton soil series. Riverwash materials consist of very recent depositions of gravel, sand, and silt alluvium. Yolo series soils consist of well-drained loams underlain by recent alluvium. Yolo and Cortina soils generally have a low shrink-swell potential, while Pleasanton soils exhibit a low to moderate shrink-swell potential.

Mineral Resources

Sonoma County

The State of California has designated certain mineral-rich areas as being regionally significant. As required by the State, the County has adopted the Sonoma County Aggregate Resources Management (ARM) Plan, which outlined plans for obtaining aggregate material. The ARM Plan regulates aggregate resources with standards that avoid or minimize significant impacts and promote the efficient use of the resource. In addition to complying with the ARM Plan, proposed new gravel operations require County approval of a Mining and Reclamation Plan, and a use permit pursuant to County Zoning Ordinance Article 72 (Nichols Berman 2006).

The California Geological Survey classifies the regional significance of mineral resources in accordance with the California Surface Mining and Reclamation Act of 1975 (SMARA) (California Department of Conservation, 2000). To implement SMARA, the State Geologist designates Mineral Resources Zones (MRZ) to indicate the significance of mineral deposits:

- MRZ-1: Areas where adequate information indicates that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence.
- MRZ-2: Areas where adequate information indicates significant mineral deposits are present or where it is judged that a high likelihood exists for their presence.
- MRZ-3: Areas containing mineral deposits the significance of which cannot be evaluated from available data.
- MRZ-4: Areas where available information is inadequate for assignment to any other MRZ (California Department of Conservation 2000).

Many areas within the County have received the MRZ-2 designation, including portions of the cities of Santa Rosa, Sebastopol, Cotati and Rohnert Park, Petaluma Valley,

Sonoma Valley, Valley of the Moon, Dry Creek, the Middle Reach of the Russian River, and the Upper Reach of the Russian River (CCR 1986).

Dry Creek Valley

The majority of Russian River gravel mining has occurred in the area commonly known as the Middle Reach (between Fitch Mountain in Healdsburg and the Wohler Bridge) and has been ongoing since the mid-1800s (EIP Associates 1994). The Middle Reach includes a small portion of lower Dry Creek near its confluence with the Russian River. In the late 1940s, gravel mining impacts in and along the Russian River intensified, largely because of developments that required sand and gravel extraction for aggregate and on-going flood protection efforts by the USACE. Historical accounts suggest that the Russian River bed was dredged to a depth of 30 to 60 feet along the entire length of the Middle Reach. As the County's population began to increase during the 1950s, the use of Russian River channel materials increased with the greater demand for concrete and road-base aggregates (EIP Associates 1994).

Gravel extraction in Dry Creek began prior to 1900 and occurred primarily in the area of the Westside Road Bridge. With the exception of the period during World War II, the extent of mining in the Westside Bridge area of Dry Creek was minimal until the demand for construction materials increased in the County beginning in the 1970s. Other areas of Dry Creek were mined to a lesser extent and include a location several miles upstream of the Westside Road Bridge and near Lambert Bridge (EIP Associates 1994). Over two million tons of aggregate is estimated to have been removed from Dry Creek between 1964 and 1984 (Miller et al. 2005).

Though the County policies allow for continued instream mining in the Russian River, the level of extraction in the future is expected to be much less than previous decades. This is, in part, due to policies in the ARM Plan which limit the amount of mining to a sustainable level that does not exceed gravel recharge or result in channel or environmental degradation. Due to past channel degradation the ARM Plan does not allow any new permits for gravel removal within the channel of Dry Creek or the Middle Reach of the Russian River (PRMD 2010). Additional requirements and restrictions imposed pursuant to the Endangered Species Act have also reduced the amount of instream mining from previous decades.

3.6.3 Regulatory Framework

State Regulations

Alquist-Priolo Earthquake Fault Zoning Act

The purpose of the Alquist-Priolo Earthquake Fault Zoning Act (1972) is to prevent the construction of buildings used for human occupancy on the surface trace of active faults in order to reduce hazards associated with surface fault rupture. The Alquist-Priolo Act requires the delineation of fault rupture zones along all active faults in California. Cities and counties must regulate certain development projects within the zones, including withholding permits until geologic investigations demonstrate that development sites are not threatened by future surface displacement (Bryant and Hart 2007). While surface fault rupture is most likely to occur in the zones delineated under the Alquist-Priolo Act, ruptures could potentially take place in other portions of the proposed project area.

Seismic Hazards Mapping Act

Under the Seismic Hazards Mapping Act (1990), the State of California must identify and map areas at risk of strong ground shaking, liquefaction, landslides, and other hazards related to seismic activity. These maps are to be used by cities and counties in preparation of their general plans and adoption of their land use policies in order to reduce and mitigate potential hazards to public health and safety. The Seismic Hazards Mapping Program affects neither the County nor any of the cities within the County (California Geological Survey c2013).

California Building Code

The California Building Code (also known as the California Building Standards Code or Title 24, California Code of Regulations) is assigned to the California Building Standards Commission, which, by law, is responsible for coordinating all building standards (Bolt c1978-1988). The California Building Code incorporates by reference the Uniform Building Code with necessary California amendments. The Uniform Building Code is a widely-adopted model building code in the United States. About one-third of the text within the California Building Code has been tailored for California earthquake conditions (CCR c2013).

California Department of Water Resources, Division of Safety of Dams

Since 1929, the State of California has supervised the construction and operation of dams to prevent failure, safeguard life, and protect property. The California Department of Water Resources, Division of Safety of Dams (DSOD) oversees the construction of dams that are over 25 feet high and impound over 15 acre-feet¹⁷ of water, or over six

¹⁷ An acre-foot is the volume of water that could cover an acre of land up to one foot in depth. It is equal to 43,560 cubic feet of water.

feet high and impound over 50 acre-feet of water. Warm Springs and Coyote Valley dams are under DSOD jurisdiction.

The DSOD reviews permit applications to evaluate the safety of dams and reservoirs. DSOD staff provides independent review of facilities design and safety calculations. The DSOD requires collection of data concerning subsoils, foundation conditions, availability of construction materials, and geologic hazards to assess the potential for seepage, earth movement, and other conditions that may occur in the vicinity of a dam or reservoir. Investigations usually include exploratory pits, trenches, drilling, coring, geophysical survey, tests to determine leakage rates, and physical tests to measure properties of foundation materials. During construction or repair of a dam or reservoir, the DSOD conducts inspections to verify that construction is proceeding in accordance with approved plans.

California Surface Mining and Reclamation Act of 1975 (SMARA)

The Surface Mining and Reclamation Act of 1975 (SMARA) was enacted by the California Legislature to address the need for a continuing supply of mineral resources, and to prevent or minimize the negative impacts of surface mining to public health, property and the environment. SMARA is jointly administered by the Office of Mine Reclamation (OMR) and the State Mining and Geology Board (SMGB). The Act's requirements apply to anyone, including government agencies, engaged in surface mining operations in California (including those on federally managed lands) which disturb more than one acre or remove more than 1,000 cubic yards of material. This includes, but is not limited to: prospecting and exploratory activities, dredging and quarrying, streambed skimming, borrow pitting, and the stockpiling of mined materials.

Local Regulations

Sonoma County Zoning Ordinance Article 72: MR Mineral Resource Combining District

The purpose of the Sonoma County Zoning Ordinance Article 72 is to conserve and protect land that is necessary for future mineral resource production. The MR district is intended to be applied only where consistent with the aggregate resources management plan and combined with base zoning within the general plan's land intensive agriculture, land extensive agriculture, diverse agriculture and resources and rural development land use categories. This zone allows mining with the issuance of a surface mining use permit and the approval of a reclamation plan, but restricts residential and other incompatible uses. Its uses supersede those allowed in the applicable base district.

Sonoma County Aggregate Resources Management (ARM) Plan

The Sonoma County's ARM Plan is designed to allow the County to meet future aggregate needs using available or potentially available local resources while continuing to protect terrace and instream sources with regulations and standards that avoid or minimize significant impacts and promote the efficient use of the resource.

Sonoma County General Plan

The proposed project is located within the jurisdiction of *Sonoma County General Plan 2020* (PRMD 2008). Please refer to Section 3.6.5, General Plans and Consistency for a detailed discussion of goals, policies, and objectives related to geology, soils, and minerals that are applicable to the proposed project.

3.6.4 Environmental Impacts and Mitigation Measures

Approach to Analysis

The geology, soils, and mineral resources impact assessment relied on a qualitative evaluation of potential changes to erosion, sediment transport, subsidence, and seismic activity, or if the Dry Creek Project could result in a change in topography or expose people or structures to major geologic hazards.

Potential impacts related to geologic, soils, and seismic conditions were evaluated on the basis of information developed through review of existing published reports and mapping. Site-specific information prepared for the project and other entities within the project area was also reviewed and, when appropriate, incorporated into the analysis. In addition, site conditions were selectively assessed during reconnaissance-level site inspections by technical personnel. The impact analysis did not include direct sampling or testing of geologic materials. Quantitative modeling of slope stability or seismic effects was not performed as part of the analysis. This assessment assumes that published mapping of geologic and soil conditions within the project area are adequate for characterization of potential landscape stability and suitability for proposed project actions.

This EIR includes project-level analysis for the Dry Creek Project, Miles 2-3 and program-level analysis for the Dry Creek Project, Miles 4-6. **Chapter 2, Project Description** identifies discrete potential enhancement sites within Miles 2–3. As such, these activities will be analyzed at the project-level, focusing on individual project sites, the type of enhancement, and potential effects on geology, soils, and mineral resources. Effects of potential enhancement sites in Miles 2–3 will be analyzed at the project-level using the program-level analysis of effects for Miles 4–6 as guidance to determine

presence or absence of impacts. If potential impacts are identical at the program- and project-level, the analyses of both levels are combined into one impact statement. The impact analyses also differentiate between construction impacts (*i.e.*, effects during construction) and operation and maintenance impacts (effects from intended operation and expected maintenance).

Project implementation includes construction, operation, and maintenance of the proposed project. The majority of the ground disturbance would take place during the construction phase of the proposed project and it is anticipated that maintenance activities would primarily consist of vegetation management. However, there is a possibility that maintenance activities would also include activities similar to construction, such as repair to damaged structures or adjustments to structures if they are not functioning properly. Therefore, maintenance activities are considered alongside construction activities in terms of their potential for impact in the analysis below.

Significance Criteria

Significance criteria, or thresholds, listed in Appendix G of the CEQA Guidelines are used to determine the significance of potential impacts due to the proposed project. Based on criteria in Appendix G of the CEQA Guidelines, a potential impact to geology or soils would be considered significant if the proposed project results in any of the following:

1. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
 - a. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (with reference to the Division of Mines and Geology Special Publication 42);
 - b. Strong seismic ground shaking;
 - c. Seismic-related ground failure, including liquefaction; and
 - d. Landslides
2. Result in substantial soil erosion or the loss of topsoil;
3. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse;
4. Be located on expansive soil as defined in Table 18-1-B of the Uniform Building Code (1994 or more current edition), creating substantial risks to life

or property; and

5. Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.

For this EIR, a project is also considered to have a significant impact related to mineral resources if it would:

1. Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.

Impacts and Mitigation Measures

The following section presents a detailed discussion of potential impacts associated within geology, soils, and mineral resources resulting from the Dry Creek Project. Both program-level and project-level project components are analyzed. Impacts are summarized and categorized as either “less than significant,” “less than significant with mitigation,” or “significant and unavoidable.” Impacts are also identified as applicable to construction, operation, and/or maintenance phases of the project.

Impact 3.6.1: Construction and maintenance of the Dry Creek Project could expose people or structures to adverse effects associated with fault rupture (Less than Significant with Mitigation)

Combined Analysis for Miles 2–3 and Miles 4–6

The proposed project would be constructed within the vicinity of and adjacent to several existing earthquake faults. Regionally active faults, as delineated by the Alquist-Priolo Earthquake Fault Zoning Map (Blake et al. 2002) include the San Andreas, Maacama, and Rodgers Creek faults. Regional geologic mapping shows several strands of the Healdsburg fault within and immediately adjacent to Dry Creek (Bryant 1982). Although the Healdsburg fault is not delineated as active by the Alquist-Priolo Earthquake Fault Zoning Map, it should be considered potentially active due to its structural relationship to the Maacama and Rodgers Creek faults (SAGE 2011). Recent modeling estimates show that within 30 years, the northern portion of the San Andreas fault has a 21 percent chance of experiencing an earthquake of magnitude >6.7 and the Rodgers Creek fault (when considered together with the Hayward fault) has a 31 percent chance of experiencing an earthquake of magnitude >6.7 during the next thirty years, the highest probability of all San Francisco Bay faults (Field and Milner 2008).

An earthquake occurs when a fault ruptures and suddenly slips. When this rupture reaches the surface of the earth and may be seen, it is referred to as a surface fault rupture (ABAG 2015). The nature of fault rupture can vary for different faults or even

along different portions of the same fault. Ground rupture is considered more likely along active faults.

Earthquake-related ground surface rupture could occur along portions of the project area. The Healdsburg fault is structurally related to the Rodgers Creek fault to the south and is connected to the Maacama fault to the east by a lateral step-over (McLaughlin and Sarna-Wojcicki 2003). As such, during a major earthquake along the Rodgers Creek, Maacama, or other regionally active faults (e.g., San Andreas Fault), there is potential for ground surface rupture along traces of the Healdsburg fault (and the project area). Although not zoned as active under the Alquist-Priolo Act, the Healdsburg fault also should be considered potentially active with potential to cause ground surface rupture during an earthquake. Aerial photographic analysis showed that low sinuosity reaches (Reaches 13–15, 10–12, 8–9, and 3–5) are likely structurally controlled by traces of the Healdsburg fault (Figure 3.6-4) (Inter-Fluve 2010).

Several potential Mile 2 and Mile 3 enhancement sites occur within reaches controlled by the Healdsburg fault. Mile 2 habitat enhancement sites potentially controlled by the fault occur from RM 8.2-8.9 (Reach 8), RM 9.2-10.5 (Reaches 9–11) and RM 12.4-13.2 (Reach 14) **Figure 2.2** from **Chapter 2, Project Description**). Mile 3 habitat enhancement sites potentially controlled by the fault occur from located at RM 3.0–4.1 (Reach 4), and RM 4.2–5.0 (Reach 5). These portions of the project area could be particularly susceptible to ground surface rupture.

The proposed project would require the construction of up to five miles of habitat enhancements along Dry Creek below Warm Springs Dam (the project area). Workers constructing the enhancements could be exposed to potential adverse effects related to fault rupture during an earthquake along the Healdsburg fault.

While it is not anticipated that the habitat enhancement structures will require regular maintenance work over the long term, temporary irrigation may be required to maintain newly-installed vegetation and periodic vegetation management may take place in certain locations to enhance fish habitat. Maintenance activities may also include repair to damaged structures or adjustments to structures if they are not functioning as intended. Like construction workers, workers maintaining the enhancements could be exposed to potential adverse effects related to ground surface rupture during an earthquake along the Healdsburg fault.

These construction and maintenance activities could expose workers to falling objects (e.g., heavy equipment, construction materials, etc.) or release of hazardous chemical (e.g., fuel). The effect of this impact would be reduced to less than significant with implementation of **Mitigation Measure 3.6.1**.

Mitigation Measure 3.6.1: The Contractor shall prepare and implement a Site Safety Plan which shall include but not be limited to:

- Documentation of an emergency communication system and protocols;
- Information on available emergency first aid supplies;
- Evacuation procedures and emergency escape route assignments; and
- Description of emergency response training for workers.

Implementation of **Mitigation Measure 3.6.1** would provide for emergency response and reduce the potential impacts of fault rupture to the health and safety of workers to a less-than-significant level.

Impact Significance: Less than Significant with Mitigation.

Impact 3.6.2: Operation of the Dry Creek Project could expose people or structures to adverse effects associated with fault rupture (No Impact)

Combined Analysis for Miles 2–3 and Miles 4–6

The proposed project would not result in the construction of buildings or other occupied structures. After construction, the proposed project would not expose people or property to risks associated with potential fault rupture greater than those that exist under present conditions.

Impact Significance: No Impact.

Impact 3.6.3: Construction and maintenance of the Dry Creek Project could expose people or structures to adverse effect associated with seismic shaking. (Less than Significant with Mitigation)

Combined Analysis for Miles 2–3 and Miles 4–6

The proposed project would be constructed within the vicinity of and adjacent to several existing earthquake faults. Regionally active faults, as delineated by the Alquist-Priolo Earthquake Fault Zoning Map (Blake et al. 2002), include the San Andreas, Maacama, and Rodgers Creek faults. Regional geologic mapping shows several strands of the Healdsburg fault within and immediately adjacent to the Dry Creek (Bryant 1982). Although the Healdsburg fault is not delineated as active by the Alquist-Priolo Earthquake Fault Zoning Map, it should be considered potentially active due to its structural relationship to the Maacama and Rodgers Creek faults (SAGE 2011).

There is high probability for the project area to experience moderate to strong shaking during a major earthquake on the San Andreas, Maacama, Rodgers Creek, or Healdsburg faults (Figure 3.6-3). Large earthquakes on the San Andreas, Maacama, or

Rodgers Creek faults would produce moderate to very strong shaking along Dry Creek (Table 3.6-4) (ABAG c2013). No estimates exist for the Healdsburg fault, but due to its proximity to the project area and potential activity, shaking would likely be moderate to very strong during a large earthquake. The intensity of ground shaking at enhancement sites would depend on the characteristics of the generating fault, the distance to the earthquake epicenter, the magnitude and duration of the earthquake, and specific site geologic conditions (SAGE 2011).

The proposed project would require the construction of up to five miles of habitat enhancements along Dry Creek below Warm Springs Dam (the project area). Workers constructing the enhancements could be exposed to potential adverse effects related to ground shaking during an earthquake along the Healdsburg fault.

While it is not anticipated that the habitat enhancement structures will require regular maintenance work over the long term, temporary irrigation may be required to maintain newly-installed vegetation and periodic vegetation management may take place in certain locations to enhance fish habitat. Maintenance activities may also include repair to damaged structures or adjustments to structures if they are not functioning as intended. Like construction workers, workers maintaining the enhancements could be exposed to potential adverse effects related to ground shaking during an earthquake along the Healdsburg fault.

These construction and maintenance activities could expose workers to falling objects (e.g., heavy equipment, construction materials, etc.) or release of hazardous chemical (e.g., fuel). The effect of this impact would be made less than significant with implementation of **Mitigation Measure 3.6.1** described above.

Impact Significance: Less than Significant with Mitigation.

Impact 3.6.4: Operation of the Dry Creek Project could expose people or structures to adverse effect associated with seismic shaking. (No Impact)

Combined Analysis for Miles 2–3 and Miles 4–6

The proposed project would not result in the construction of buildings or other occupied structures. After construction, the operation of the proposed project would not expose people or property to risks associated with potential ground shaking greater than those that exist under present conditions.

Impact Significance: No Impact.

Impact 3.6.5: Construction and maintenance of the Dry Creek Project could expose people or structures to adverse effect associated with liquefaction. (Less than Significant with Mitigation)

Combined Analysis for Miles 2–3 and Miles 4–6

There is potential for liquefaction along portions of the project area during an earthquake. Enhancements within the project area will be constructed along the Dry Creek valley floor within floodplains or terraces comprised of loose, semi-consolidated and unconsolidated alluvium derived from surrounding tributary streams (Harvey and Schumm, 1985). The cohesionless nature of the alluvium and water saturation from the relatively high water table due to the proximity to Dry Creek and consistent flow releases from Warm Springs Dam leads to the potential for liquefaction to occur (SAGE 2011). Recent maps of quaternary deposits and their susceptibility to liquefaction show a very high susceptibility directly adjacent to the Dry Creek channel, high within floodplain and terrace deposits (Figure 3.6-5) (Knudsen et al., 2000a, 2000b; ABAG, 2006c).

The proposed project would require the construction of up to five miles of habitat enhancements along Dry Creek below Warm Springs Dam (the project area). Workers constructing the enhancements could be exposed to potential adverse effects related to ground failure associated with liquefaction during an earthquake along the San Andreas, Maacama, Rodgers Creek, or Healdsburg faults.

While it is not anticipated that the habitat enhancement structures will require regular maintenance work over the long term, temporary irrigation may be required to maintain newly-installed vegetation and periodic vegetation management may take place in certain locations to enhance fish habitat. Maintenance activities may also include repair to damaged structures or adjustments to structures if they are not functioning as intended. Like construction workers, workers maintaining the enhancements could be exposed to potential adverse effects related to ground failure associated with liquefaction during an earthquake along the San Andreas, Maacama, Rodgers Creek, or Healdsburg faults.

These construction and maintenance activities could expose workers to falling objects (e.g., heavy equipment, construction materials, etc.) or release of hazardous chemical (e.g., fuel). The effect of this impact would be made less than significant with implementation of **Mitigation Measure 3.6.1** described above.

Impact Significance: Less than Significant with Mitigation.

Impact 3.6.6: Operation of the Dry Creek Project could expose people or structures to adverse effect associated with liquefaction. (No Impact)

Combined Analysis for Miles 2–3 and Miles 4–6

The proposed project would not result in the construction of buildings or other occupied structures. After construction, the operation of the proposed project would not expose

people or property to risks associated with ground failure due to liquefaction greater than those that exist under present conditions.

Impact Significance: No Impact.

Impact 3.6.7: Construction, operation, and maintenance of the Dry Creek Project could expose people or structures to adverse effect associated with landslides. (Less than Significant)

Combined Analysis for Miles 2–3 and Miles 4–6

The Dry Creek Valley is classified as being an area of greatest relative stability due to low slope inclination (less than 15 percent). The proposed project is located in a valley, which is stable and not prone to landslides. Adjacent hillsides are classified as: 1) areas of relatively unstable rock and soil units, on slopes greater than 15 percent, containing abundant landslides; 2) areas of relatively stable rock and soil units, on slopes greater than 15 percent, containing few landslides; and 3) locally level areas within hilly terrain that may be underlain or bounded by unstable or potentially unstable rock materials. Recent mapping does not show any historical or recent landslides within the Dry Creek Valley or adjacent to the project area (Huffman and Armstrong 1980, plate 2A).

Construction and Maintenance

Construction of the proposed project would not expose people or property to risks associated with potential landslides greater than those that exist under present conditions, therefore the impact is considered less than significant.

Impact Significance: Less than Significant.

Operation

After construction, operation of the proposed project in itself would not expose people or property to risks associated with potential landslides greater than those that exist under present conditions, therefore the impact is considered less than significant.

Impact Significance: Less than Significant.

Impact 3.6.8. Construction, operation, and/or maintenance of the Dry Creek Project could result in substantial soil erosion or loss of topsoil. (Less than Significant with Mitigation)

Combined Analysis for Miles 2–3 and Miles 4–6

Construction and Maintenance

Construction and heavy maintenance of enhancement features, such as backwater channels, alcoves, and side channels involves grading of floodplain and terrace surfaces to create the desired topography. Grading to construct these features would

likely reduce the overall acreage of steep banks and slopes but could potentially create steep banks or slopes in some locations, reducing the potential for localized erosion in some locations and increasing the potential for localized erosion in other locations. To reduce near-term erosion potential, streambanks and slopes would be stabilized by seeding with native species and by coverage with biodegradable erosion control fabrics (Inter-Fluve 2015). Native revegetation with container plants would provide long-term streambank and slope stability. Mulch would also be applied to revegetation areas to improve water holding capacity and promote soil development. This impact would be less than significant with the implementation of **Mitigation Measure 3.3.1c** in **Chapter 3.3, Biological Resources; Mitigation Measures 3.8.1a through 3.8.1d** in **Chapter 3.8, Hydrology and Water Quality; and Mitigation Measure 3.6.8a** described below.

Mitigation Measure 3.6.8a: Sites where construction activities result in exposed soil will be stabilized to prevent erosion. For each of these sites, the Water Agency will prepare and implement a revegetation plan to mitigate the loss of native riparian vegetation.

- Erosion control fabric, hydromulch, or other mechanisms will be applied as appropriate to provide protection to seeds, hold them in place, and help retain moisture.
- Recontoured banks will be seeded and revegetated and erosion control fabric will be used to prevent erosion.
- Plant species selected for revegetation will be based upon surveys of riparian habitat along Dry Creek upstream and downstream of the project site.
- Planting requirements in the revegetation plan will be based upon species composition and density recommendations associated with the overall habitat enhancement design for the project.
- If soil moisture is deficient, new vegetation will be supplied with supplemental water until vegetation is firmly established.
- Revegetation shall be regularly monitored for survival until minimum survival/cover is achieved.
- If invasive plant species colonize the area, action shall be taken to control their spread; options include hand and mechanical removal and replanting with native species.
- The final revegetation plan will include details regarding planting, implementation, maintenance, and monitoring.

Impact Significance: Less than Significant with Mitigation.

Operation

The proposed project would occur along the Dry Creek Valley on soils in the Yolo-Cortina-Pleasanton association that are slightly to moderately erosive (**Table 3.6-3**). The erosivity of individual soil types in the association decreases with slope. Project operation, and maintenance would occur in low gradient areas (zero percent slope;

floodplains and terraces) adjacent to Dry Creek within the lowest erosivity (slight erosivity) soil types. Areas steepened by grading, thereby increasing local erosivity, to create enhancement features, such as backwater channels, alcoves, and side channels, would be stabilized during construction (see above) and maintained as part of the project. Further, enhancement features, such as large woody debris, create hydraulic roughness designed to reduce water velocity to create areas of low water velocity (hydraulic refuge) for juvenile coho salmon and steelhead. Lower water velocity will be less erosive in backwater channels, alcoves, side channels, and on the floodplain. As such, the operation or presence of project elements would likely not result in substantial erosion or loss of topsoil.

Further, the proposed project would reduce soil erosion by stabilizing stream banks within enhancement areas. But, owing to the current geomorphic condition of Dry Creek, pool enhancements may be constructed in relatively confined stream segments or next to steep banks leading from the active channel to the adjacent terrace. In these locations, large woody debris structures could divert streamflow toward streambanks, potentially increasing erosion. In such cases, large woody debris structures will be placed and constructed close to the banks to limit potential for nuisance erosion or flanking around the installations and damaging the banks (Inter-Fluve 2015). This impact would be made less than significant with implementation of **Mitigation Measure 3.6.8b**.

Mitigation Measure 3.6.8b: The Water Agency will implement its Adaptive Management Plan and revise current and future enhancement feature designs as needed.

Impact Significance: Less than Significant with Mitigation

The probability and magnitude of nuisance sedimentation or erosion will be minimized through project design. Because the proposed project will be constructed in phases, a monitoring and adaptive management program is being implemented that will allow for modification of project designs for future phases to address concerns such as nuisance sedimentation or erosion associated with specific types of features. Adaptive management monitors project performance through a set of metrics linked to goals and objectives. The monitoring data provide feedback on project performance, allowing managers to adapt future project elements based on knowledge gained from the data (Porter et al. 2014). Porter et al. (2014) developed an adaptive management plan for the Dry Creek Project. The Water Agency implemented the plan on a previous phase of the Project (the Demonstration Project [Mile 1] in Reach 7) and intends to implement the plan on all future phases (Miles 2–3 and Miles 4–6). If monitoring data suggests widespread, project-related nuisance sedimentation of backwater channels and alcoves,

or nuisance erosion associated with large woody debris structures, the Water Agency will adjust current and future designs to prevent future impacts.

Impact 3.6.9: Construction, operation, and maintenance of the Dry Creek Project could be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse. (Less than Significant with Mitigation)

Combined Analysis for Miles 2–3 and Miles 4–6

The proposed project site is located in an area that is alluvial material and saturated due to the year-round flows in the creek. It is indicated as being subject to liquefaction potential in the *Sonoma County General Plan 2020* (PRMD 2014). However, as noted above in **Impacts 3.6-1** through **3.6-6**, construction and maintenance of the proposed project would expose workers to risks associated with potential seismic-related ground failure, including liquefaction. Still, operation of the proposed project would not expose people or property to risks associated with potential seismic-related ground failure, including liquefaction, or failure due to landslides, greater than those that exist under present conditions. It is not anticipated that the project area would result in the area becoming unstable or result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse, therefore the impact is less than significant with implementation of **Mitigation Measures 3.6.1, 3.6.8a, and 3.6.8b** described above.

Impact Significance: Less than Significant with Mitigation.

Impact 3.6.10: Construction, operation, and maintenance of the Dry Creek Project could be located on expansive soil as defined in Table 18-1-B of the Uniform Building Code (1994 or more current edition), creating substantial risks to life or property. (Less than Significant)

Combined Analysis for Miles 2–3 and Miles 4–6

The project site is primarily on soils classified as Riverwash with adjacent lands outside of the creek primarily part of the Yolo soils series. Riverwash materials consist of very recent depositions of gravel, sand, and silt alluvium. Yolo series soils consist of well-drained loams underlain by recent alluvium. The soil types in the project area have low levels of clay and therefore have correspondingly low to moderate shrink-swell potential (**Table 3.6-3**).

Construction

Construction of Dry Creek habitat enhancements would not occur on expansive soil and would not create substantial risks to workers constructing enhancements or to property or equipment related to shrinking or swelling. This impact would be less than significant.

Impact Significance: Less than Significant.

Operation and Maintenance

The proposed project would not result in the construction of buildings or other occupied structures on expansive soil. After construction, operation and maintenance of the proposed project in itself would not expose people or property to risks associated with shrinking or swelling of soils, greater than those that exist under present conditions. In addition, the types of structures proposed would not be subject to damage even if minor amounts of shrinking and swelling were to occur. The proposed project would not create substantial risks to life or property as a result of construction on expansive soils, therefore the impact is less than significant.

Impact Significance: Less than Significant.

Impact 3.6.11: Construction, operation, and maintenance of the Dry Creek Project could result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan (No Impact)

Combined Analysis for Miles 2–3 and Miles 4–6

The majority of Russian River gravel mining has occurred in the area commonly known as the Middle Reach (between Fitch Mountain in Healdsburg and the Wohler Bridge), which includes a small portion of lower Dry Creek near its confluence with the Russian River. Though Sonoma County polices allow for continued instream mining in the Russian River, the level of extraction in the future is expected to be much less than previous decades. This is in part due to policies in the ARM Plan which limit the amount of mining to a sustainable level that does not exceed gravel recharge or result in channel or environmental degradation. Due to past channel degradation, the ARM Plan does not allow any new permits for gravel removal within the channel of Dry Creek or the Middle Reach of the Russian River (PRMD, 2010). There is only one existing mine site on Dry Creek (Blue Rock Quarry, Mine ID 91-17-0033), but it is closed with no intent to resume (Office of Mine Reclamation, c2014).

Construction

Construction of enhancement features, such as backwater channels, alcoves, and side channels, involves grading of floodplain and terrace surfaces to create the desired topography. Construction may also require excavation and removal of material from construction sites, particularly for backwater channels created within current floodplain areas (i.e., not constructed within an existing or abandoned backwater channel). This material could be utilized on other areas of the landowners' properties (e.g., gravel cover for existing vineyard roads) or it would be off-hauled to a location outside of the project area. The USACE is considering a gravel augmentation program as a

restoration opportunity to offset the loss caused by Warm Springs Dam of gravel input into the Dry Creek system below Warm Springs Dam. If this gravel augmentation program moves forward, it's possible that gravel materials removed as part of the Dry Creek habitat enhancement projects could be transported to the Warm Springs Dam area and stockpiled for Dry Creek gravel augmentation purposes. Dry Creek habitat project construction would not occur on an existing or future gravel mine site, as none currently exist, and no future permits will be issued. There would be no impact to the availability of gravel as a mineral resource as a result of the Dry Creek habitat enhancement.

Impact Significance: No Impact

Operation and Maintenance

After construction, operation and maintenance of the proposed project would not occur on an existing or future gravel mine site, as none currently exist, and no future permits will be issued. There would be no impact to the availability of gravel as a mineral resource as a result of the Dry Creek habitat enhancement.

Impact Significance: No Impact.

3.6.5 General Plan and Consistency

Sonoma County General Plan 2020

The project area is located within Sonoma County. The following section lists goals, objectives, and policies related to geology, soils, and mineral resources from *Sonoma County General Plan 2020* and ends with a brief analysis discussing consistency with this plan.

Open Space and Resource Conservation (OSRC)

Goal OSRC-10: Encourage the conservation of soil resources to protect their long term productivity and economic value.

Objective OSRC-10.1: *Preserve lands containing prime agricultural and productive woodland soils and avoid their conversion to incompatible residential, commercial or industrial uses.*

Goal OSRC -11: Promote and encourage soil conservation and management practices that maintain the productivity of soil resources.

Objective OSRC-11.1: Ensure that permitted uses are compatible with reducing potential damage due to soil erosion.

Objective OSRC-11.2: Establish ways to prevent soil erosion and restore areas damaged by erosion.

Policy OSRC-11a: Design discretionary projects so that structures and roads are not located on slopes of 30 percent or greater. This requirement is not intended to make any existing parcel unbuildable if Health and Building requirements can be met.

Policy OSRC-11b: Include erosion control measures for any discretionary project involving construction or grading near waterways or on lands with slopes over 10 percent.

Policy OSRC-11d: Require a soil conservation program to reduce soil erosion impacts for discretionary projects which could increase waterway or hillside erosion. Design improvements such as roads and driveways to retain natural vegetation and topography to the extent feasible.

Policy OSRC-11e: Retain natural vegetation and topography to the extent economically feasible for any discretionary project improvements near waterways or in areas with a high risk of erosion as noted in the Sonoma County Soil Survey.

Policy OSCR-11g: Continue to enforce the Uniform Building Code to reduce erosion and slope instability problems.

Public Safety Element (PS)

Goal PS-1: Prevent unnecessary exposure of people and property to risks of damage or injury from earthquakes, landslides and other geologic hazards.

Objective PS-1.1: Continue to utilize available data on geologic hazards and associated risks.

Objective PS-1.2: Regulate new development to reduce the risks of damage and injury from known geologic hazards to acceptable levels.

Consistency

The Dry Creek Project would comply with goals, objectives, and policies related to geology, soils, and mineral resources contained in *Sonoma County General Plan 2020*.

In terms of soil erosion, operation of the proposed project would result in less loss of soil along Dry Creek due to habitat enhancement features that would slow velocities and reduce erosion along banks. The proposed project also includes extensive erosion control measures to stabilize soil in areas disturbed during construction and

maintenance activities as well as revegetation with native plants to stabilize soil long term.

The proposed project also complies with goals, objectives, and policies related to seismic risks and other geologic hazards because the contractor would be required to prepare an earthquake response plan to ensure safety of workers during construction and maintenance activities.

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CHAPTER 3.7 Hazards and Hazardous Materials

3.7.1 Introduction

This chapter describes the existing conditions relating to hazards and hazardous materials within the Dry Creek Habitat Enhancement Project, Miles 2-6 (Dry Creek Project or proposed project) area. Section 3.6.2, “Environmental Setting” describes the regional and project area environmental setting, focusing on the hazards and hazardous materials occurring therein. Section 3.6.3, “Regulatory Setting” details the federal, state, and local laws related to hazards and hazardous materials. Potential impacts to these resources resulting from the proposed project are analyzed in Section 3.6.4, “Impacts and Mitigation Measures” in accordance with the California Environmental Quality Act (CEQA) significance criteria (CEQA Guidelines, Appendix G) and mitigation measures are proposed that could reduce, eliminate, or avoid such impacts.

Other public health and safety issues are addressed in other chapters as follows: air quality is discussed in **Chapter 3.2, Air Quality, Greenhouse Gas Emissions, Energy, and Sustainability**; toxic spills are discussed in **Chapter 3.5, Fisheries Resources**; seismic hazards are discussed in **Chapter 3.6, Geology, Geomorphology, and Soils**; flood hazards and water quality are discussed in **Chapter 3.8, Hydrology and Water Quality**; public services impacts are discussed in **Chapter 3.11, Public Services and Utilities**; recreational hazards are discussed in **Chapter 3.12, Recreation**; and traffic hazards are discussed in **Chapter 3.13, Transportation and Traffic**.

3.7.2 Environmental Setting

Regional Setting

Hazardous Materials

A hazardous material, as defined by California Health and Safety Code [§25501(m)], is “a material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment.”

Hazardous materials are strictly regulated by both state and federal laws as described in Regulatory Setting, Section 3.7.3 below. The Dry Creek Valley in Sonoma County is primarily an agricultural area containing rural residences, vineyards, wineries, wildlands,

and government lands. Agricultural activities involve the use of pesticides, herbicides, fungicides, machine equipment containing oil and fuel, and fuel storage tanks. The primary sources of hazardous materials in the project area are underground storage tanks for fuel and fuel oil used in vineyard and winery operations and residences. Another source of hazardous material is the disposal of waste containing hazardous materials such as organic and inorganic compounds, asbestos, and pesticides. At the southern extent of Dry Creek near the City of Healdsburg there are also commercial and industrial land uses. These include the City of Healdsburg's corporation yard, wastewater treatment facility, and electric utility facility, in addition to the Syar Industries gravel mining operation and other smaller commercial activities.

Fire Hazards

The combination of highly flammable fuel, long dry summers and steep slopes creates a significant natural hazard of large wildland fires in many areas of Sonoma County. The highest hazard is found in the southern extent of the Mayacamas mountain range in the north east portion of Sonoma County (Sonoma County Permit and Resource Management Department [PRMD] 2008). The area along Dry Creek (below Lake Sonoma) is designated a Non-Very High Fire Hazard Severity Zone (FHSZ) and bordered by Moderate, High and Very High FHSZ (California Department of Forestry and Fire Protection [CAL FIRE] 2008).

Project Area Setting

The following section describes the hazards and hazardous material resources for project-level and program-level elements of the Dry Creek Project. Project-level detail will be provided for Miles 2-3 of the Dry Creek Project, whereas program-level detail will be provided for Miles 4-6.

Potential Presence of Hazardous Materials in Soil and Groundwater

Land use adjacent to the project area is primarily agricultural, with a focus on vineyards. Agricultural operations have the potential to release hazardous materials from the use of fuel, pesticides, herbicides, fertilizer, and waste runoff. Other land uses within the project vicinity include residential, industrial, and government. In Dry Creek, as in many other watershed areas, historic erosion control methods included the use of car bodies, concrete debris, and a variety of other materials placed along the creek in an attempt to prevent erosion. The remnants of these past erosion control practices are still evident in many places along Dry Creek. The hazardous material potential of these materials is unknown due to the limited documentation of what and where these materials were placed. As part of the Dry Creek Habitat Enhancement Demonstration Project, old automobiles as well as a variety of other old debris were encountered during construction. Typically, debris encountered during construction consisted of rusted metal material and car tires. Debris encountered during construction was hauled off and

properly disposed. Figure 3.7-1 below shows some of the debris removed during construction of the Dry Creek Habitat Enhancement Demonstration Project. Figure 3.7-2 shows a historic photograph of Dry Creek at Westside Road Bridge from 1976 with areas of concrete debris visible along the upper banks. This concrete debris is still present, although mostly hidden from view by vegetation. The likelihood of encountering debris within Dry Creek as part of the project is high. Whether any hazardous materials are associated with this debris is unknown; however, if encountered, the debris would be removed from the Dry Creek system and properly disposed.



Figure 3.7-1. Debris removed during construction of the Dry Creek Habitat Enhancement Demonstration Project. June 30, 2014.



Figure 3.7-2. Dry Creek at Westside Road Bridge with areas of concrete debris visible along the upper banks. December 17, 1976.

The potential to encounter hazardous materials in soil or groundwater as a result of the project is based primarily upon review of the regulatory agency database search conducted by Kennedy/Jenks (2010) in the *Preliminary Hazardous Waste Assessment Dry Creek Bypass Pipeline Feasibility Study*, and a recent search of relevant regulatory databases. This assessment includes a summary of all sites within an 1,000-foot buffer zone of the potential routes for a bypass pipeline listed in federal, state, local and tribal environmental databases.¹ The types of sites reported in the environmental databases include: EPA Superfund Sites, potentially hazardous waste sites, leaking underground storage tank (LUST) sites; land disposal sites; military sites; California Department of Toxic Substances Control (DTSC) cleanup sites; other cleanup sites; permitted

¹ The study area for this hazardous waste assessment included Dry Creek, West Dry Creek, and Canyon roads. The entire length of Dry Creek from Warm Springs Dam to the confluence with the Russian River and nearly all of the Dry Creek Valley was included.

underground storage tank (UST) facilities; and permitted hazardous waste generators. **Table 3.7-1** summarizes the environmental databases that were reviewed.

Mile 2

Mile 2 of the Dry Creek Project will occur in selected sections of Dry Creek located between the downstream end of the USACE Reach 15 Project and upstream of the Water Agency's Demonstration Project, located in the Lambert Bridge area. Land in the selected river segments for this portion of the Dry Creek Project is used for agriculture (wine grapes), rural residential and includes a portion of the USACE parcel surrounding Lake Sonoma. No potential sources of hazardous materials were identified for the Mile 2 segment of the Dry Creek Project.

Mile 3

Mile 3 of the Dry Creek Project will occur in selected sections of Dry Creek located between the downstream end of the Water Agency's Demonstration Project and the confluence with the mainstem Russian River. Land in the selected river segments for this portion of the Dry Creek Project is used for agriculture (wine grapes), rural residential and industrial. **Table 3.7-2** contains a detailed list of potential hazardous material sites located in Mile 33. Potential hazardous materials sources were identified from residential, vineyard/winery, government and commercial/industrial properties. The majority of potential hazard sources were from fuel/oil storage in underground tanks, some of which included reports of leaks and/or clean-up of contaminated soil. Other properties are included in the reporting because they operate under a Waste Discharge Requirement from the North Coast Regional Water Quality Control Board (NCRWQCB) for storm runoff, construction activity runoff, or discharge of winery wastes. **Table 3.7-2** also includes records of waste disposal where the waste was considered hazardous because it contained oil, organic or inorganic compounds, pesticides or PCBs (polychlorinated biphenyls). Two unique properties in the Mile 3 project area include an historical gravel processing facility and the City of Healdsburg Energy Utility that is identified as a PCB generator due to the location of transformers at the city's corporationcorporation yard.

Miles 4-6

Miles 4-6 of the Dry Creek Project will take place along Dry Creek for three, non-contiguous miles. The project sites will be selected from those that are not included in the Water Agency's Demonstration Project or in Miles 2 and 3 of the Dry Creek Project as described above. Therefore, evaluation of the hazardous materials impacts for this portion of the Dry Creek Project included all portions of Dry Creek not previously evaluated. Potential hazardous materials sources for Miles 4-6 are similar to those described for Miles 2 and 3 above. The majority of the properties identified as potential hazardous materials sources (**Table 3.7-2**) were cited as having leaky fuel tanks or contaminated stormwater runoff. However, one property was cited in the

Table 3.7-1. Federal and State Hazardous Materials Databases. This table contains the names, description and web addresses for Federal and State databases containing information regarding hazardous materials that were searched to provide detailed information on potential hazardous material sites within the Dry Creek Project area.

Database	Description	Database location
CA WDS	California Waste Discharge System (CA WDS) includes sites which have been issued waste discharge requirements by the SWRCB.	https://geotracker.waterboards.ca.gov/
CERCLIS	The CERCLIS database compiles facilities that the US Environmental Protection Agency (USEPA) has investigated or is currently investigation for the release or threatened release of hazardous substances.	http://www.epa.gov/enviro/facts/cerclis/search.html
CHMIRS	California Hazardous Materials Incident Report Subsystem (CHMIRS) of the Pipeline and Hazardous Materials Safety Administration, Department of Transportation	https://hazmatonline.phmsa.dot.gov/IncidentReportsSearch/
Cortese	The Cal EPA Office of Emergency Information previously maintained a list of sites designated as LUST, SWF/LF or CalSites. The list is no longer updated and cases are maintained by the SWRCB, CalRecycle (formerly the Integrated Waste Management Board) and DTSC. ²	http://www.envirostor.dtsc.ca.gov/public/
ECHO	Enforcement and Compliance History Online (ECHO) database maintained by USEPA. ECHO contains enforcement and compliance data for regulated facilities nationwide with data on air emissions, surface water discharges, hazardous waste, and drinking water systems. Facility Registry Service now contained in this database, formerly FINDS.	http://echo.epa.gov/

² SWF/LF refers to solid waste facility or landfill. "CalSites" are sites known to be or potentially contaminated with hazardous substances.

Table 3.7-1 continued. Federal and State Hazardous Materials Databases. This table contains the names, description and web addresses for Federal and State databases containing information regarding hazardous materials that were searched to provide detailed information on potential hazardous material sites within the project area.

Database	Description	Database location
ENVIRO-STOR	DTSC Site Mitigation and Brownfields Reuse Program's EnviroStor database identifies sites that have known contamination or sites that may need further investigation. The database includes the following site types: Federal Superfund sites (National Priorities List [NPL]), State Response including Military Facilities, State Superfund, Voluntary Cleanup, and School sites. EnviroStor provides information including identification of formerly contaminated properties that have been released for reuse, properties with environmental deed restrictions, and risk characterization information used to assess potential impacts to public health and the environment at contaminated sites. Replaces the CalSites database no longer updated by the DTSC.	http://www.envirostor.dtsc.ca.gov/public/
ERNS	The Emergency Response Notification System (ERNS) records and stores information on reported releases of oil and hazardous substances.	http://www.rtknet.org/db/erns
HIST UST	The Hazardous Substance Storage Container Database is a historical listing of UST sites previously maintained by SWRCB. Current data can be found in the State or local UST database.	Found in https://geotracker.waterboards.ca.gov/
HWTS	Hazardous Waste Tracking System (formerly referred to as HAZNET) maintained by the California Department of Toxic Substances Control (DTSC).	http://hwts.dtsc.ca.gov/report_list.cfm
LUST	The State Water Resources Control Board (SWRCB) maintains an inventory of Leaking Underground Storage Tanks (LUST) Incident Reports.	Found in https://geotracker.waterboards.ca.gov/

Table 3.7-1 continued. Federal and State Hazardous Materials Databases. This table contains the names, description and web address for Federal and State databases containing information regarding hazardous materials that were searched to provide detailed information on potential hazardous material sites within the project area.

Database	Description	Database location
NPDES	National Pollutant Discharge Elimination System (NPDES) permits, also referred to as Waste Discharge Requirements (WDR) issued by North Coast Regional Water Quality Control Board under jurisdiction of Cal EPA.	http://echo.epa.gov/
PADS	The USEPA maintains the PCB Activity Database System (PADS) which is a list of generators, transporters, commercial storers, and/or brokers and disposers of PCBs required to report to the USEPA.	http://www.epa.gov/epawaste/hazard/tsd/pcbs/pubs/data.htm
RCRA INFO	The USEPA maintains the RCRA INFO database to list facilities that generate hazardous waste as part of their normal business practice.	http://www.epa.gov/enviro/facts/rcrainfo/search.html
SLIC	The SWRCB maintains the statewide Spills, Leaks, Investigations and Cleanup (SLIC) program which is designated to protect and restore water quality from spills, leaks and similar discharges.	https://geotracker.waterboards.ca.gov/
State UST	SWRCB maintains a database of registered Underground Storage Tanks (UST). The database may also include registered Aboveground Storage Tanks.	https://geotracker.waterboards.ca.gov/
SWF/LF	CalRecycle (formerly the Integrated Waste Management Board) maintains a list of Solid Waste Facilities/Landfill (SWF/LF) sites, including active and inactive, permitted and non-permitted solid waste disposal facilities.	http://www.calrecycle.ca.gov/FacIT/Facility/Search.aspx
VCP Site Remediation Program	DTSC's Voluntary Cleanup Program (VCP) contains low treat level properties with either confirmed or unconfirmed releases and the project proponents have requested that DTSC oversee investigation and/or cleanup activities.	https://geotracker.waterboards.ca.gov/

Table 3.7-2. Potential Hazardous Materials Sources for Dry Creek Habitat Enhancement Project, Miles 2-6. This table contains the river mile location and name of identified hazardous materials sources in the vicinity of the Dry Creek Project. These sites were either identified previously in the 2010 Kennedy/Jenks Technical Memorandum, during a recent database search, or both. Six properties with current findings are identified for Mile 3 and two properties have current findings for Miles 4–6 of the Dry Creek Project.

Project Phase	River Mile	Kennedy/Jenks Data Source ^a	Current Data Source ^b	Location	Comments	Listing Active / Inactive
Mile 3	5.0-4.2	HAZNET	<i>not found</i>	Carrey	Oil containing waste disposed of via transfer station	Inactive
Mile 3	5.0-4.2	Hist UST	<i>not found</i>	Laughlin	Fuel tank leak detection	Inactive
Mile 3	5.0-4.2	UST	GeoTracker	<i>not provided</i>	Facility 49-000-002893	Active
Mile 3	4.1-3.0	CA WDS	<i>not found</i>	Montemaggiore Winery	Active facility that discharges winery waste continuously or seasonally under a Waste Discharge Requirement	Inactive
Mile 3	4.1-3.0	NDPES	<i>not found</i>	White residence	Active - stormwater construction	Inactive
Mile 3	4.1-3.0	HAZNET	<i>not found</i>	TDC Mobile Mechanic	Aqueous solution with <10% organic residues	Inactive
Mile 3	2.0-1.0	CA WDS; MINES; ERNS	ECHO	Syar Industries	Active industrial treats and disposes of wash water waste from onsite operations; non-coal mining; incident reported to Air Pollution Control District	Active
Mile 3	2.0-1.0	Hist Cortese; LUST	GeoTracker	Soiland Company	gasoline and diesel spill (completed - case closed April 1995)	Active
Mile 3	2.0-1.0	EMI, Hist UST; SWEEPS UST	<i>not found</i>	Healdsburg Sand and Gravel	Fuel tank leak detection	Inactive

Table 3.7-2 continued. Potential Hazardous Materials Sources for Dry Creek Habitat Enhancement Project, Miles 2-6. This table contains the river mile location and name of identified hazardous materials sources in the vicinity of the Dry Creek Project. These sites were either identified previously in the 2010 Kennedy/Jenks Technical Memorandum, during a recent database search, or both. Six properties with current findings are identified for Mile 3 and two properties have current findings for Miles 4–6 of the Dry Creek Project.

Project Phase	River Mile	Kennedy/Jenks data source ^a	Current data source ^b	Location	Comments	Listing Active / Inactive
Mile 3	2.0-1.0	HazNet, Hist Cortese, SLIC, AST, LUST, CA WDS, CHMIRS, Hist UST, NPDES, SWEEPS UST	ECHO, GeoTracker, PADS, HWTS	City of Healdsburg Corperation Yard	Disposal of oil, PCB's and inorganic containing waste; potential oil contamination (case open-inactive as of March 2009); AST of unknown content, fuel tank leak detection, gasoline contaminated soil (completed - case closed August 1996); latex paint improperly disposed; active stormwater industrial; active facility that discharges stormwater runoff under a Waste Discharge Requirement	Active
Mile 3	2.0-1.0	HazNet	<i>not found</i>	Sonoma County Waste Management Agency	Disposal of household wastes and aqueous solution with <10% organic residues	Inactive
Mile 3	2.0-1.0	FTTS, Hist FTTS,	<i>not found</i>	City of Healdsburg electric utility	Section 6 PCB investigation, no violations found	Inactive
Mile 3	2.0-1.0	Ca WDS, HazNet, NPDES	<i>not found</i>	Everett Ridge Winery	Active industrial treats and disposes of stormwater runoff under a Waste Discharge Requirement; disposal of organics, inorganics and pesticides; active stormwater industrial	Inactive

Table 3.7-2 continued. Potential Hazardous Materials Sources for Dry Creek Habitat Enhancement Project, Miles 2-6. This table contains the river mile location and name of identified hazardous materials sources in the vicinity of the Dry Creek Project. These sites were either identified previously in the 2010 Kennedy/Jenks Technical Memorandum, during a recent database search, or both. Six properties with current findings are identified for Mile 3 and two properties have current findings for Miles 4–6 of the Dry Creek Project.

Project Phase	River Mile	Kennedy/Jenks data source^a	Current data source^b	Location	Comments	Listing Active / Inactive
Mile 3	2.0-1.0	CaWDS, Hist UST	<i>not found</i>	Bellerose Vineyard	Active site treats and disposes of stormwater runoff under a Waste Discharge Requirement; leak detection	Inactive
Mile 3	2.0-1.0	NPDES	<i>not found</i>	Stanley residence	Active stormwater construction	Inactive
Mile 3	2.0-1.0	LUST, Hist Cortese	<i>not found</i>	Barrett	Case closed, no further information	Inactive
Mile 3	2.0-1.0	LUST, SWPPPS UST	<i>not found</i>	North Coast Nursery	Fuel tank, no action information available	Inactive
Mile 3	2.0-1.0	Hist UST	<i>not found</i>	Beeson	Fuel tank leak detection	Inactive
Mile 3	2.0-1.0	CHMIRS	<i>not found</i>	unnamed	Sediment released into Mill Creek tributary	Inactive
Mile 3	2.0-1.0	HazNet	HWTS	Portola Properties	Organic and inorganic waste disposal	Active
Mile 3	2.0-1.0	HazNet	<i>not found</i>	Tolmasoff	Waste and mixed oil disposed of via recycler	Inactive
Mile 3	2.0-1.0	Hist UST	<i>not found</i>	Dacha Vineyards	Fuel tank leak detection	Inactive
Mile 3	2.0-1.0	UST	<i>not found</i>	<i>not provided</i>	Facility 49-000-005435	Inactive
Mile 3	2.0-1.0	Hist Cortese, LUST	GeoTracker	City of Healdsburg, lift station	Potential gasoline contamination (completed – case closed June 2013)	Active
Miles 4-6	12.0-11.5	Hist UST	<i>not found</i>	Meeker vineyards	<i>not provided</i>	<i>Inactive</i>
Miles 4-6	12.0-11.5	Hist UST	<i>not found</i>	Petersen	Fuel tank leak detection	Inactive

Table 3.7-2 continued. Potential Hazardous Materials Sources for Dry Creek Habitat Enhancement Project, Miles 2-6. This table contains the river mile location and name of identified hazardous materials sources in the vicinity of the Dry Creek Project. These sites were either identified previously in the 2010 Kennedy/Jenks Technical Memorandum, during a recent database search, or both. Six properties with current findings are identified for Mile 3 and two properties have current findings for Miles 4–6 of the Dry Creek Project.

Project Phase	River Mile	Kennedy/Jenks data source^a	Current data source^b	Location	Comments	Listing Active / Inactive
Miles 4-6	10.6-11.0	Hist UST	<i>not found</i>	Rued Ranch	Fuel tank leak detection	Inactive
Miles 4-6	7.4-8.1	UST	GeoTracker		Facilities 49-000-006018 and 49-000-003254	Active
Miles 4-6	7.4-8.1	Hist UST	<i>not found</i>	C. Hollis Black	Fuel tank leak detection	Inactive
Miles 4-6	7.4-8.1	NPDES	<i>not found</i>	Lands of Valhall Vineyards	Active stormwater construction	Inactive
Miles 4-6	7.4-8.1	NPDES	<i>not found</i>	Martorana Winery	Active stormwater construction	Inactive
Miles 4-6	5.1-6.1	CaWDS, HazNet, NPDES	<i>not found</i>	Lambert Bridge Winery	discharges stormwater runoff under a Waste Discharge Requirement, disposal of asbestos waste, active stormwater construction	Inactive
Miles 4-6	5.1-6.1	Hist UST	<i>not found</i>	Maize	Fuel tank leak detection	Inactive
Miles 4-6	2.1-2.9	Hist UST	<i>not found</i>	Becker	Fuel tank leak detection	Active
Miles 4-6	2.1-2.9	NPDES	<i>not found</i>	Emerald Ridge Road Improvements	Active stormwater construction	Inactive
Miles 4-6	0.0-0.9	UST	Geotracker	<i>not provided</i>	Facilities 49-000-006977, 49-000-003827, 49-000-005824	Inactive
Miles 4-6	0.0-0.9	NPDES	<i>not found</i>	MacPhail Family Winery	Active stormwater construction	Inactive

^a Hazardous sites within 1,000 feet of bypass pipeline routes as identified in the 2010 Kennedy/Jenks technical memorandum (Kennedy/Jenks Consultants 2010).

^b Hazardous sites within 1,000 feet of bypass pipeline routes from resources listed in Table 3.7-1.

Kennedy/Jenks Preliminary Hazardous Waste Assessment (2010) for the disposal of asbestos waste. Detailed information is provided in **Table 3.7-2**.

Wildfire Hazards

The combination of highly flammable fuel, long dry summers and steep slopes creates a significant natural hazard of large wildland fires in many areas of Sonoma County. The highest hazard is found in mountainous areas (PRMD 2008). The CAL FIRE Fire Hazard Severity Zone Map (2008) was used to identify the fire hazards in the proposed project area.³ Much of Dry Creek Valley is designated a Non-Very High Fire Hazard Severity Zone (FHSZ) but the surrounding hillsides are designated Moderate, High and Very High FHSZ.

The Water Agency's Local Hazard Mitigation Plan (LHMP) evaluated fire hazards related to potential damage to Water Agency facilities and firefighting demands to the water supply system, however the LHMP does not address Dry Creek specifically (SCWA 2012).

Airports

There are two municipal and private airports in the project vicinity within Sonoma County. The largest, and only commercial use airport, is located in Santa Rosa, approximately 2.5 miles east of the Russian River and 5.5 miles south of Dry Creek. The nearest public airport is the Healdsburg Municipal Airport located approximately 1 mile east of Dry Creek and 3 miles west of the Russian River.

3.7.3 Regulatory Framework

The regulatory processes and agencies that are relevant to hazards and hazardous materials associated with the Dry Creek Project are described briefly below.

Federal

United States Environmental Protection Agency

The United States Environmental Protection Agency (USEPA) is the lead federal agency responsible for enforcing federal regulations regarding hazardous materials and hazardous waste. The primary legislation governing hazardous materials and hazardous waste are the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the

³ This map has been created by CAL FIRE's Fire and Resource Assessment Program (FRAP) using data and models describing development patterns, potential fuels over a 30-50 year time horizon, expected fire behavior, and expected burn probabilities to quantify the likelihood and nature of vegetation fire exposure (including firebrands) to new construction. Details on the project and specific modeling methodology can be found at <http://frap.cdf.ca.gov/projects/hazard/methods.htm>

Superfund Amendments and Reauthorization Act (SARA). The USEPA is also the federal agency responsible for water quality management.

Federal Clean Water Act

The USEPA administers the federal Water Pollution Control Act Amendments of 1972 and 1987, collectively known as the Clean Water Act (CWA 2012). The CWA establishes the principal federal statutes for water quality protection. It was established with the intent “to restore and maintain the chemical, physical, and biological integrity of the nation’s water, to achieve a level of water quality which provides for recreation in and on the water, and for the propagation of fish and wildlife.”

RCRA

RCRA regulates the generation, transportation, treatment, storage and disposal of hazardous waste by “large-quantity generators” (1,000 kilograms per month or more) through comprehensive life cycle or “cradle to grave” tracking requirements. The requirements include maintaining inspection logs of hazardous waste storage locations, records of quantities being generated and stored, and manifests of pick-ups and deliveries to licensed treatment/storage/disposal facilities. RCRA also identifies standards for treatment, storage, and disposal. Individual states may implement their own hazardous waste programs in lieu of the RCRA as long as the state program is at least as stringent as federal RCRA requirements and is approved by the EPA. The EPA approved California’s RCRA program, called the Hazardous Waste Control Law (HWCL), in 1992. California’s HWCL is discussed below.

CERCLA

CERCLA, also known as Superfund, created a tax on the chemical and petroleum industries to provide for response and cleanup of hazardous substances that may endanger public health or the environment. CERCLA established requirements for abandoned hazardous waste sites and provided for liability of persons responsible for releases of hazardous waste at these sites.

SARA

SARA amended CERCLA, to increase state involvement and required Superfund actions to consider state environmental laws and regulations. SARA also established a regulatory program for underground storage tanks (USTs) and the Emergency Planning and Community Right-to-Know Act.

Occupational Safety and Health Act

The Occupational Safety and Health Administration (OSHA) administers the Occupational Health and Safety Act, which requires special training for hazardous materials operators, notification to employees who work in the vicinity of hazardous materials, and the acquisition from the manufacturer of material safety data sheets

(MSDS). The training includes personal safety, hazardous materials storage and handling procedures, and emergency response procedures.

Toxic Substance Control Act

The Toxic Substances Control Act (TSCA) of 1976 was enacted by Congress to give the USEPA the ability to track, screen and test chemicals currently produced or imported into the United States that may pose an environmental or human-health hazard.

State

California Department of Toxic Substances Control

The California Department of Toxic Substances Control (DTSC) is primarily responsible for the regulation of hazardous materials in California. DTSC is responsible for the management of hazardous substances and oversees the investigation and remediation of contaminated sites.

North Coast Regional Water Quality Control Board

The North Coast Regional Water Quality Control Board (NCRWQCB) is the arm of the State Water Quality Control Board primarily responsible for the protection of groundwater and surface water resources from hazardous materials within the project area.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Porter-Cologne 2015) requires that “any person discharging waste, or proposing to discharge waste, within any region that could affect the waters of the State to file a report of discharge” with the RWQCB through an application for waste discharge. The term “waters of the State” is defined as any surface water or groundwater, including saline waters within the boundaries of the state. It should be noted that pursuant to the Porter-Cologne Water Quality Control Act, the RWQCB also regulates “isolated wetlands” or those wetlands considered to be outside of USACE jurisdiction.

California Code of Regulations

The California Code of Regulations (CCR), Title 22, Section 66261.20-24 contains technical descriptions of characteristics that would classify a soil as a hazardous waste. When excavated, soils having concentrations of contaminants higher than certain acceptable levels must be handled and disposed as hazardous waste.

California Hazardous Waste Control Law

The California Hazardous Waste Control Law, California Health and Safety Code, Division 20, Chapter 6.5, is the basic hazardous waste statute in California and is administered by DTSC. This law is similar to, but more stringent than RCRA and applies

to a broader range of hazardous wastes and requires recycling and waste reduction programs.

Carpenter-Presley-Tanner Hazardous Substances Account Act

The Carpenter-Presley-Tanner Hazardous Substances Account Act, California Health and Safety Code, Division 20, Chapter 6.8, authorizes DTSC and the NCRWQCB to require, oversee, and recover costs for the remediation of sites where contamination of soil and water present a hazard to human health or the environment.

California Occupational Safety and Health Act

The California Occupational Safety and Health Administration (Cal OSHA) regulates worker safety similar to federal OSHA but also requires preparation of an Injury and Illness Prevention Program, an employee safety program of inspections, procedures to correct unsafe conditions, employee training, and occupational safety communication. In addition, Cal OSHA regulations indirectly protect the general public by requiring construction managers to post warnings signs, limit public access to construction areas, and obtain permits for work considered to present a significant risk of injury, such as excavations greater than five feet.

Unified Hazardous Waste and Hazardous Materials Management Regulatory Program

Cal EPA adopted regulations in 1996 to establish a Unified Hazardous Waste and Hazardous Materials Management Regulatory Program and designated local agencies called Certified Unified Program Agencies (CUPA). The local agencies regulate hazardous substances management with respect to the following areas: hazardous waste generators and hazardous waste onsite treatment; USTs; aboveground storage tanks (ASTs); hazardous materials release response plans and inventories (business plans), including Unified Fire Code hazardous materials management plans, and inventories; and risk management and accidental release prevention programs.

The CUPA in the project area is the County of Sonoma Department of Emergency Services, Hazardous Materials Division.

Hazardous Materials Business Plans

Health and Safety Code (Division 20, chapter 6.95, Ch. 1167, Section 1, Article 1; modified by Stats. 1985, Ch. 1167, Sec. 1 and Stats. 2013, Ch. 419, Sec. 3) established the requirement that businesses that handle hazardous materials in California must file a Hazardous Materials Business Plan (HMBP). The HMBP includes general business information, basic information on the location, type, quantity and health risks of hazardous materials; and emergency response and training plans. Hazardous materials must be reported if they are handled in quantities equal to or greater than 55 gallons of a liquid, 200 standard cubic feet of a compressed gas, or 500 pounds of a solid.

Reporting may occur through the California Environmental Reporting System (County of Sonoma, 2013).

Safe Drinking Water and Toxics Enforcement Act (Proposition 65)

Administered by the CUPA, the Safe Drinking Water and Toxics Enforcement Act (California Code of Regulations Title 27, sections 25000 to 27001) requires businesses, which use hazardous materials to post public notice of release of any accidental hazardous materials, or other potential exposure to materials known to the State of California to cause cancer or reproductive toxicity. The Act prohibits such businesses from releases of hazardous materials into the environment and into sources of drinking water at levels above identified risk levels.

Uniform Fire Code

The Uniform Fire Code is administered by the CUPA via regular site inspections. The code regulates the type, configuration, and quantity of hazardous materials that may be stored within structures or in outdoor areas.

Public Resources Code Section 4290

California Public Resources Code Section 4290 provides authority to State Board of Forestry and Fire Protection to develop and implement fire safety standards for defensible safety on SRA lands. All residential, commercial, and industrial construction on SRA lands approved after January 1, 1991, must follow the regulations established by this board.

Local Regulations

Hazardous Materials Management Ordinance of Sonoma County

The Hazardous Materials Management Ordinance of Sonoma County (Sonoma County Municipal Code Chapter 29 Ord. No. 5015 § 1, 1997) was established to regulate the storage, handling, and management of hazardous materials, and grants authority to the County or CUPA with jurisdiction to administer and enforce applicable laws and regulations governing hazardous materials.

Sonoma County Fire and Emergency Services Department, Hazardous Materials Division

The Hazardous Materials (HazMat) Division of the Sonoma County Fire and Emergency Services Department is the CUPA that enforces the regulatory-based Hazardous Materials Business Plan Program, Hazardous Waste Program, Underground Storage Tank Program, Aboveground Petroleum Storage Act, Accidental Release Program, and portions of the Uniform Fire Code that address hazardous materials. The HazMat Division prepares the Sonoma County Hazardous Materials Area Plan and the Offshore Oil Spill Plan for the County.

Sonoma County General Plan

The *Sonoma County General Plan 2020* (County of Sonoma 2014) contains various policies that encourage fire safe practices and implementation of federal, state and county hazardous materials laws and regulations.

Sonoma County Fire Safety Ordinance

Often referred to as the "Fire Safe Standards," this regulatory code constitutes the local adoption of the California Fire Code and was adopted for the purpose of establishing minimum fire safe standards for development within the unincorporated area of the county. This code is based on national standards, including the Uniform Fire Code Standards and the National Fire Code.

3.7.4 Environmental Impacts and Mitigation Measures

This section describes the impact analysis relating to hazards and hazardous materials for the proposed project. It describes the methods used to determine the impacts of the project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany each impact discussion, where applicable.

Significance Criteria

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the CEQA Guidelines. For this analysis, the project would be considered to have a significant impact associated with hazards and hazardous materials if it would:

1. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
2. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment; or
3. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, would create a significant hazard to the public or the environment.

Several of the criteria included in Appendix G of the CEQA Guidelines do not apply to this analysis and are not used, as explained below.

Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. The Dry Creek Habitat Enhancement Project, Miles 2-6 is not located within one quarter mile of any schools. There are a number of public and private schools in the Healdsburg area, but none are close enough to be affected by any potential releases of hazardous materials from ground disturbing activities.

For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area. One public use airstrip, Healdsburg Municipal Airport, is located approximately one mile east of the northern sections of Mile 3 of the Dry Creek Project. However, since the project will not involve the construction of any structures or alter existing elevations it would not result in a safety hazard for people residing or working in the project area.

For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area. The project is not located in the vicinity of a private airstrip.

Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. The project is located on private property and would not interfere with any adopted emergency response plan or emergency evacuation plan. Construction of the project will not block roadways, interfere with identified evacuation routes, restrict access for emergency response vehicles, or restrict access to critical facilities such as hospitals or fire stations. Temporary lane closures that would have the potential to disrupt emergency vehicle response times are not anticipated. Implementation of a Traffic Control Plan prepared by the contractor in coordination with the Water Agency would ensure safe and efficient traffic movement throughout the project area. More information regarding traffic is available in **Chapter 3.13, Transportation and Traffic.**

Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands. The project is located on rural residential and agricultural lands adjacent to wildlands. Completion of the proposed project would not expose people or structures to a significant risk of loss, injury or death as a result of wildland fires beyond the risks that currently exist in the project area vicinity.

Approach to Analysis

This analysis considers the proximity and status of hazardous sites relative to the proposed project areas along Dry Creek in Sonoma County. Activities associated with construction and maintenance of the proposed project were evaluated to determine if they would increase human exposure to hazards or hazardous materials. The majority of the ground disturbance would take place during the construction phase of the proposed project. While it is anticipated that maintenance activities would primarily consist of vegetation management, there is a possibility that it would also include activities similar to construction, such as repair to damaged structures or adjustments to structures if they are not functioning properly. Therefore, maintenance activities are analyzed alongside construction activities in terms of their potential for impact. Operation of the project is excluded from hazards and hazardous materials analysis since operation would not involve any risk of exposure to hazardous materials or hazards including wildland fire risks.

Previous investigations of existing hazardous materials sources within the Dry Creek Valley were used to evaluate existing conditions for the proposed project. The draft technical memorandum completed by Kennedy/Jenks (2010) for the Water Agency for the Dry Creek Pipeline Feasibility Study was the primary source for identification of recognized environmental conditions (RECs). This study compiled data collected from regulatory agency databases to identify federal, state, local and tribal hazardous material release, spill, storage and waste sites along Dry Creek. A review of the same regulatory agency databases were conducted to obtain updated information of the project area. Results were summarized to identify areas of potential environmental impact from exposure to hazardous materials within the project area (**Table 4.7-2**).

Other resources consulted include the Fire Hazard Severity Zone maps (CAL FIRE, 2008) to identify areas with increased potential for wildland fire risks within the project area; the *Sonoma County General Plan 2020, Public Safety Element* (PRMD, 2014); the Water Agency's own *Emergency Response Plan* (SCWA, 2014); and the Water Agency's *Local Hazard Mitigation Plan Update 2012* (SCWA 2012).

Impacts and Mitigation Measures

Impacts associated with hazards and hazardous materials are summarized and categorized as either “no impact,” “less than significant,” “less than significant with mitigation,” or “significant and unavoidable.” Impacts are also identified as applicable to construction, operation, and/or maintenance phases of the project.

Impact 3.7.1: Construction and maintenance of the Dry Creek Project could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. (Less than Significant)

Combined analysis for Miles 2-3 and Miles 4-6

During construction and maintenance of the proposed project, passenger vehicles, light trucks and construction equipment that use hazardous materials (i.e. gasoline, motor oil) would be used in the project areas and would travel along local roadways. However, since the project will not involve the routine transport or disposal of hazardous materials the impact is considered less than significant.

Impact Significance: Less than Significant; no mitigation required.

Impact 3.7.2: Construction and maintenance of the Dry Creek Project could create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. (Less than Significant)

Combined analysis for Miles 2-3 and Miles 4-6

Construction and maintenance of the proposed project would require the use of vehicles and equipment that may have a potential for accidentally spilling oil or fuel. Accidental release of any hazardous materials would not create a significant hazard to the public or environment because the project is located in a sparsely populated area, the quantity and toxicity of materials that could be released would be low, best management practices would be employed to prevent a spill from occurring, and the active work sites would be isolated from the creek by cofferdams or other methods. Therefore, construction and maintenance of the proposed project would not create a significant hazard to the public or environment. Implementation of **Mitigation Measure 3.7.2** would further reduce this impact.

Mitigation Measure 3.7.2: To minimize the potential for accidental spills from equipment and to provide for a planned response in the event that an accidental spill does occur, the Sonoma County Water Agency will include the following construction best management practices in the project specifications:

- The contractor must comply with the Sonoma County Water Agency's Standard Contract Documents to protect the project area from being contaminated by the accidental release of any hazardous materials and/or wastes;
- The contractor will prepare a Safety Plan in accordance with the Sonoma County Water Agency's Standard Contract Documents;
- Spill containment and clean up equipment will be maintained onsite;
- Construction personnel will be trained in proper material handling, clean up, and disposal procedures;
- Disposal of all hazardous materials will be in compliance with all current hazardous waste disposal laws;
- The construction contractor will contact the local fire agency and the Sonoma County Department of Environmental Health for any site-specific requirements regarding hazardous materials or hazardous waste containment or handling;
- If hazardous materials are encountered during construction activities, the contractor will be required to halt construction immediately and notify the Water Agency's Construction Inspection Section; and
- Disposal of all hazardous materials will be in compliance with all applicable hazardous waste disposal laws.

Impact Significance: Less than Significant; no mitigation required

Impact 3.7.3: Construction and maintenance of the Dry Creek Project could create a significant hazard to the public or the environment if it is located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. (Less than Significant)

Project-Level Analysis: Miles 2-3

Findings from the Preliminary Hazard Waste Assessment conducted in 2010 (Kennedy/Jenks 2010) and an updated search of relevant databases is summarized in Table 4.12-2. No significant environmental conditions were identified within 1,000 feet of Mile 2 of the Dry Creek Project. Due to the proximity of Mile 3 to the City of Healdsburg, a number of significant environmental conditions were identified within 1,000 feet of Mile 3 of the Dry Creek Project. The types of hazardous waste records include solid and liquid waste disposal for waste containing oil, organic and inorganic residues, and PCBs. These waste disposal records include residential, vineyard, commercial and government properties. Other records include permitted discharges from wineries, an industrial gravel mining operation, residential and commercial construction, and stormwater runoff. A few locations have records of fuel tanks with leaks detected or tanks where spills have been reported. None of these locations have active clean-up remediation. These locations, which include ongoing stormwater or wastewater management activities and the presence of permitted fuel tanks, are not expected to be

impacted by the proposed project. Construction activities anywhere within Dry Creek have the potential to encounter historic erosion control debris placed along the channel banks. Based on the condition, environment, and location, any hazardous materials associated with this debris are not likely to present a significant risk of release beyond what has existed since these materials were placed. Materials encountered during project construction would be removed from the system, which is considered an environmental benefit. Implementation of **Mitigation Measure 3.7.2** would further reduce any potential impacts.

Impact Significance: Less than Significant; no mitigation required.

Program-Level Analysis: Miles 4-6

Findings from the Preliminary Hazard Waste Assessment conducted in 2010 (Kennedy/Jenks 2010) and an updated search of relevant databases summarized in Table 4.7-2 were used to evaluate the potential program-level impacts due to hazardous materials sites. Most of the sites identified were residential or vineyard properties with permitted fuel tanks, some of which had historic leak detections. None of these locations have active clean-up remediation. Other records include permitted discharges from construction, and stormwater runoff. None of these locations identified with ongoing stormwater management activities or the presence of permitted fuel tanks are expected to be impacted by the proposed project. Construction activities anywhere within Dry Creek have the potential to encounter historic erosion control debris placed along the channel banks. Based on the condition, environment, and location, any hazardous materials associated with this debris are not likely to present a significant risk of release beyond what has existed since these materials were placed. Materials encountered during project construction would be removed from the system, which is considered an environmental benefit. Implementation of **Mitigation Measure 3.7.2** would further reduce any potential impacts.

Impact Significance: Less than Significant; no mitigation required.

3.7.5 General Plan and Consistency

The Sonoma County General Plan Public Safety Element (PRMD 2008) was reviewed to ensure that the proposed project elements are consistent with local policies and ordinances. Relevant Goals, Objectives and Policies are provided below.

Sonoma County General Plan 2020

The *Sonoma County General Plan 2020*, Public Safety Element (PRMD 2014) contains the following goals, objectives, and policies regarding fire hazards and hazardous materials:

Goal PS-3 *Prevent unnecessary exposure of people and property to risks of damage or injury from wildland and structural fires.*

Objective PS-3.1: *Continue to utilize complete data on wildland and urban fire hazards.*

Objective PS-3.2: *Regulate new development to reduce the risks of damage and injury from known fire hazards to acceptable levels.*

Objective PS-3.3: *Utilize the Sonoma County Hazard Mitigation Plan to help reduce damages from wildland fire hazards.*

Policy PS-3a: *Continue to utilize available information on wildland and structural fire hazards.*

Policy PS-3b: *Consider the severity of natural fire hazards, potential damage from wildland and structural fires, adequacy of fire protection and mitigation measures consistent with this element in the review of projects.*

Policy PS-3c: *Continue to adopt revisions to the Uniform Fire and Building Code and other standards, which address fire safety as they are approved by inspection organizations and the State of California. Review, revise, and/or adopt existing or new local codes, ordinances, and Fire Safe Standards to reflect contemporary fire safe practices.*

Policy PS-3d: *Refer projects and code revisions to the Department of Emergency Services and responsible fire protection agencies for their review and comment.*

Policy PS-3e: *The Department of Emergency Services shall offer assistance to local agencies in adoption and enforcement of fire safety regulations and shall work with local agencies to develop proposed improvements to County codes and standards.*

Policy PS-3f: *Encourage strong enforcement of State requirements for fire safety by the California Department of Forestry.*

Policy PS-3g: *Encourage continued operation of CDF programs for fuel breaks, brush management, controlled burning, revegetation and fire roads.*

Policy PS-3k: *Work with the California Department of Forestry and Fire Protection to identify areas of high fire fuel loads and take*

advantage of opportunities to reduce those fuel loads, particularly in “Areas with very high or high potential for large wildland fires” and in High Fire Hazard Severity Zones.

Goal PS-4: *Prevent unnecessary exposure of people and property to risks of damage or injury from hazardous materials.*

Objective PS-4.1: *Maintain complete documentation and assessments of data on hazardous materials.*

Objective PS-4.2: *Regulate the handling, storage, use, and disposal of hazardous materials in order to reduce the risks of damage and injury from hazardous materials.*

Policy PS-4a: *While maintaining the autonomy granted to it pursuant to State zoning laws, implement Federal, State, and County requirements for the storage, handling, disposal, and use of hazardous materials, including requirements for management plans, security precautions, and contingency plans.*

Policy PS-4b: *Prepare and maintain an inventory of sites with storage or use of hazardous materials in threshold planning quantities as determined by Federal and State laws.*

Policy PS-4c: *Require a use permit for any commercial or industrial use involving hazardous materials in threshold planning quantities as determined by Federal and State laws. Hazardous materials management plans shall be required as a condition of approval for such permits.*

Policy PS-4d: *Work with applicable regulatory agencies to regulate the transportation of hazardous materials consistent with adopted County policies.*

Policy PS-4e: *Continue to design and operate County-owned solid waste disposal facilities to prevent disposal of and contamination by hazardous materials.*

Policy PS-4f: *Continue as needed the hazardous materials business advisory group, and consider adding an agricultural representative composed of citizens and representatives.*

Policy PS-4g: *Maintain the Sonoma County Operational Area Hazardous Materials Incident Response Plan, which provides for*

effective responses to releases of hazardous materials, the safe disposal of hazardous wastes, and a public information program.

Policy PS-4m: *Continue to educate the public about, encourage, and promote the reduction in use of hazardous materials and the use of safe alternatives to hazardous materials in County operations and private businesses.*

Policy PS-4n: *Encourage the private sector to reduce the use of potentially hazardous pesticides and to use alternatives such as best management practices.*

Policy PS-4o: *Encourage reduction in the use of potentially hazardous pesticides and increased use of alternatives, such as best management practices, in County operations, including but not limited to maintenance of roads, parks, and facility grounds. Emphasize the use of alternatives to potentially hazardous pesticides in areas likely to drain to waterways. Coordinate with the cities in this effort.*

Consistency

Based on a review of *Sonoma County General Plan 2020*, the proposed project appears to be consistent with the County's general plan. For example, the project would be consistent with "Goal PS-4" listed above because removing car bodies and other debris from project areas would reduce the risk of people or property sustaining damage or injury from hazardous materials long term. No significant impacts related to hazards and hazardous materials are anticipated during project construction-, operation- or maintenance-related activities. However, implementation of **Mitigation Measures 3.7.2a and 3.7.2b** would further reduce the risk of hazardous materials released by requiring the contractor to 1) comply with the Sonoma County Water Agency's Standard Contract Documents to protect the project area from being contaminated by the accidental release of any hazardous materials and/or wastes, and 2) prepare a Safety Plan in accordance with the Sonoma County Water Agency's Standard Contract Documents to address hazardous materials that may be encountered. Therefore, the proposed project appears to be consistent with the goals, objectives, and policies related to hazards and hazardous materials set forth in *Sonoma County General Plan 2020*.

3.7.6 References

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CHAPTER 3.8 Hydrology and Water Quality

3.8.1 Introduction

This chapter describes the existing conditions relating to hydrologic and water quality resources within the Dry Creek Habitat Enhancement Project, Miles 2-6 (Dry Creek Project or proposed project) area. Section 3.8.2, “Environmental Setting” describes the regional and project area environmental setting, including important water bodies, surface and groundwater hydrology, geomorphology, flooding, and water quality. Section, 3.8.3, “Regulatory Framework” details the federal, state, and local laws related to hydrology and water quality. Potential impacts to these resources resulting from the proposed project are analyzed in Section 3.8.4, “Impacts and Mitigation Measures” in accordance with the California Environmental Quality Act (CEQA) significance criteria (CEQA Guidelines, Appendix G) and mitigation measures are proposed that could reduce, eliminate, or avoid such impacts.

Other impacts to related resources are addressed in other chapters as follows: impacts to fish are addressed in **Chapter 3.5, Fisheries Resources**; impacts to geology, soil, and mineral resources are addressed in **Chapter 3.6, Geology, Soil, and Mineral Resources**; impacts to recreation are addressed in **Chapter 3.12, Recreation**.

3.8.2 Environmental Setting

The environmental setting for hydrology and water quality includes all areas that could be affected by activities associated with the Dry Creek Project. As stated in **Chapter 2, Project Description**, habitat enhancement sites have been identified for Miles 2-3, but specific sites have yet to be determined for Miles 4–6. Projects could occur anywhere along the 14-mile length of Dry Creek from Warm Springs Dam to the Russian River (exclusive of sites already enhanced in Mile 1). Consequently, the environmental setting includes the Dry Creek basin downstream of Warm Springs Dam, including the 14 river miles (RMs) from the dam to the Russian River, adjacent riparian areas, and surrounding floodplains and terraces, either unvegetated or occupied by agricultural or residential land-uses. The setting also includes tributaries entering Dry Creek as they are part of the drainage network potentially affected by enhancement activities. A more narrow focus is applied to individual project sites in Miles 2 and 3, along with associated riparian areas, floodplains and terraces.

Physiography

North Coast Hydrologic Region

The California Water Plan (California Department of Water Resources 2005) divides California into 10 hydrologic regions, based upon the state's major drainage basins. Each of these basins has distinct precipitation and runoff characteristics. The project area is within the North Coastal Basin, which is part of the North Coast Hydrologic Region. The North Coast Hydrologic Region encompasses 19,470 square miles, and includes Lake, Sonoma, Humboldt, Mendocino, Modoc, Siskiyou, Del Norte and Trinity counties. The North Coastal Basin (the Basin) covers an area of approximately 8,560 square miles along the north-central California Coast. The Basin is bounded by the Pacific Ocean to the west; the Klamath and Trinity river basins to the north; the Sacramento Valley, Clear Lake, Putah and Cache Creeks, and the Napa river basin to the east; and the Marin-Sonoma county line to the south. The Basin covers all of Mendocino County, major portions of Humboldt and Sonoma Counties, about one-fifth of Trinity County, and small portions of Glenn, Lake and Marin Counties. Most of the Basin consists of rugged, forested coastal mountains dissected by six major river systems: Eel, Russian, Mad, Navarro, Gualala, and Noyo rivers, and numerous smaller river systems. Soils are generally unstable and erodible, and rainfall is high.

Russian River Basin

The Russian River drains 1,485 square miles from the Coast Ranges in northern California, flowing 110 miles from its origination point from near the city of Ukiah to the Pacific Ocean near the town of Jenner (USACE 1982). The northwest trending basin is characterized by a series of alluvial valleys separated by bedrock constrictions (Florsheim and Goodwin 1993). From its headwaters, the river is comprised of three distinct sections: 1) an upper portion that flows generally southwest through the Ukiah, Hopland, and Alexander alluvial valleys, 2) a middle portion that travels abruptly west through a sinuous bedrock canyon near Healdsburg, then south through an alluvial valley, and 3) a lower portion that begins at a bedrock constriction near the Wohler Bridge at the town of Mirabel and continues west through an alluvial valley to the Russian River estuary and the Pacific Ocean. The middle and lower portions are commonly referred to as the Middle Reach and the Lower Reach, while the alluvial valleys (Ukiah, Hopland, and Alexander) in the upper portion are recognized as separate reaches. Dry Creek enters the Russian River within the Middle Reach, in the alluvial valley downstream of the sinuous bedrock canyon near Healdsburg.

Dry Creek Basin

The Dry Creek basin drains 217 square miles from the interior Coast Ranges of northern Sonoma and southern Mendocino counties before entering the Russian River near the city of Healdsburg, 30 miles upstream of the Pacific Ocean (Figure 3.8-2)

(Harvey and Schumm 1985). The northwest trending basin is 32 miles long and 7 miles across at its widest point, with elevations ranging from 3,000 feet (ft) at the drainage divide to 70 ft near the confluence with the Russian River. Dry Creek is the second largest tributary by area within the Russian River basin, but contributes the largest amount of annual runoff (USACE 1984). Current land use is dominated by agriculture (viticulture), but historical land use still influences the landscape. Past practices include forest clearance for grazing and agriculture, gravel and sand excavation, and channel straightening and levee construction for flood control (Harvey and Schumm 1985; Inter-Fluve 2010).

Warm Springs Dam bisects and controls the upper 131 square miles of the basin (USACE 1984). The dam is located 14 miles upstream from the confluence of Dry Creek with the Russian River and is jointly operated by the USACE for flood control and by the Water Agency for water supply. Terrain upstream of the dam is steep and mountainous, with hillslopes exceeding 30% and channel slope ranging from 0.2 to 4% (Inter-Fluve 2010). Downstream of the dam, Dry Creek flows through a flat, relatively narrow alluvial valley with a channel slope ranging from 0.2% downstream near the Russian River to greater than 2% upstream near the dam (Inter-Fluve 2010). Major tributaries to Dry Creek are Cherry and Warm Spring creeks upstream of the dam and Pena and Mill creeks below. Construction of Warm Springs Dam altered basin hydrology by reducing peak flows during wet periods and increasing baseflow during dry periods. Dam emplacement also interrupted sediment transport, leading to incision and bed coarsening in downstream reaches (USACE 1987).



Figure 3.8-1. Russian River Figure

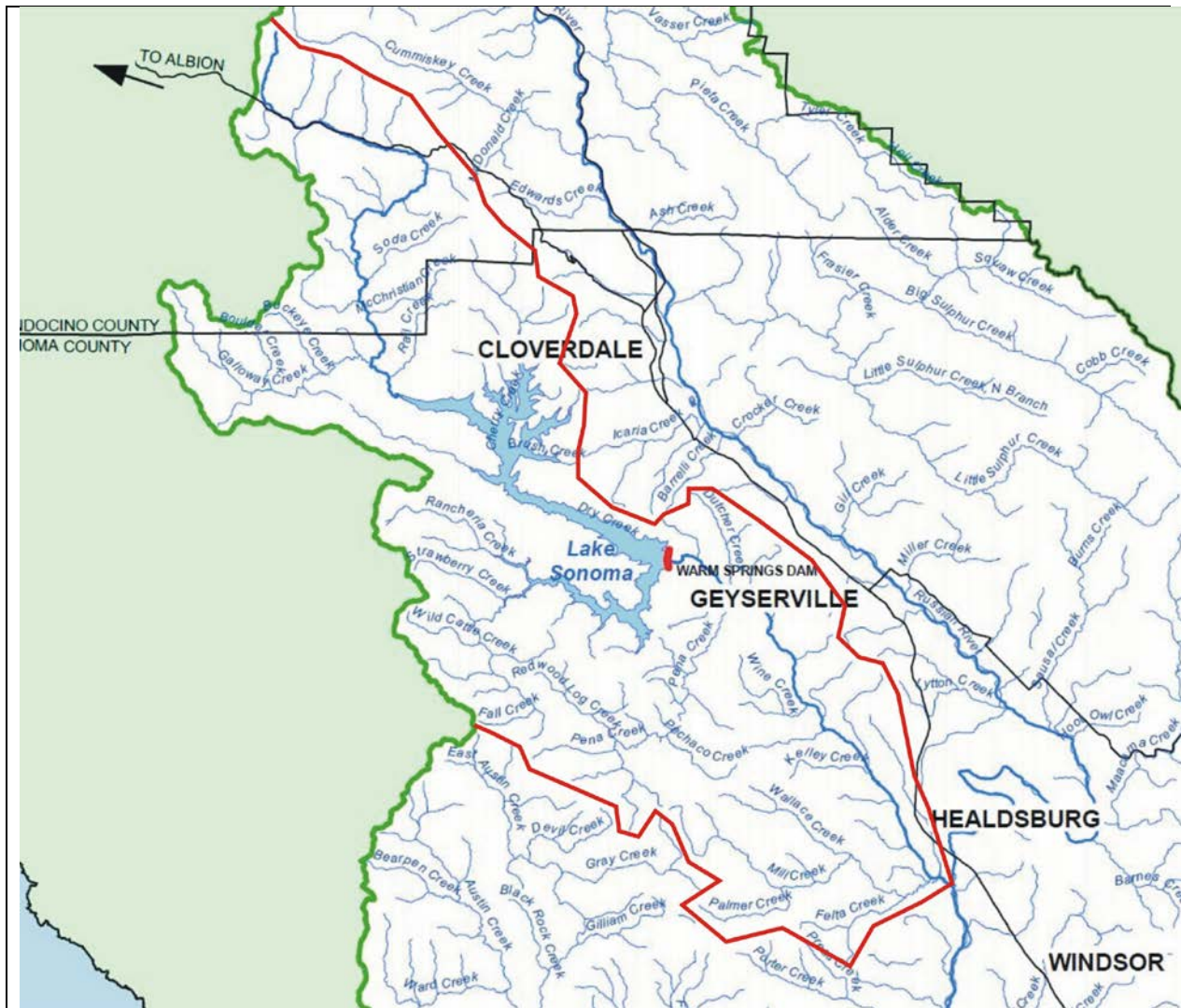


Figure 3.8-2. Dry Creek Watershed Boundary

Principal tributaries to Dry Creek below Warm Springs Dam are Fall, Dutcher, Peña, Grape, Crane, and Mill creeks (Table 3.8-1). Fall and Dutcher creeks enter Dry Creek approximately 1.5 miles downstream of Warm Springs Dam from the west and north respectively, and Peña Creek enters approximately 2.5 miles downstream from the west, but all are upstream of Yoakim Bridge. Grape and Crane creeks enter just upstream and downstream of Lambert Bridge from the southwest. Mill Creek is the largest tributary (by drainage area [22 square miles]), along with Peña Creek, and enters from the southwest near the confluence with the Russian River.

Table 3.8-1. Major tributaries to Dry Creek.

Tributary	Drainage Area (square miles)	Dry Creek River Mile
Fall Creek	2.0	12.1
Dutcher Creek	3.0	11.8
Peña Creek	22.9	11.0
Grape Creek	3.3	7.3
Crane Creek	2.4	6.3
Mill Creek	22.0	0.7

Surface Water Hydrology and Drainage

Climate and Precipitation

Historical precipitation patterns within the Dry Creek basin reflect a Mediterranean climate, with cool, wet winters and hot, dry summers. Most precipitation (94%) falls as rain from October through April, with 70% occurring from November through February (USACE 1984; Inter-Fluve 2010). These patterns are driven by Pacific frontal storms bringing warm subtropical moisture to produce intense, short bursts of rainfall (Mount 1995). The seasonal southerly migration of the Aleutian low pressure system forces westward moving storms over the Coast Ranges (USACE 1984), creating an orographic effect whereby water vapor cools and condenses as it rises, then rapidly precipitates. Rainfall tends to be heaviest at higher elevations near the coast, with average annual rainfall of 60 inches/year near the drainage divide at the western edge of the basin (upstream of Warm Springs Dam). In lower elevation valley areas, downstream of the dam and within the project area, annual precipitation ranges from 41 inches/year at the city of Healdsburg to 45 inches/year at the base of Warm Springs Dam (Inter-Fluve 2010).

Seasonal Hydrology

Seasonal hydrology in Dry Creek shows characteristic patterns. Flow is greatest during late-fall and early winter and lowest from summer to early-fall (Figure 3.8-3). Under current conditions, the median mean monthly flow, as shown by the Dry Creek near Geyserville United States Geological Survey (USGS) stream gage (USGS gage # 11465200), is greatest in March (approximately 390 cubic feet per second (cfs)) and lowest from May through October (approximately 100 cfs). This pattern is consistent with the Mediterranean climate and regulation by Warm Springs Dam. The period of record for the Dry Creek near Geyserville stream gage (October 1959 to present) encompasses pre- and post-dam hydrologic conditions. Before construction of Warm Springs Dam in 1984, surface flow in Dry Creek typically peaked in February (940 cfs median mean monthly flow) and nearly disappeared from June to October (0.5 to 0.20 cfs median monthly flow) (Figure 3.8-4). Dam operations mute peak flows (compared to unregulated conditions) and release a consistent summer flow, reflecting the flood control and water supply functions of Warm Springs Dam (see Surface Water

Regulations and Releases below for a description of dam operations). During the wet season (November through May), runoff from tributaries accounts for most of the flow in the Dry Creek. During the dry season, most of the flow in Dry Creek consists of water released from Lake Sonoma.

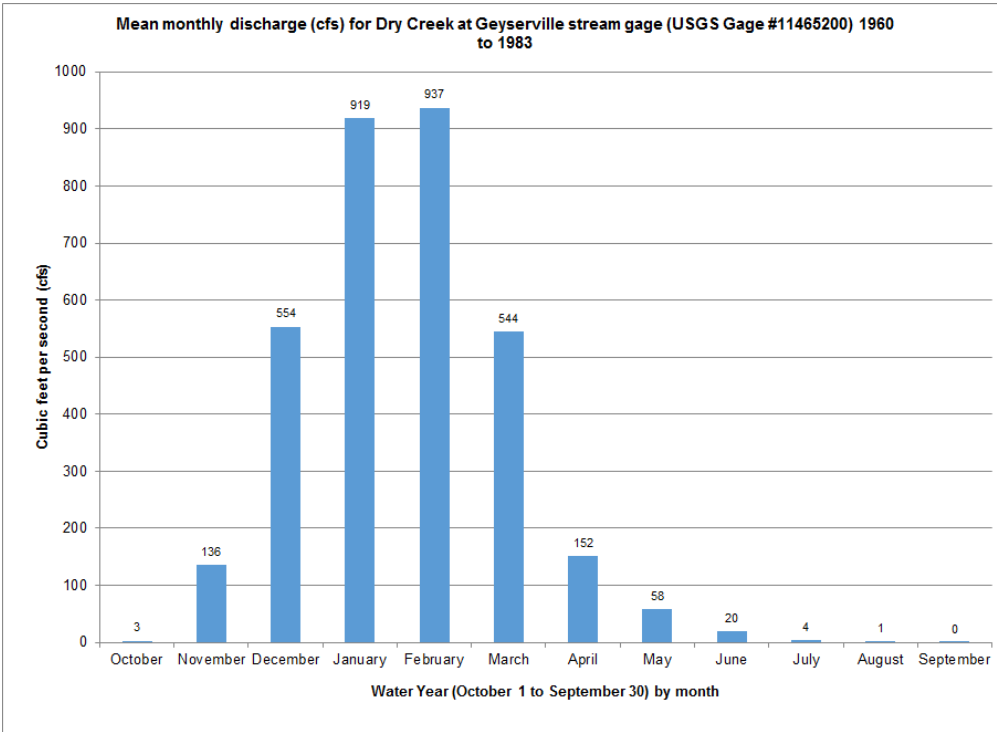


Figure 3.8-3. Pre-Warm Springs Dam median monthly flows.

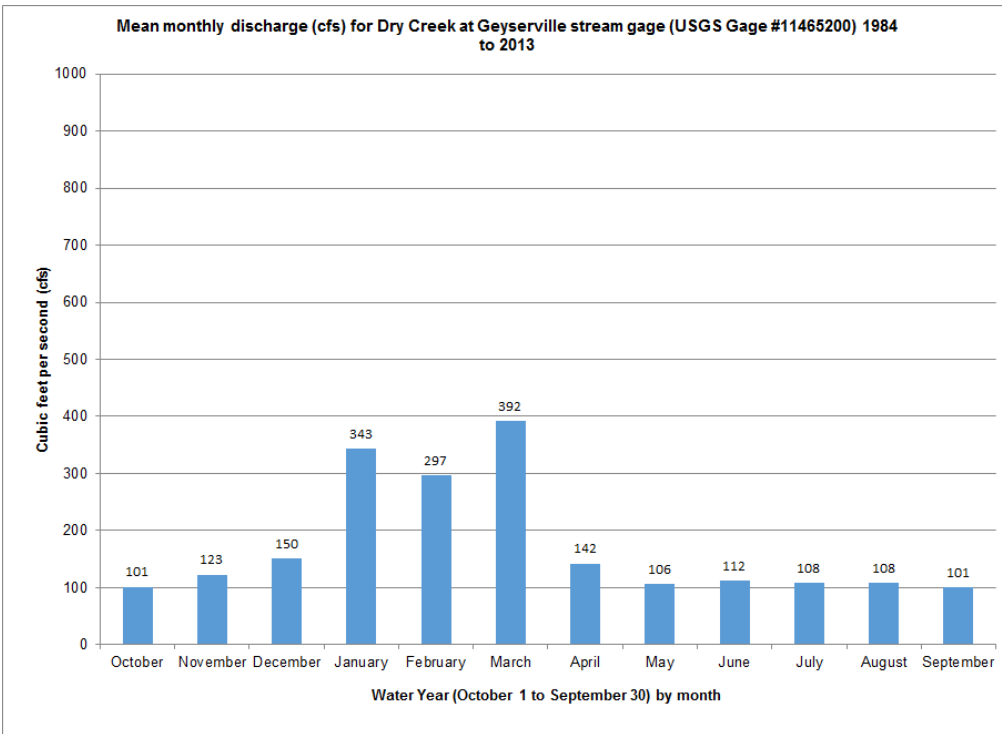


Figure 3.8-4. Post-Warm Springs Dam median monthly flows.

Flood Hydrology

Floods in the Russian River basin are normally of short duration, lasting three to four days, developing within 24 to 48 hours after the beginning of a storm, but rapidly receding within 2 or 3 days (USACE 1984). Tributaries, such as Dry Creek, can rise more rapidly than the mainstem Russian River, with flooding occurring as soon as four hours after heavy rainfall. Tributaries to Dry Creek also rise rapidly in response to storms, reaching their peak flow three to five hours after the heaviest rainfall. The greatest peak flows, as recorded by the Dry Creek near Cloverdale USGS stream gage¹, and the Dry Creek near Geyserville stream gage, occurred in December 1964, January 1963, and December 1955 (Table 3.8-2). The December 1955 storm was the “most severe multiple peaked storm of record,” and produced the greatest critical runoff volume into Dry Creek (USACE 1984). Consequently, the USACE used this storm as the Standard Project Flood (SPF) on Dry Creek, applying the 144-hour, 30 in. recorded rainfall and 170,000 acre-feet basin-wide runoff as the maximum flood controllable by Warm Springs Dam and Lake Sonoma. The December 1964 storm produced a higher peak flow, but was less intense and of shorter duration than the December 1955 storm. Consequently, USACE (1984) found the December 1955 flood produced the maximum runoff in the lower Russian River, and used it as the SPF for that portion of the basin.

¹ (USGS gage # 11464500; located on Dry Creek within the inundation area of Lake Sonoma this gage is no longer operating; period of record: October 1939 to September 1980)

Regulation by Warm Springs Dam reduced peak flows by up to an order of magnitude. Prior to Warm Springs Dam, the Dry Creek near Geyserville stream gage showed a median annual peak flow of 16,600 cfs, with peak flows regularly exceeding 7,500 cfs (Figure 3.8-5; 20 out of 24 years from water year (WY) 1960 to WY 1983).² After dam completion, median annual peak flow fell to 3,900 cfs and due to dam operations (see Surface Water Regulation and Releases, below) did not exceed 7,500 from WY 1984 to WY 2013. Accordingly, regulation decreased flood magnitudes across a range of recurrence intervals (Table 3.8-3). The Federal Emergency Management Agency (FEMA) and USACE estimated post-dam peak discharges from downstream of the dam to just upstream of Peña Creek that were an order of magnitude lower than pre-dam flood magnitudes at Yoakim Bridge. The post-dam flood recurrence intervals show the effect of flood control operations just downstream of the dam as 10-, 50-, and 100-yr floods are all of similar magnitude (6,000 cfs). Current flood response comes largely from dam operation and tributary input.

² The instantaneous peak flow differs from the mean monthly flow peak described above. The instantaneous peak flow is the maximum flow reached during a water year [WY; October 1 through September 30]. The mean monthly flow peak is the average daily flow over an entire month.

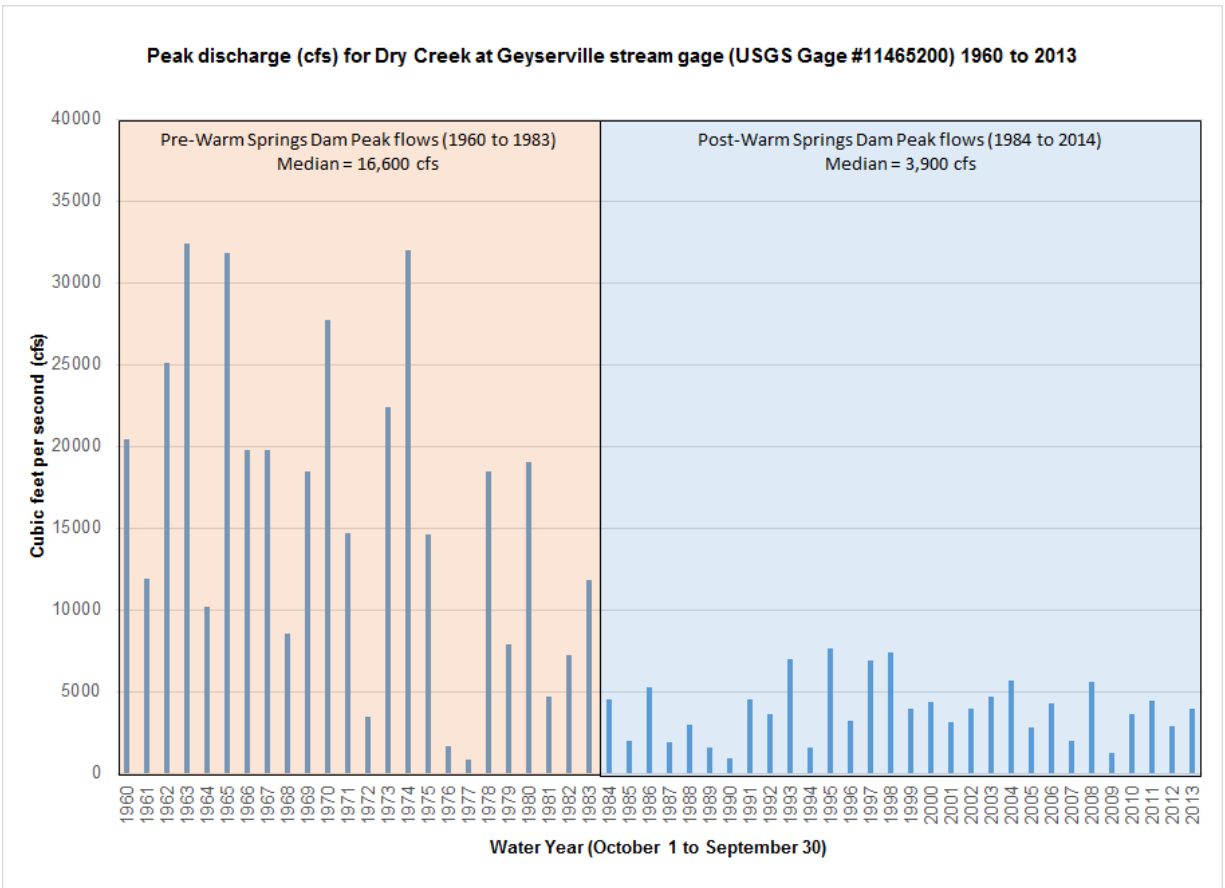


Figure 3.8-5. Pre- and Post-Warm Springs Dam Peak discharge (cubic feet per second) for Dry Creek at Geyserville stream gage (United States Geological Survey Gage #11465200) 1960 to 2013.

Table 3.8-2. Flood flows on Dry Creek before Warm Springs Dam.³

Date	Dry Creek near Cloverdale (USGS gage # 1146500) 1941-1980 88 square miles drainage area	Dry Creek near Geyserville (USGS gage # 11465200) 1959-present 162 square miles drainage area
	January 1943	23,000 cfs
December 1945	13,600 cfs	
December 1955	26,000 cfs	
February 1960	19,200 cfs	20,400 cfs
January 1963	25,000 cfs	32,400 cfs
December 1964	27,000 cfs	31,800 cfs
January 1970		27,700 cfs
January 1974		32,000 cfs

³ United States Geological Survey Dry Creek gage near Cloverdale was approximately 8-miles further upstream of the gage at Geyserville and was upstream of the major tributaries of Pena Creek and Warm Springs Creek. The gage location near Cloverdale as well as a large portion of Warm Springs Creek were inundated with the formation of Lake Sonoma.

Table 3.8-3. Flow recurrence intervals before and after Warm Springs Dam.⁴

Flow event (recurrence interval)	Pre-Dam Dry Creek near Geyserville (USGS gage # 11465200)	Post-Dam Dry Creek below WSD (USGS gage # 11465200)	
		FEMA	USACE
2-yr	23,000 cfs		4,000 cfs
5-yr	25,000 cfs		4,500 cfs
10-yr	30,000 cfs	6,000 cfs	6,000 cfs
25-yr	35,000 cfs		6,000 cfs
50-yr	38,000 cfs	6,000 cfs	6,000 cfs
100-yr	40,000 cfs	6,000 cfs	6,000 cfs

Surface Water Regulation and Releases

Warm Springs Dam

Warm Springs Dam, which forms Lake Sonoma, is a multi -purpose facility constructed by the USCAE from 1970 to 1983 (litigation halted construction from 1974 to 1978) for flood control, recreation, and water supply (USACE 1984). The 2,600-foot wide earthfill embankment extends 319 ft above the streambed and forms Lake Sonoma. The lowest outlet gate at Warm Springs Dam is at elevation 228 mean sea level (msl), but the lake has a minium pool level elevation, which is set at 292 feet msl to sustain a reservoir fishery. Except for emergencies, releases of water that result in the water elevation of the lake to drop below 292 feet msl is not authorized. Between water elevation 292 feet msl and 451 feet msl, the lake is in the water conservation pool. Above elevation 451 feet msl to the spillway crest at 495 feet msl, the lake is in the flood control pool. The lake has a has a gross capacity of 381,000 acre-feet (af) at the spillway crest elevation (of which 130,000 af makes up the flood control pool and 212,000 af makes up the water conservation pool, with the remainder making up the minium pool). The dam and lake are part of the Russian River Project, which also includes Coyote Valley Dam and Lake Mendocino on the upper Russian River. The Water Agency is the local sponsor of the Russian River Project and under agreements with USACE, manages the water conservation pool storage space in the lake to provide water supply and to maintain instream flows in the Russian River and Dry Creek.

Flood Control Releases

USACE operates Warm Springs Dam whenever the water elevation of the lake is within the flood control pool. The primary flood control objectives of Warm Springs Dam are to reduce peak flows in Dry Creek and the Russian River downstream of Healdsburg and to limit flows in the Russian River at Guerneville to 35,000 cfs (USACE 1984). Flood control releases follow one of three schedules depending on storage capacity within Lake Sonoma: 1) 2,000 cfs outlet release when the water elevation in the flood control pool is between 451.1 feet msl and 456.7 feet msl; 2) 4,000 cfs outlet

⁴ Aconyms used in Tables 3.8-1 – 6.8-3: CFS – cubic feet per second; USGS – United States Geological Survey; WSD – Warm Springs Dam; FEMA – Federal Emergency Management Agency; USACE – United States Army Corps of Engineers

release when the water elevation in the flood control pool is between 456.7 feet msl and 468.9 feet msl; and 3) 5,500 outlet cfs release when the water elevation in the flood control pool is between 468.9 feet msl and 502.0 feet msl (spillway discharge at 502 feet msl is estimated at 7,000 cfs in addition to the outlet release) . Above 502.0 feet msl wse, flood control gates make emergency releases, bringing the maximum outlet release to a maximum of 7,900 cfs at water elevation 505.0 feet msl and above (spillway discharge at 505 feet msl is estimated at 11,200 cfs in addition to the outlet release) (USACE 1998). Regardless of schedule, releases are subject to four limitations:

1. When the reservoir pool is at or below 502.0 msl wse and inflow (to the reservoir) is at or above 5,000 cfs, no gate releases will be made
2. When reservoir pool elevation is at or below 502.0, no releases will be made that will cause discharge on the Russian River at Guerneville to exceed 35,000 cfs
3. When Quantitative Precipitation Forecasting (QPF) is >1 in. for 24 hours, or 0.6 in. for 6 hours, outflow from the reservoir will not exceed 2,000 cfs
4. Changes in release rates will not exceed 1,000 cfs/hour to prevent bank failure and erosion along Dry Creek.

Water Supply Releases

The Agency holds water right permits issued by the State Water Resources Control Board (SWRCB) to divert⁵ Dry Creek flows and to re-divert⁶ water stored and released from within Lake Sonoma. These rights are in combination with other rights to divert Russian River flows and re-divert water from Lake Mendocino⁷. The Lake Sonoma conservation pool holds 245,000 af that constitutes the principal municipal, domestic, and industrial water supply for most of the lower Russian River, and parts of Sonoma and Marin counties (State Water Resources Control Board 1986; NMFS 2008).

Whenever the lake elevation is within the water conservation pool, the Water Agency directs USACE releases from Lake Sonoma into Dry Creek and downstream into the Russian River. The Water Agency sets release levels to meet water supply needs in accordance with its water rights permits, SWRCB Decision 1610 which establishes minimum instream flow requirements in Dry Creek and the Russian River, and the Biological Opinion which sets maximum flow levels in order to avoid take of endangered species. The Water Agency could be directing releases from Lake Sonoma (or Lake Mendocino) during any month of the year as long as the lake elevation is within the water conservation pool; however, it is commonly referred to as “summer flows” or “low-

⁵ Divert – refers to water diverted directly from streamflows into distribution systems for beneficial uses or into storage in reservoirs.

⁶ Re-divert – refers to water that has been diverted to storage in a reservoir, then is released and diverted again at a point downstream.

⁷ SWRCB water rights permits 12947a, 12949, 12950, and 16596 apply to the diversion of water from Lake Mendocino and Lake Sonoma and re-diversion at the Wohler/Mirabel facilities.

flow season” when the Water Agency is directing releases and “winter flows” or “high-flow season” when the USACE is directing releases from these reservoirs.

Water released into the Dry Creek flows downstream and joins the Russian River near Healdsburg. Flows in the Russian River continue downstream and can be impounded at a seasonal inflatable dam just downstream of the Wohler Bridge, which crosses the Russian River just upstream of the Mirabel area. The dam is inflated when Russian River discharge falls below approximately 800 cfs, typically from April to November, and creates a pool that submerges pumps that divert up to 100 cfs of water into adjacent infiltration ponds (Entrix Inc 2004). Water is then pumped from river side collector wells that typically include a concrete caisson (pipe) extending approximately 80 feet down into the gravel aquifer. Six to twelve horizontal intake laterals (perforated pipes) ranging from 8- to 18-inches in diameter extend out radially from the bottom of each caisson into the aquifer.

Groundwater

The California Water Code (Section 10752) defines "groundwater" as all water beneath the surface of the earth within the zone below the water table in which the soil is completely saturated with water, but does not include water which flows in known and definite channels. Groundwater resources in the North Coast Hydrologic Region occur along the coast near major river mouths, on marine terraces, or inland river valleys and basins (CDWR 2003). Reliability of these resources varies, but CDWR (2003) delineated 63 groundwater basins (divided into 551 basin/sub-basins) in the region underlying approximately 1.022 million acres (1,600 mi²). Along the coast, most groundwater comes from shallow wells in alluvium (sand and gravel) underlying the region's rivers. Within the Russian River basin, a significant amount of groundwater development has occurred on the Santa Rosa Plain and surrounding areas (CDWR 2003).

In Sonoma County, groundwater supplies agricultural, industrial, and domestic water uses (PRMD 2008). The Russian River is the primary source of domestic water for urban areas, but groundwater serves most rural areas. Nonetheless, not all groundwater in the county is of sufficient volume, has a reasonable rate of recharge, or is suitable for drinking water or other purposes. Local basins occur along creek and river valleys in central and southern portions of the county, areas typically underlain by alluvium. Other geologic units may also store and yield water, but are less dependable than alluvial deposits.

Dry Creek occurs within the Healdsburg Area groundwater sub-basin (California groundwater sub-basin #1-55.02) of the Santa Rosa Valley groundwater basin (California groundwater basin #1-55 (CDWR 2003, 2013). The Healdsburg Area sub-basin encompasses 15,400 acres, which includes areas outside of Dry Creek, with

maximum estimated well yields of 500 gallon per minute (gpm). A detailed groundwater budget, an analysis of inflows and outflows useful for estimating storage change, has not been conducted for the Healdsburg Area sub-basin (Type C budget). Consequently, there are not enough data to provide an estimate of groundwater extraction from the sub-basin.

Under the California 2009 Comprehensive Water Package, CDWR implemented the California Statewide Groundwater Elevation Monitoring (CASGEM) program to establish rules for local agencies to develop and conduct groundwater level monitoring programs (CDWR 2015). The water package required CDWR to describe the degree of groundwater elevation monitoring within groundwater basins listed in CDWR (2003; California's Groundwater, Bulletin 118, update 2003) to prioritize basins to identify, evaluate, and determine the need for additional groundwater level monitoring. CDWR (2015a; California's Groundwater, Update 2013, dated April 2015) used groundwater reliance as the leading indicator of basin priority to evaluate and categorize groundwater basins into high, medium, low, and very low priority for water level monitoring. High or medium priority basins encompass 96 percent of annual groundwater use in California. The Healdsburg area groundwater sub-basin (#155.02), including Dry Creek, received a very low overall basin priority with low scores of groundwater use and groundwater reliance (CDWR 2014). The CDWR Groundwater Information Center shows two wells within the Dry Creek basin just downstream of Warm Springs Dam where Sonoma County PRMD measured groundwater surface elevation and depth below ground surface, although use of the two wells is unknown (CDRW 2015b, c).

Geotechnical Investigation of potential off-channel enhancement areas (conducted for areas included in the Demonstration Project) found groundwater present in test pits excavated in floodplain areas (SAGE 2011). The groundwater occurred in loose to medium dense sand and gravel mixtures, at approximately the same elevation as the adjacent water surface.

Flows in Dry Creek and rainfall both have a direct impact on groundwater levels in the project area. Depending upon conditions and location along Dry Creek, groundwater can be flowing out of the creek bank and reach surface water (termed "gaining stream" conditions), or the surface water flows in Dry Creek can be flowing through the creek bed and banks and recharging groundwater levels (termed "losing stream" conditions). Rainfall in the region either lands on unsaturated permeable soils and is absorbed or it lands on impermeable surfaces, or on permeable surfaces at a faster rate than can be absorbed, and becomes runoff or surface water (see discussion later in this sub-chapter under "Hydrology and Surface Storage"). Highly permeable areas that have the ability to absorb large amounts of water are called recharge areas. Water that infiltrates permeable materials may eventually reach a zone of saturation and become groundwater. As groundwater levels are depleted (either naturally through springs or

mechanically through wells), infiltration is necessary to recharge or maintain groundwater levels. Groundwater levels will drop if the rate of withdrawal is greater than the rate of infiltration.

The same characteristics that allow some soils to absorb water quickly (permeable soils) also make these materials attractive locations for removing water. Permeable soils tend to consist of coarse grain materials with large pore (open) spaces. The larger the pore space, the faster water can move through the material. Nearly all of the geologic formations of Sonoma County can yield water to wells. Well yields range from 14,000 gallons per minute (gpm) in wells located in coarse grained alluvium, to less than 1 gpm in wells located in fractured rock. In general, water-yielding formations in Sonoma County are stream channel deposits, the Wilson Grove Formation, and Sonoma Volcanics. Formations that generally produce only low yields of ground water are basin deposits, such as the Glen Ellen Formation. The only non-water-yielding formation in the study area is the Franciscan complex. Please refer to **Chapter 3.6, Geology, Soils, and Mineral Resources**, for a discussion of the geology of the project area.

Geomorphology

Historical Condition

The current geomorphic condition of Dry Creek is a reflection of the evolution and intensity of past and current land-use practices. Harvey and Schumm (1985) conducted a geomorphic assessment of Dry Creek that described cross-sectional and longitudinal response to changes in land-use since 1850, the beginning of European settlement (Figure 3.8-6). Prior to 1850, forests covered 50 percent of the Dry Creek basin (Ritter and Brown 1971, as cited in (Harvey and Schumm 1985)). Settlers cleared up to 40 percent of these forests for grazing, resulting in increased surface and hillslope erosion and sediment delivery to the stream channel. This land-use change also increased stream discharge through decreases in infiltration and more efficient delivery of runoff from agricultural drainage systems. The stream channel responded by aggrading up to 3 ft, then degrading approximately 12 ft to reach an equilibrium base-level by 1900. The onset of gravel mining from the channel and floodplains caused further channel degradation in response to base-level lowering in the Russian River, an increase in extraction rates in Dry Creek from the 1950s to 1960s, and record annual runoff (see Flood Hydrology, above). By 1964 the Dry Creek channel incised another 10 ft, resulting in channel instability and increased sediment yield to the Russian River. The rate of channel incision decreased by 1974, with Harvey and Schumm (1985) noting further degradation (2.4 ft) from the 1964 base-level. But, the systemic incision ceased just upstream of Lambert Bridge due to the presence of grade controlling Franciscan Formation bedrock outcrops. By 1984, Dry Creek downstream of Lambert Bridge

lowered another 2 ft, but appeared to reach a new equilibrium with the formation of a sinuous channel and adjacent gravel bars within the recently incised valleys.

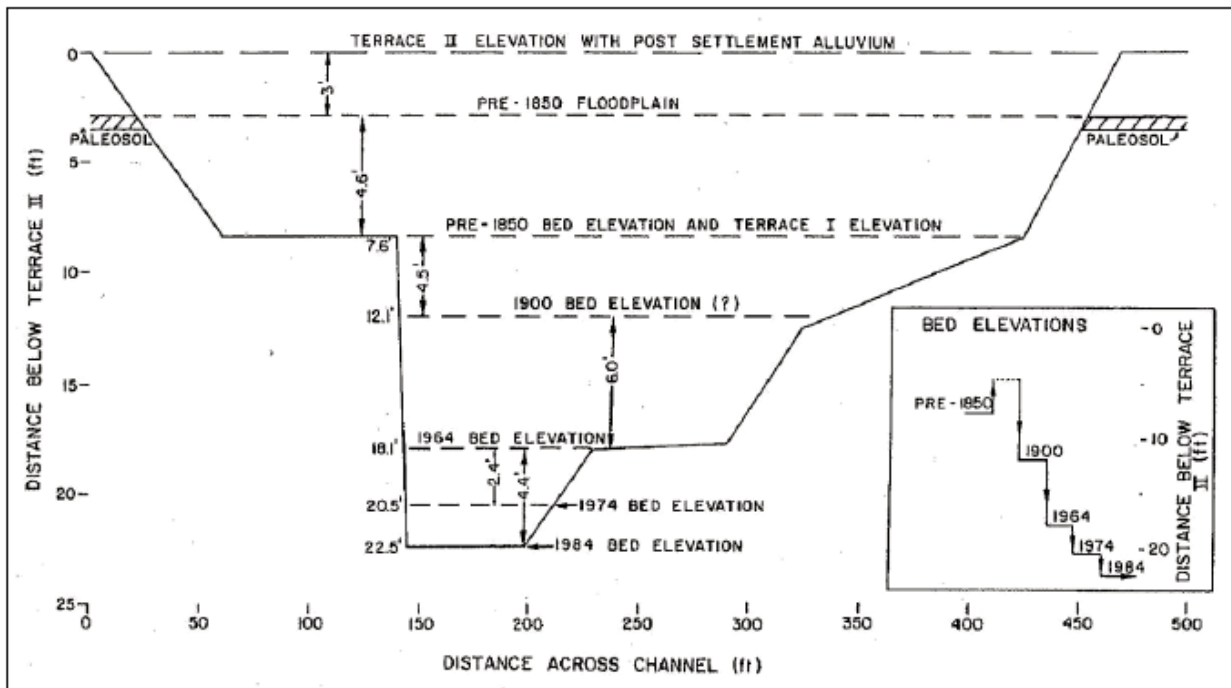


Figure 3.8-6. Incision figure from Harvey and Schumm

Incision is a common response within alluvial channels disturbed by changes in sediment input or flow, which can lead to excess flow energy or stream power relative to the sediment load (Simon and Hupp 1986), (Simon and Rinaldi 2006). Systemically incising alluvial channels can pass through a continuum of phases or stages, each characterized by a set of particular adjustment processes. Simon and Hupp (1986) developed a channel evolution model to conceptually describe the evolution of channels through a continuum of six stages in response to disturbance (Figure 3.8-7). Stage I is the pre-disturbed channel condition. Stage II is the disturbed channel stage, a short-lived or rapid stage that adjusts through rapid incision or downcutting to Stage III. The Stage II downcutting lessens in Stage III as channels reach a new base level or as degradation flattens channel gradient, thereby reducing stream power and incision. As banks increase in height and become oversteepened in Stage III, they fail from lateral erosion, resulting in channel widening in Stage IV. Aggradation occurs in Stage V from deposition of bank eroded sediment input during Stage IV, and from flattening of the channel gradient occurring in Stage III. A new, post-disturbance equilibrium is reached in Stage VI as inset floodplains form and become vegetated.

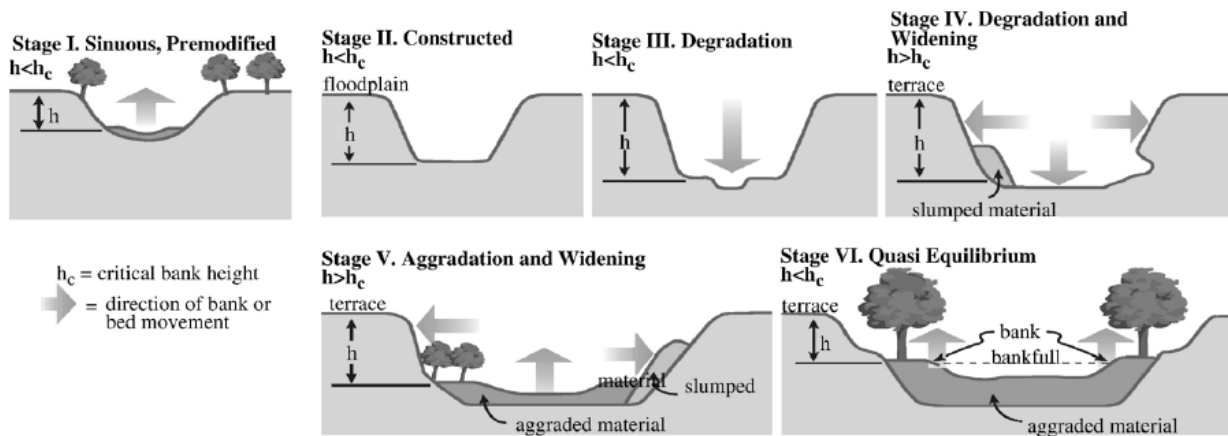


Figure 3.8-7. Stages of channel evolution as described by Simon and Hupp (1986) (figure from Simon and Rinaldi 2006).

The changes in land-use and the bed-level response also affected adjacent streambanks and tributaries entering Dry Creek. The systemic incision leading to a post-disturbance equilibrium (Stage IV, above), created a new fluvial and riparian environment, but also increased channel migration and bank erosion. The steep banks created by the (geomorphically) rapid incision were susceptible to failure from toe erosion (erosion at the base of the bank), leading adjacent landowners to armor banks with hard material, such as rip-rap and automobile bodies. USACE added rip-rap bank protection, rock groins, pile walls, and willow planting as bank protection measures, and built drop structures crossing Dry Creek near the Westside Road Bridge to prevent channel degradation (USACE 1984). Tributaries to Dry Creek incised in response to base-level lowering in Dry Creek, much like the incision of Dry Creek in response to base-level lowering in the Russian River. Consequently, tributaries experienced a similar channel evolution and management response as Dry Creek, with incision followed by widening and erosion, bank armoring to protect streambanks, and installation of grade control structures at the mouths of tributaries to prevent headward (upstream) erosion. The geomorphic response by Dry Creek and its tributaries to historical changes in land-use largely subsided by 1984.

Current Condition

The completion of Warm Springs Dam in 1983 further altered the geomorphology of Dry Creek through changes in hydrology and sediment dynamics. The dam decreased flood peaks during high flow months and increased baseflows during low flow months (see Surface Water Hydrology and Drainage discussion above). The hydrology changed from seasonally runoff-based to moderate winter floods, perennial flows, and elevated summer baseflows. The reduced peak flows prevented flooding downstream of the dam, but still maintained the ability to transport sediment supplied from tributaries. Warm Springs Dam interrupted sediment supply from upstream. In alluvial rivers,

reaches downstream of dams typically incise as bed sediment is transported downstream, but is not replaced by sediment from upstream (Kondolf 1997). Tributaries still contribute sediment to Dry Creek, but substantially less than Dry Creek in unregulated conditions. Channel incision in Dry Creek is moderated by the reduction of peak flows, but the current channel configuration is still effective at transporting current sediment load under regulated hydrology.

Regionally, under unregulated conditions, riparian vegetation follows a successional pathway that begins with establishment on gravel bars (willow and cottonwood) and cut banks (alder) near or in contact with the streambed (McBride and Strahan 1984). Willows and cottonwoods dominate initially, but alders eventually dominate as they form a dense canopy that shade other species. As gravel bars grow laterally and horizontally due to deposition of fluvial sediment, rooting distance to ground and surface water increases, shifting species to those better adapted to floodplain and terrace environments. These later successional species, such as walnut, oak, and bay, eventually dominate the upper elevations of geomorphic surfaces once occupied by willow, cottonwood, and alder. The regulated hydrology interrupts this typical riparian succession. The elevated summer baseflows provide a constant water source for early-successional willow, cottonwood, and alders, and the lack of large peak flows prevents sediment deposition and the evolution of gravel bars to floodplains, and terraces. As such, under current conditions, riparian succession in Dry Creek remains in an early stage, dominated by a dense alder community that covers gravel bars and prevents lateral channel migration (Inter-Fluve 2010). Fluvial sediment is sequestered within the densely vegetated gravel bars that also concentrate flow (and velocity) within the channel. The result is a system with little lateral migration and a channel effective at transporting sediment supplied from tributaries (due to consistently high water velocity) despite regulated flow.

The riparian-influenced channel form and regulated flows efficiently transport available sediment (Inter-Fluve 2013). Mobilization of bed sediment supports relatively infrequent, small riffles separated by long homogenous flatwater and pool habitats with high water velocities. Further, the discharge responsible for maintaining channel form is relatively frequent, occurring sub-annually, and of sustained duration, in contrast to large annual peak flows. Inter-Fluve (2013) calculated an effective discharge⁸ of 2,500–3,500 cfs upstream of Peña Creek, approximate to a 2-yr recurrence interval (RI) flow⁹. Downstream of Peña Creek, effective discharge ranged from 700 to 1,500 cfs (<1-yr RI)

⁸ The effective discharge is the discharge that transports the greatest volume of sediment over the long-term (Knighton 1998).

⁹ RI is the reciprocal probability of occurrence in any year. In other words, if a twice bankfull flood is a 50-year recurrence interval (RI) flood, the probability of that flood happening in any one year is $p=1/RI$ or 2%.

at several locations, and approximately 3,000 cfs (approximate to a 2-yr RI flow) near Grape Creek, likely due to sediment input.

Water Quality

Historical Conditions

Prior to the operation of Warm Springs Dam beginning in 1984, Dry Creek was a seasonal, runoff-dependent stream that would periodically experience periods of intermittent flow during the summer and early fall dry season (June through October). When stream flows recede to a point where they become subsurface through gravel bars and shallow riffles, flows are considered intermittent. This can result in the formation of isolated pools between areas of subsurface (intragravel) flow. The effect of reduced flows on water quality conditions, including dissolved oxygen concentrations and temperature, in these isolated pools can be variable and dependent on several elements.

Wind plays an important role in the distribution of dissolved gases by providing the energy to stir the water column (Horne and Goldman 1994). As they splash over rocks, streams are naturally aerated and are usually saturated with oxygen (Horne 1994). In small, turbulent streams that have received only limited pollution, diffusion maintains oxygen near saturation (Allan 1995). However, when surface flows become intermittent, oxygenation processes including diffusion and turbulence are reduced and dissolved oxygen concentrations can decline over time. Groundwater can be very low in dissolved oxygen (Allan 1995). This can result in depressed surface water dissolved oxygen concentrations 'when there are substantial groundwater inputs that have had little opportunity for equilibration with the atmosphere' (Allan 1995). Oxygen gas occurs in the atmosphere and dissolves into water according to partial pressure and temperature (Allan 1995). Increasing temperatures reduce the amount of oxygen that can dissolve into water from the atmosphere. For example, the concentration of dissolved oxygen in saturated pure water at sea level ranges from 14.2 milligrams per liter (mg/L) at 32°F (0°C) to 7.5 mg/L at 86°F (30°C) (Allan 1995). In addition, there are a multitude of chemical and biological processes that can increase or decrease dissolved oxygen levels during a typical daily (diel) cycle, including primary production, predation, and decomposition.

Likewise there are several factors that can affect temperatures in isolated pools including the relative temperature of intragravel and groundwater inflows, the amount of solar exposure, and wind mixing. Water quality data, including temperature data, was collected by the USGS at two gaging stations in Dry Creek before and after the installation and operation of Warm Springs Dam. The USGS data shows that before the installation of the dam, water temperatures in Dry Creek were frequently above levels considered suitable for salmonids between May and October (see **Chapter 3.5**,

Fisheries Resources for a discussion on suitable temperature levels for salmonid species). Historical daily minimum and maximum temperatures recorded at the USGS Dry Creek near Geyserville stream gage (USGS 11465200) between January 1965 and September 1984 show daily maximum water temperatures were observed as high as 83°F (28°C) prior to the installation of Warm Springs Dam (Figure 3.8-8). This stream gaging station is located approximately 3 miles downstream of the current location of Warm Springs Dam. Daily maximum temperatures above 68°F (20°C) typically occurred between the months of May and October on a given year, with seasonal maximums predominantly occurring in the months of June and July, and to a lesser degree August and September.

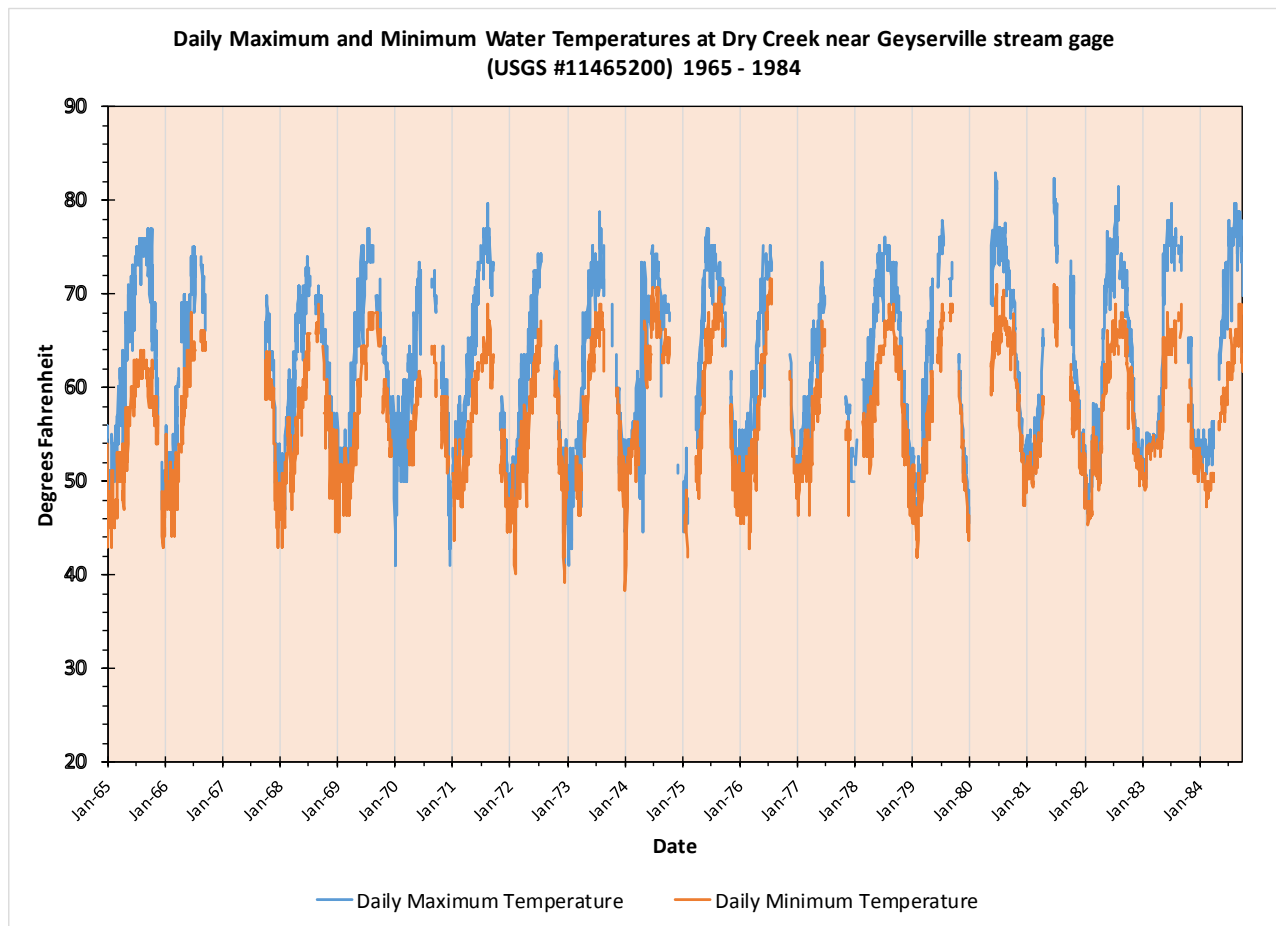


Figure 3.8-8. Daily Maximum and Minimum Water Temperatures at USGS Dry Creek near Geyserville stream gage (USGS 11465200) between January 1965 and September 1984.

Temperature data collected at the USGS Dry Creek Below Warm Springs Dam stream gage (USGS 11465000) between 1982 and 1994 show similar temperature patterns before operation of the dam, followed by a significant reduction in seasonal maximum water temperatures in Dry Creek after the lake was filled in late 1984 to early 1985 and full operation of the dam commenced (Figure 3.8-9). The reduction of seasonal

maximum temperatures in Dry Creek served to increase the dissolved oxygen carrying capacity of the surface water. Similarly, the increase in Dry Creek base flows from regulated reservoir releases and resultant elimination of intermittent flows also increased the ability for oxygen to diffuse into the surface water during the dry season. Current temperature and dissolved oxygen data being collected by USGS in Dry Creek is discussed in the following section.

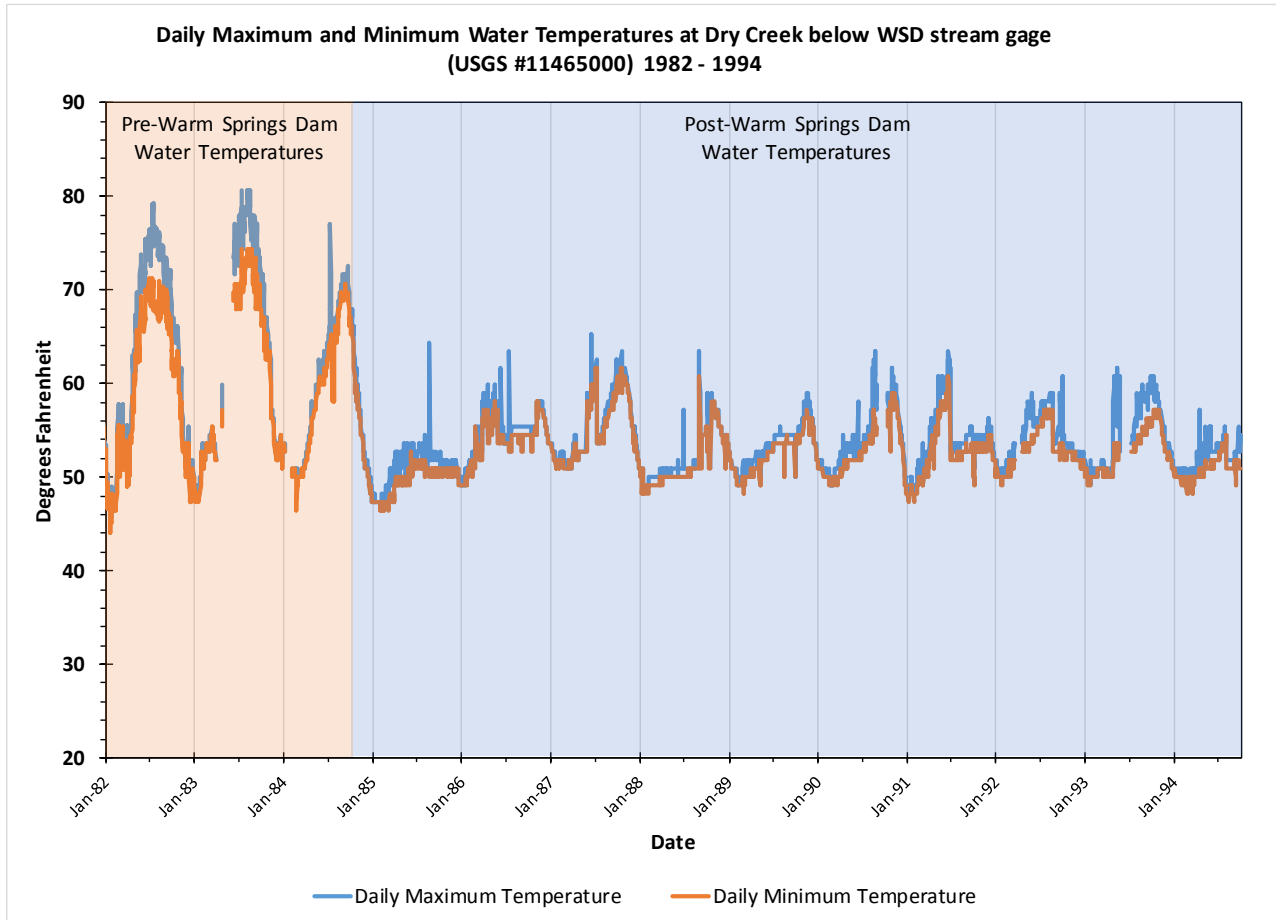


Figure 3.8-9. Daily Maximum and Minimum Water Temperatures at USGS Dry Creek below Warm Springs Dam stream gage (USGS 11465000) between 1982 and 1994.

Current Conditions

Since the completion of Warm Springs Dam and the consequent filling and operation of Lake Sonoma Reservoir, Dry Creek has been transformed into a perennial flowing stream with highly regulated flood flows and dry season base flows. The release of water from Lake Sonoma is not only regulated for flow, but also for temperature. Temperature is regulated by releasing water from the lake through a combination of inlet structures positioned at various depths to provide for water temperatures that are suitable for the Don Clausen hatchery (at Warm Springs Dam) operations for hatching

and rearing steelhead and coho salmon (18 May 2015 email from Ben White at USACE to Jeff Church at SCWA). This results in a consistently cool water source flowing down the length of Dry Creek to the confluence with the Russian River. Temperature data was collected seasonally¹⁰ at the USGS Dry Creek below Lambert Bridge stream gage (USGS 11465240) in 2012, 2013, and 2014 and maximum temperatures were observed to range from approximately 54°F (12°C) to 62°F (17°C) during those monitoring seasons (Figure 3.8-10). Temperature data was generally recorded every 15 minutes during the monitoring season.

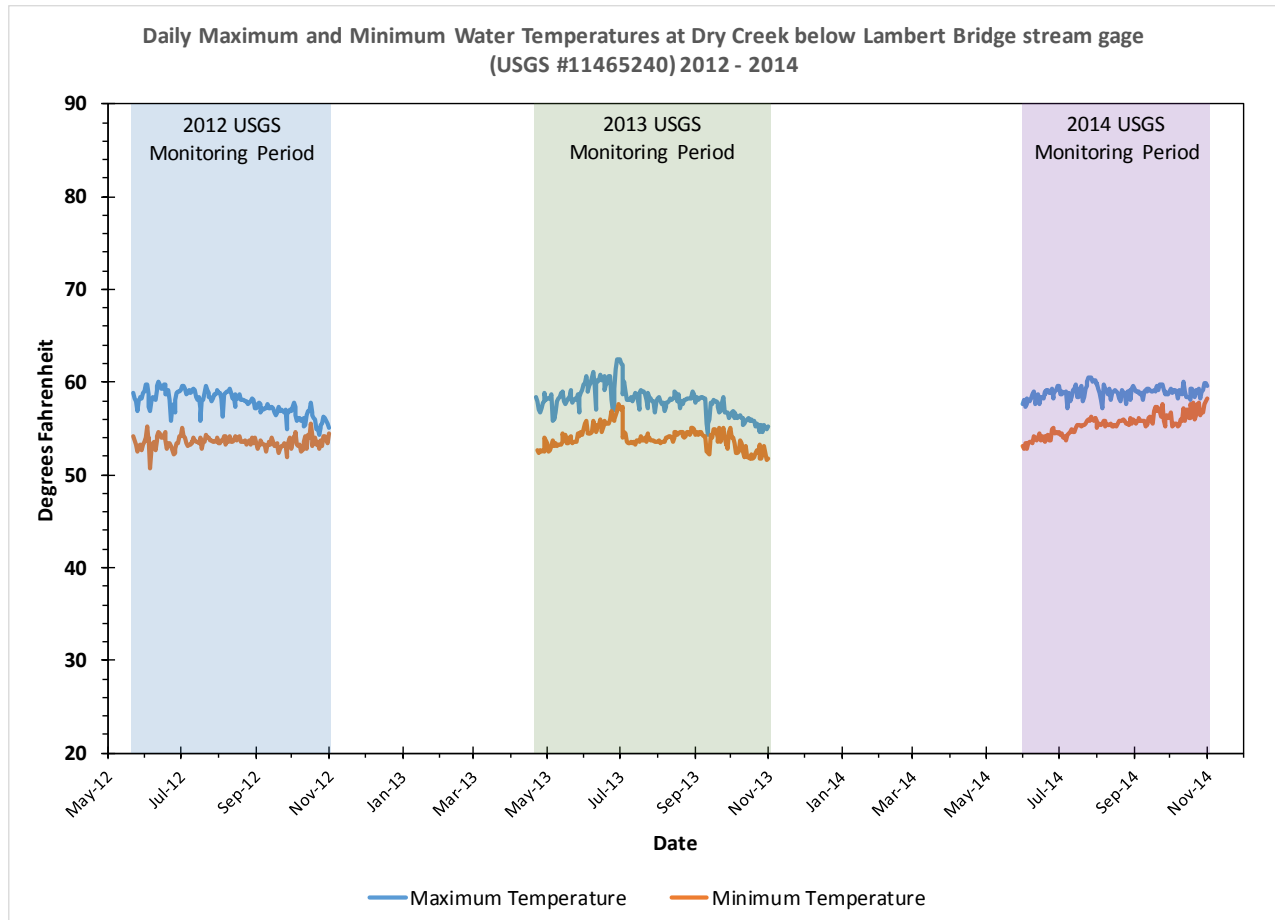


Figure 3.8-10. Daily Maximum and Minimum Water Temperatures at USGS Dry Creek below Lambert Bridge stream gage (USGS 11465240), collected seasonally between 2012 and 2014.

Current temperatures in Dry Creek compared to pre-dam conditions allow for higher concentrations of dissolved oxygen to be contained within the water column during the warmer dry season months. Consequently, dissolved oxygen data collected at Dry

¹⁰ The period of record for the seasonal water quality data collected at the USGS Dry Creek below Lambert Bridge stream gage varied from year to year based on environmental conditions, but generally occurred during the dry season of a given year.

Creek below Lambert Bridge stream gage had concentrations that ranged between approximately 8.8 mg/L to 12.2 mg/L from May through October for the years 2012 through 2014 (Figure 3.8-11). Dissolved oxygen data is also generally recorded every 15 minutes at this stream gage. Dissolved oxygen concentrations of at least 7mg/L are typically considered suitable for rearing salmonids (see **Chapter 3.5, Fisheries Resources** for a full discussion on suitable dissolved oxygen levels for salmonid species).

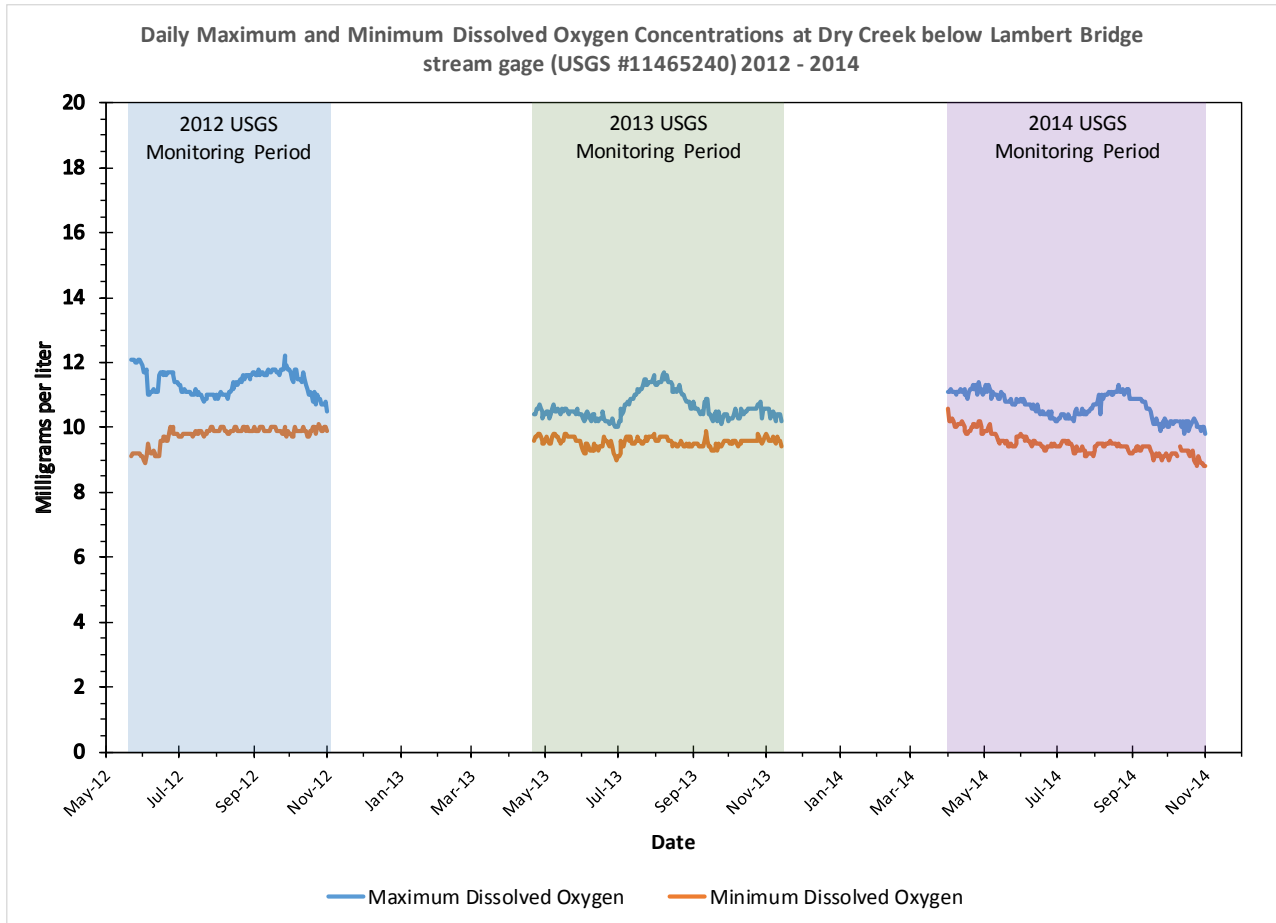


Figure 3.8-11. Daily Maximum and Minimum Dissolved Oxygen Concentrations at USGS Dry Creek below Lambert Bridge stream gage (USGS 11465240), collected seasonally between 2012 and 2014.

Suspended sediments can affect temperature and dissolved oxygen concentrations, which in turn can affect the availability of suitable salmonid habitat. Suspended sediment causes a range of environmental damage, including benthic smothering, irritation of fish gills, and transport of sorbed materials (Davies-Colley and Smith 2001). The term “suspended and settleable solids” is descriptive of the organic and inorganic particulate matter in water (USEPA 1986). Water clarity can be affected by releases of solids into a stream course and by the disturbance of sediments within the stream from streambed alteration or modification activities. Turbidity is a measurement of the clarity

of the water column and more turbid conditions are generally associated with elevated levels of suspended and settleable solids in the water column. The USGS has been collecting turbidity data along with temperature and dissolved oxygen data at Dry Creek below Lambert Bridge stream gage since 2012. Seasonal turbidity data collected at Dry Creek below Lambert Bridge stream gage in 2012 and 2013 were observed to have a maximum daily value of 5.4 Nephelometric turbidity units (NTU) and 6.8 NTU, respectively, whereas the maximum daily value observed in 2014 was 110 NTU (Figure 3.8-13).

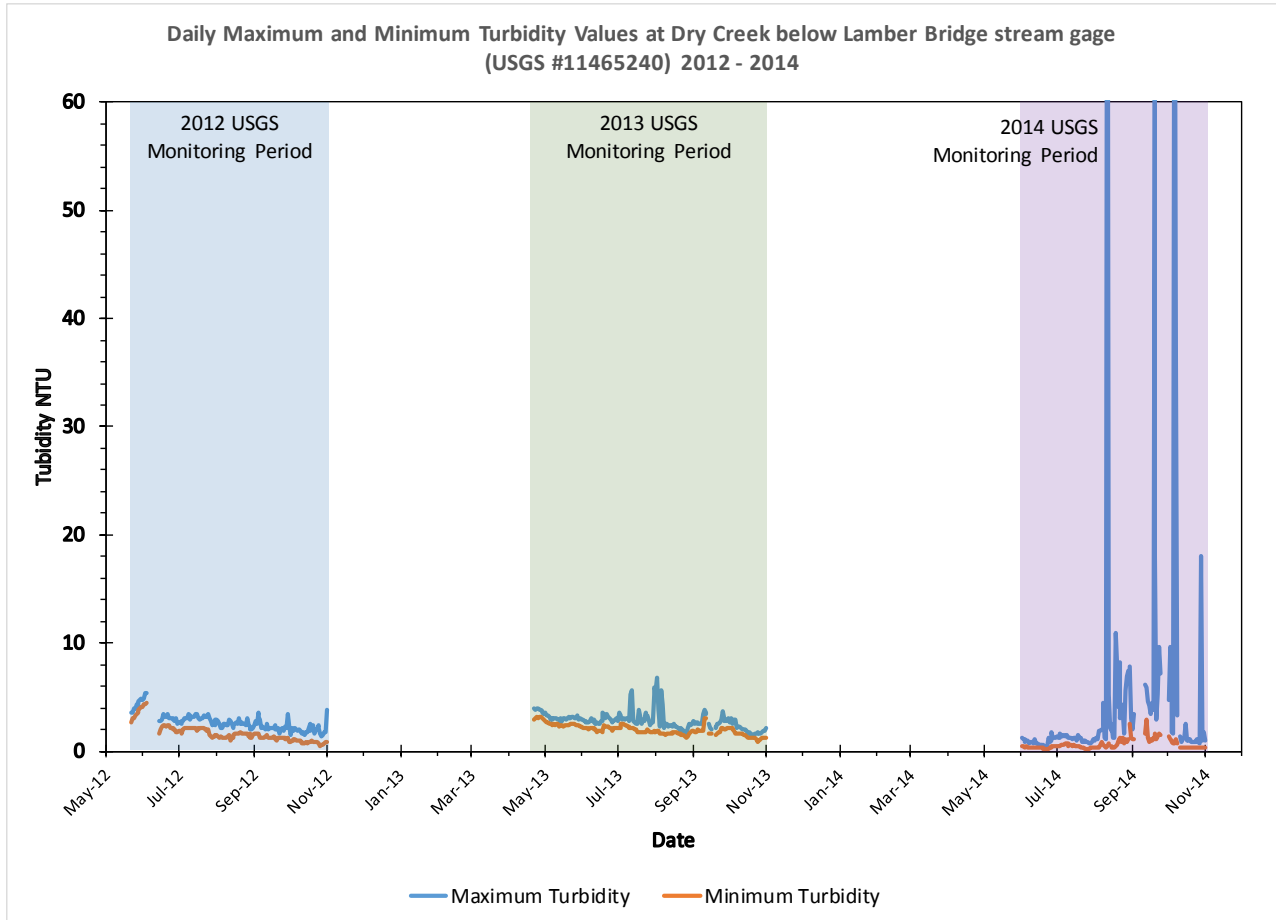


Figure 3.8-12. Daily Maximum and Minimum Turbidity values at USGS Dry Creek below Lambert Bridge stream gage (USGS 11465240) between 2012 and 2014.

The 2014 maximum daily turbidity value of 110 NTU was recorded on 11 August and occurred during Water Agency construction activities on the Dry Creek Habitat Enhancement Demonstration Project (Demonstration Project) that was required by the Biological Opinion. Overall, there were several days between June and October with elevated turbidity levels that occurred during Demonstration Project construction activities in 2014 (Figure 3.8-12). These elevated turbidity levels during construction were generally associated with times when creek flow was initially reintroduced back

into a habitat feature area after it was constructed. Although daily maximum values were significantly higher in 2014 than in 2012 or 2013, during which time construction of the Demonstration Project also occurred, these elevated values were associated with brief spikes that typically lasted several minutes to a few hours. For example, whereas the maximum value on 11 August was 110 NTU, the median value for the day was 3.0 NTU, and the minimum value was 0.5 NTU (Figure 3.8-13). Similarly, during Habitat Enhancement activities on 19 September, the maximum daily value was 72 NTU, the median value was 3.6 NTU and the minimum value was 1.1 NTU. Likewise on 6 October, the maximum daily value was 92 NTU, whereas the median value was 1.2 NTU and the minimum daily value was 0.8 NTU (Figure 3.8-13). By contrast, the highest daily median value recorded during the 2014 season was 4.1 NTU on 13 September, when the daily maximum was only 5.9 NTU (Figure 3.8-13).

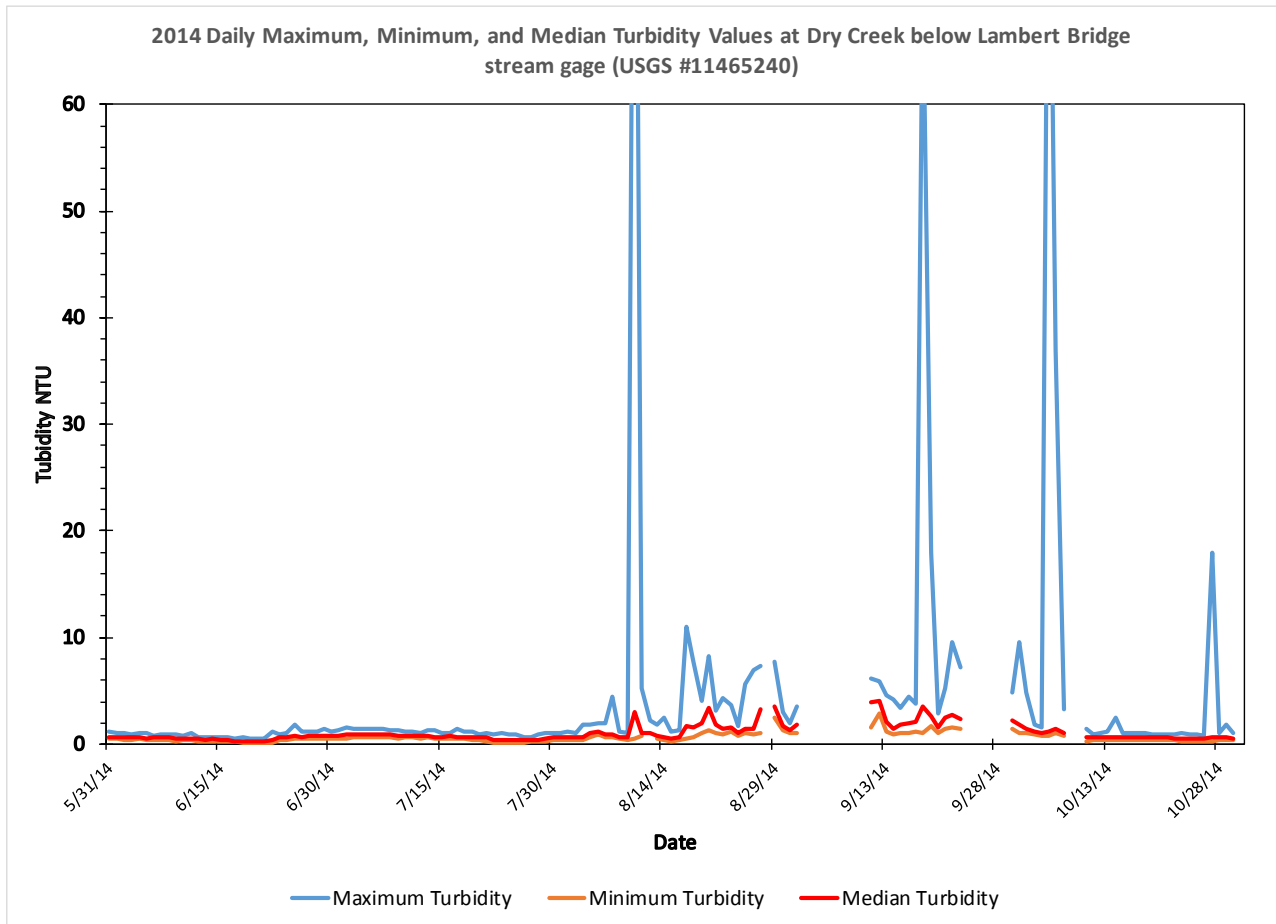


Figure 3.8-13. Daily Maximum, Minimum, and Median Turbidity values at USGS Dry Creek below Lambert Bridge stream gage (USGS 11465240) between 2012 and 2014.

During these brief spikes in turbidity, temperatures and dissolved oxygen concentrations at the stream gage were observed to remain consistent with temperature and dissolved oxygen concentrations being recorded before and after Demonstration Project

construction activities (Figures 3.8-14 and 3.8-15). Temperature and dissolved oxygen concentrations in 2014 also remained consistent with seasonal concentrations recorded during 2012 and 2013 (Figures 3.8-10 and 3.8-11).

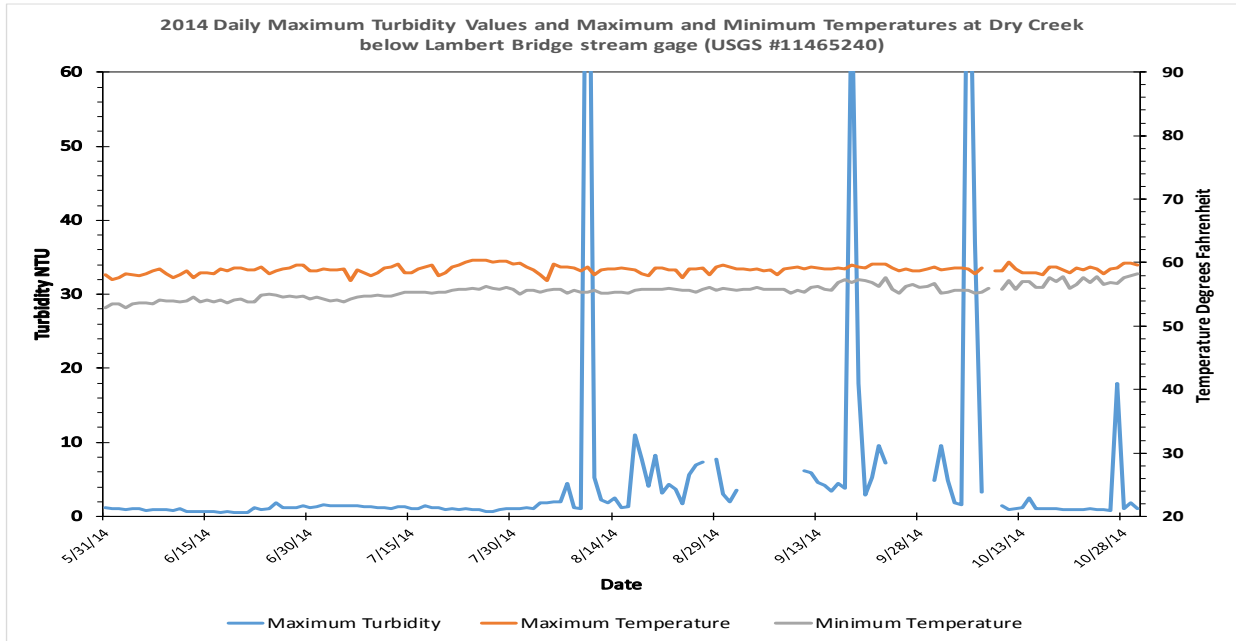


Figure 3.8-14. Daily Maximum Turbidity values and Maximum and Minimum Temperatures at USGS Dry Creek below Lambert Bridge stream gage (USGS 11465240) between 2012 and 2014.

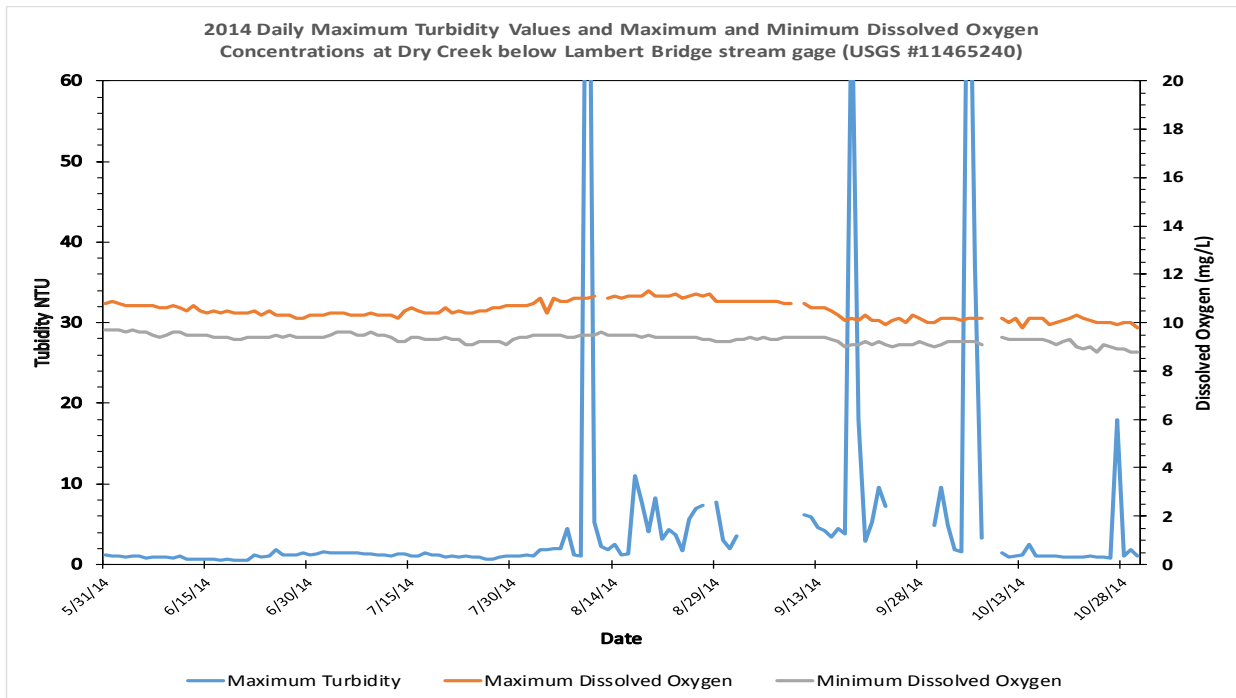


Figure 3.8-15. Daily Maximum Turbidity values and Maximum and Minimum

Dissolved Oxygen Concentrations at USGS Dry Creek below Lambert Bridge stream gage (USGS 11465240) between 2012 and 2014.

Study Reach and Feasibility Segment Delineation

Study Reaches

Identification of study reaches in Dry Creek generally followed the protocol for stream segment identification developed by the State of Washington's Timber, Fish and Wildlife Program (Pleus and Schuett-Hames 1998). Delineation of study reaches relied on geomorphic parameters (relative drainage area, channel gradient and channel confinement) and non-fluvial features (e.g. structures such as bridges). Inter-Fluve (2013) delineated preliminary study reaches, then performed a field verification to make adjustments as appropriate. The delineation identified 16 reaches with an average length of 0.9 miles (**Figure 3.8-16**).

In addition to the study reaches, Inter-Fluve (2010) also identified and described three primary feasibility segments (Upper, Middle, and Lower segments as described in **Chapter 2, Project Description**).

Upper Segment

The Upper Segment does not receive significant sediment or hydrologic inputs from tributaries and is the most affected by regulation.

Middle Segment

The Middle Segment receives water and sediment from tributaries that partially offset flow regulation impacts.

Lower Segment

The Lower Segment receives sediment and water contributions from tributaries, partially offsetting flow regulation impacts (Inter-Fluve 2010).

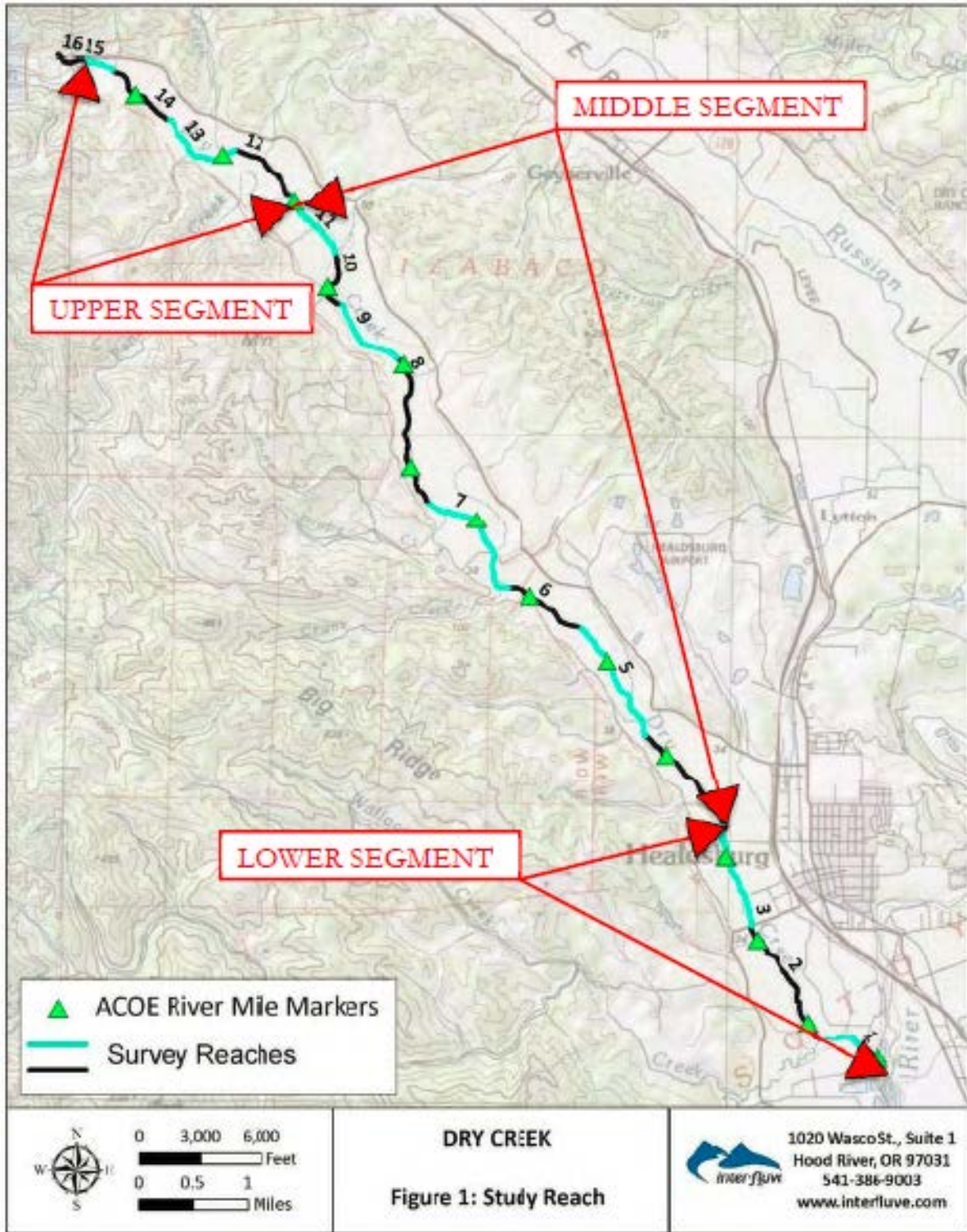


Figure 3.8-16. Dry Creek Study Reaches and Feasibility Segments

3.8.3 Regulatory Framework

Federal Regulations

Federal Clean Water Act

The U.S. Environmental Protection Agency (USEPA) is the federal agency responsible for water quality management. The USEPA administers the federal Water Pollution Control Act Amendments of 1972 and 1987, collectively known as the Clean Water Act (CWA) (Clean...2011). The CWA establishes the principal federal statutes for water quality protection. It was established with the intent “to restore and maintain the chemical, physical, and biological integrity of the nation’s water, to achieve a level of water quality which provides for recreation in and on the water, and for the propagation of fish and wildlife.” Several key sections of the CWA apply to the regulation of water pollution in the United States.

Section 208 Water Quality Control Plans.

This section requires the preparation of local water quality control plans by regulatory agencies throughout the nation. Each water quality control plan covers a defined drainage area. The primary goal of each water quality control plan is to attain water quality standards established by the CWA and the state governments within the defined area of coverage. Minimum content requirements, preparation procedures, time constraints, and federal grant funding criteria pertaining to the water quality control plans are established in Section 208 of the CWA. Preparation of water quality control plans has been delegated to the individual states by the USEPA.

Section 303(d) Impaired Watersheds.

This section of the CWA requires the designation of “impaired waterbodies” be applied to any watershed exceeding specified thresholds for various pollutants or water temperatures. The Russian River is listed as an impaired waterbody because of sedimentation and elevated temperatures (NCRWQCB 2010).

Section 319 Nonpoint Source Management Program.

This section of the CWA establishes a national program to control nonpoint sources of water pollution through the development of assessment reports, adoption of management programs, and implementation of those management programs. The USEPA awards grants to states to assist them in implementing the nonpoint source pollution management programs (Nonpoint...2010).

Section 401 Water Quality Certifications.

This section of CWA requires that, prior to the issuance of a federal license or permit for an activity or activities that may result in a discharge of pollutants into navigable waters (see Section 404 discussed below), the permit applicant must first obtain a certification

from the state in which the discharge would originate. A state certification indicates that the proposed activity or activities would not result in a violation of applicable water quality standards established by federal or state law, or that there are no water quality standards that apply to the proposed activity.

Section 402 National Pollutant Discharge Elimination System (NPDES).

This section requires permits for pollution discharges into water bodies such that the permitted discharge does not cause a violation of federal and state water quality standards. NPDES permits define quantitative and/or qualitative pollution limitations for the permitted source, and control measures that must be implemented to achieve the pollution limitations. Pollution control measures are often referred to as Best Management Practices (BMPs).

Section 404 Discharge of Dredge and Fill Material.

Section 404 of the CWA assigns the USACE with permitting authority for proposed discharges of dredged and fill material into waters of the United States, defined as "...waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; territorial seas and tributaries to such waters." Section 404 is applicable to projects in which fill material would be placed within or below the ordinary high water mark of a stream. Any project requiring a 404 permit also requires a Section 401 water quality certification (discussed above).

Federal regulations 40 CFR 131.38 (CA Toxics Rule).

This section of the CWA promulgates criteria for priority toxic pollutants in the State of California for inland surface waters and enclosed bays and estuaries. This regulation establishes two numerical criteria for a substantial list of constituents: Criteria Maximum Concentration (CMC) and Criteria Continuous Concentration (CCC). CMC equals the highest concentration of a pollutant to which aquatic life can be exposed for a short period of time without deleterious effects. CCC equals the highest concentration of a pollutant to which aquatic life can be exposed for an extended period of time (4 days) without deleterious effects.

National Flood Insurance Program

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program. FEMA has completed Flood Insurance Rate Maps that identify Special Flood Hazard Areas in Sonoma County. There are no 100-year flood zones designated by FEMA or any other entity within or adjacent to the project area.

State Regulations

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Porter-Cologne...2014) requires that “any person discharging waste, or proposing to discharge waste, within any region that could affect the waters of the State to file a report of discharge” with the Regional Water Quality Control Board (RWQCB) through an application for waste discharge (Waste...2014). The term “waters of the State” is defined as any surface water or groundwater, including saline waters within the boundaries of the state. It should be noted that pursuant to the Porter-Cologne Water Quality Control Act, the RWQCB also regulates “isolated wetlands” or those wetlands considered to be outside of USACE jurisdiction.

State Water Resources Control Board

The State Water Resources Control Board (SWRCB) and the local RWQCBs are responsible for ensuring implementation and compliance with the provisions of the federal CWA and California’s Porter-Cologne Water Quality Control Act. While the Corps administers permitting programs that authorize impacts to waters of the United States, including wetlands, and other waters, any USACE permit authorized for a proposed project would be invalid unless it is a Nationwide Permit (NWP) that has been certified for use in California by the SWRCB, or if the RWQCB has issued a project specific certification or waiver of water quality. Certification of NWP requires a finding by the SWRCB that the activities permitted by the NWP will not violate water quality standards individually or cumulatively over the term of the issued NWP (typically a 5-year term). Certification must be consistent with the requirements of the federal CWA, CEQA, California Endangered Species Act (CESA), and the SWRCB’s mandate to protect beneficial uses of waters of the state. Any denied (i.e., not certified) NWPs, and all Individual Corps permits, would require a project-specific RWQCB CWA 401 certification or waiver of water quality certification.

Regional Water Quality Control Board - North Coast Region

The Project Area is situated within the jurisdiction of the North Coast Regional Water Quality Control Board (NCRWQCB). The NCRWQCB has the authority to implement water quality protection standards through the issuance of permits for discharges to waters at locations within its jurisdiction. Responsibilities of the NCRWQCB are discussed below.

Water Quality Control Plan for the North Coast Region

Water quality objectives for the Russian River and its tributaries are specified in the Water Quality Control Plan for the North Coast Region Basin Plan (Basin Plan) prepared by the NCRWQCB in compliance with the federal CWA and the Porter-Cologne Act (NCRWQCB 2011).

The Basin Plan, updated by the NCRWQCB in 2011, provides a program of actions designed to preserve and enhance the water quality and to protect beneficial uses of water in the North Coast regions, and sets the numeric water quality objectives for the Russian River (NCRWQCB 2011). Among these objectives are parameters for suspended material, settleable material, sediment, and turbidity. Furthermore, water quality objectives set forth in the Basin Plan include a range of pH between 6.5 and 8.5, stream dissolved oxygen levels over 7.0 mg/L, a turbidity level that does not exceed 20 percent of background levels (levels not established (NCRWQCB 2011)). Because the project area is located within the NCRWQCB's jurisdiction, all discharges to surface water or groundwater are subject to the Basin Plan requirements.

Total Maximum Daily Load (TMDL)

The NCRWQCB implements the TMDL program for each watershed within its jurisdiction. The Russian River Pathogen Indicator Bacteria TMDL is currently being prepared by the NCRWQCB (State Water Resources Control Board 2015). The term TMDL is used by the NCRWQCB and the EPA to identify, on a stream-specific basis, pollutant limitation standards. The technical definition of a TMDL is the "sum of the individual wasteload allocations for point sources, load allocations for nonpoint sources and natural background pollutants, and an appropriate margin of safety ." TMDLs serve to identify impaired water bodies, determine the sources of this impairment, and implement mitigation measures to reduce those sources and remove impairments.

California Department of Water Resources (CDWR)

The CDWR is the state agency responsible for managing California's water resources, including conducting technical studies of surface water and groundwater in cooperation with local agencies, overseeing certain flood prevention and floodplain management programs, and developing and implementing water conservation and efficient water use strategies and programs in cooperation with local agencies. CDWR historically had the responsibility for overseeing the preparation of Groundwater Management Plans (Department of Water Resources 2012). With the enactment of the 2014 Sustainable Groundwater Management Act (SGMA), there was a recognition that groundwater management in California is best accomplished locally. However, the SGMA does require that groundwater management in defined groundwater basins or subbasins designated by CDWR as either high or medium priority would be mandatory under the SGMA and requires the formation of Groundwater Sustainability Agencies which must develop Groundwater Sustainability Plans. The Dry Creek Valley area is designated as very low priority (CDWR 2015)

National Pollutant Discharge Elimination System (NPDES) Program

The SWRCB and the nine RWQCBs in California implement the state and federal clean water laws, including the NPDES permitting process. This program regulates point source discharges from industrial, municipal, and other facilities if their discharges go

directly to surface waters. In 1987, the NPDES program also began a phased approach to addressing non-point source pollution from streets, parking lots, construction sites, homes, businesses, and other sources.

Under Phase I of the NPDES stormwater program, all medium separate storm sewer systems (serving a population of 100,000 to 249,000) and large separate storm sewer systems (serving a population of 250,000 or more) are required to obtain a municipal permit. Under Phase II of the program, small storm sewer systems are also required to obtain coverage under a Regional Board-issued permit. A small storm sewer system is defined as an unpermitted municipal separate storm sewer system located in an urbanized area with a population of 50,000 and a population density of 1,000 per square mile. In Sonoma County, only the City of Santa Rosa is covered by a Phase I permit, and the urban areas within and around Rohnert Park, Cotati, Sebastopol, Healdsburg, Windsor, Petaluma, and Sonoma are covered by Phase II permits.

The NPDES permit program also affects construction sites that disturb one acre or more. Under the Phase I NPDES stormwater program, construction sites that are larger than five acres are required to obtain a General Construction Activity Stormwater Permit. Under the Phase II NPDES program, construction sites disturbing one to five acres of land are also required to obtain coverage under the General Construction Activity Stormwater Permit. Permit applicants are required to prepare a Stormwater Pollution Prevention Plan (SWPPP), implement construction-related BMPs, monitor discharges, and implement post-construction BMPs. As of July 1, 2010, an updated Construction General Permit (State Water Resources Control Board permit 2009-0009-DWQ, amended by 2010-0014-DWQ) became effective; substantially modifying the previous permit by requiring significant effort to ensure compliance (U.S. Environmental Protection Agency 2015).

The NPDES program is the basis for the County's Storm Water Quality Ordinance (Chapter 11A Sonoma County Code). Violations are considered misdemeanors and public nuisances and may be subject to court orders, fines, and reimbursement of County costs and damages.

Local Regulations

Sonoma County General Plan

The proposed project is located within the jurisdiction of *Sonoma County General Plan 2020* (PRMD 2008). Please refer to Section 3.6.5, "General Plans and Consistency" for a detailed discussion of goals, policies, and objectives related to geology, soils, and minerals that are applicable to the Project.

Sonoma County Stormwater Quality Ordinance

Chapter 11A, Stormwater Quality, (Sonoma County Code Chapter 11A) of the Sonoma County Code adopted December 12, 2009 re-designates and amends the former Chapter 11 of the County Code, entitled Drainage and Stormwater Management. The purpose of this ordinance is to protect and enhance the water quality of the County's watercourses pursuant to and consistent with the Federal CWA and the conditions set forth by the NPDES as requirements for stormwater discharge permits (Chapter 11A Sonoma County Code).

Sonoma County Permit and Resource Management Department (PRMD)

The Sonoma County PRMD is responsible for issuing groundwater well permits in unincorporated areas of the County. The well permitting process varies depending on the availability of groundwater at the location of the proposed well. A four-tiered classification system is used to indicate general areas of groundwater availability:

- Class I includes Major Groundwater Basins;
- Class II includes the Major Natural Recharge Areas;
- Class III includes the Marginal Groundwater Availability Areas; and
- Class IV includes Areas with Low or High Variable Water Yield.

For proposed non-agricultural wells located in Class III and Class IV areas, applicants are required to provide proof of adequate groundwater yields to meet the proposed domestic or commercial uses by means of a geologic report. Provided they meet certain minimum County and state requirements for construction, agricultural well permits are granted, generally without further technical review. However, agricultural well permits may be associated with other aspects of an agriculturally related project, such as processing or visitor-serving use. Such uses are typically subject to discretionary project review and permit approval process, including the review of the proposed well construction and operational details. Discretionary permits are not granted unless the geologic report establishes that groundwater supplies in the vicinity of the proposed well are adequate and will not be adversely impacted by anticipated future land uses and development.

3.8.4 Environmental Impacts and Mitigation Measures

Approach to Analysis

The hydrology and water quality impact assessment relied on a qualitative evaluation of potential changes to surface water conditions (including existing water quality, natural drainage patterns, and flooding hazards) under the Dry Creek Project.

This EIR includes program- and project-level analysis. The locations of proposed program-level components have not yet been identified however, due to the general uniformity of the riparian zone in Dry Creek and the similarity in types of enhancements proposed for Miles 2–3 and 4–6, the potential impacts are combined for project-level and program-level analysis.

The impact analysis includes consideration of impacts associated with construction, operation, and maintenance activities. The majority of the ground disturbance would take place during the construction phase of the proposed project and it is anticipated that maintenance activities would primarily consist of vegetation management. However, there is a possibility that maintenance activities would also include activities similar to construction, such as repair to damaged structures or adjustments to structures if they are not functioning properly. Therefore, maintenance activities are considered alongside construction activities in terms of their potential for impact in the analysis below.

Significance Criteria

The criteria used to determine the significance of an impact are based on the environmental checklist in Appendix G of the CEQA Guidelines. For this analysis, implementation of the proposed Dry Creek Project would be considered to have a significant impact associated with hydrology and water quality if it would:

1. Violate any water quality standards or waste discharge requirements;
2. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)
3. Substantially alter the existing drainage pattern of a site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or sedimentation on- or off-site, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;
4. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;

5. Otherwise degrade water quality
6. Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
7. Place within a 100-year flood hazard area structures which would impede or redirect flood flows;
8. Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam; or
9. Contribute to inundation by seiche, tsunami, or mudflow.

Impacts and Mitigation Measures

The following section presents a detailed discussion of potential impacts associated within hydrology and water quality resources resulting from the Dry Creek Project. Both program-level and project-level project components are analyzed. Impacts are summarized and categorized as either “less than significant,” “less than significant with mitigation,” or “significant and unavoidable.” Impacts are also identified as applicable to construction, operation, and/or maintenance phases of the project.

Impact 3.8.1. Construction of the Dry Creek Project could alter drainage patterns that could result in substantial erosion or sedimentation on- or off-site. (Less than Significant with Mitigation)

Combined Analysis for Miles 2–3 and Miles 4–6

Three of the enhancement tools to create habitat as part of the Dry Creek Project rely on altering the existing drainage pattern. Backwater channels, alcoves, and side channels are off-channel features that maintain a surface water connection to the main channel at the downstream end (Figures 2.3 through 2.5 from **Chapter 2.0, Project Description**). Alcoves are depressional features adjacent to the channel typically connected to the mainstem at the downstream end (ESA-PWA 2014a). Side channels carry flows from the mainstem through adjacent floodplain areas before reconnecting downstream. The bottom grades of backwater channels, alcoves, and side channels would be constructed 4 feet below the summer water surface elevations to maintain a perennial surface water connection. In Dry Creek, these enhancement tools would be targeted to reaches with locally wide floodplains to accommodate the features and to ensure lower water velocities. Construction of these features has the potential to impact water quality but the implementation of **Mitigation Measures 3.8.1a-3.8.1d** would reduce that impact to a less-than-significant level.

Mitigation Measure 3.8.1a: Construction of all enhancement features, including backwater channels, alcoves, and side channels, will occur during the dry season, typically from June 15 to October 15, except in cases when permission is granted from permitting agencies to work beyond this time frame. Upon prediction or recognition of a storm during the work period, the work site would be prepared following appropriate best management practices (BMPs) such as those included in California Department of Transportation's *Construction Site Best Management Practice (BMP) Field Manual and Troubleshooting Guide (Caltrans' BMP Guide)* that specify construction rules to prevent excessive erosion.

Mitigation Measure 3.8.1b: If required by the NCRWQCB, the Water Agency will file a Notice of Intent prior to construction, direct the contractor to develop and implement a SWPPP. Typically, SWPPPs include the following elements:

- Source identification;
- Site map;
- Description of construction materials, practices, and equipment storage and maintenance;
- List of pollutants likely to contact stormwater;
- Estimate of the construction site area and percent impervious area;
- Erosion and sedimentation control practices, including soil stabilization, revegetation, and runoff control to limit increases in sediment in stormwater runoff, such as detention basins, straw bales, silt fences, check dams, geofabrics, drainage swales, and sandbag dikes;
- Proposed construction dewatering plans;
- List of provisions to eliminate or reduce discharge of materials to stormwater;
- Description of waste management practices;
- Spill prevention and control measures;
- Maintenance and training practices; and
- Sampling and analysis strategy and sampling schedule for discharges from construction activities.

Mitigation Measure 3.8.1c: In locations where construction would take place in the creek and could result in excess sediment delivery to Dry Creek that may increase turbidity, the contractor will divert the stream around work zones and/or dewater active work zones during construction. Methods to divert water around the work zone could include temporary pipes and culverts, and lined open bypass channels. Methods to dewater the work zones could include using sheet piling to isolate a discrete portion of the active channel from which water is

removed using high capacity pumps. Turbidity curtains will be used as appropriate to separate in-channel work areas from the main channel.

Mitigation Measure 3.8.1d: Best Management Practices (BMPs) such as those included in the California Department of Transportation's *Construction Site Best Management Practice (BMP) Field Manual and Troubleshooting Guide* will be incorporated into project specifications to stabilize soil and prevent erosion in areas where construction activities result in exposed soil. These may include the following:

- Erosion control techniques such as silt fencing, desilting basins, sediment traps, check dams, fiber rolls, gravel bag berms, street sweeping and vacuuming, sandbag barriers, and straw bale barriers will be employed as appropriate.
- Soil exposed during construction activities will be reseeded and revegetated and erosion control fabric will be used to prevent erosion.
- Erosion control fabric, hydromulch, or other mechanisms will be applied as appropriate to provide protection to seeds, hold them in place, and help retain moisture.
- If soil moisture is deficient, new vegetation will be supplied with supplemental water until vegetation is firmly established.
- Revegetation shall be regularly monitored for survival until minimum survival/cover is achieved.
- The final revegetation plan will include details regarding planting, implementation, maintenance, and monitoring.

Impact Significance: Less than Significant with Mitigation.

Impact 3.8.2. Operation and maintenance of the Dry Creek Project could alter drainage patterns that could result in substantial erosion or sedimentation on- or off-site. (Less than Significant)

Combined Analysis for Miles 2–3 and Miles 4–6

A primary challenge to the longevity of backwater channels, alcoves, and side channels is nuisance sedimentation. Based on repeat observations of backwater habitats in Dry Creek, assessment of the response of these habitats to high flow events, and monitoring of constructed side channels on other streams, Inter-Fluve (2013) developed considerations to inform design backwater channels, alcoves, and side channels on Dry Creek (**Table 3.8-6** and **Table 3.8-7**). They found that backwater channels and alcoves with upstream ends located a moderate distance from the active channel, and/or with a section of hydraulically rough floodplain between the upstream channel and the habitat showed substantially less nuisance sedimentation. Inter-Fluve (2013) also suggested that side channel inlet and outlets should not be located in depositional zones (e.g.,

riffles), the inlet alignment should be oblique to the upstream main channel alignment, and that sediment competency should be balanced with the main channel to prevent nuisance sedimentation. Following these considerations would potentially increase the longevity of the backwater channels, alcoves, and side channels. Concept designs show that these considerations will be followed by the Water Agency for Miles 2–3 (ESA-PWA 2014a, 2014b; Inter-Fluve 2014a, 2014b, 2014c).

Natural geomorphic processes of sediment scour and deposition will occur throughout the project area, including backwater channels, alcoves, and side channels. The amount of scour and deposition will likely vary by feasibility segment (upper, middle, or lower) as these segments are defined by differences in sediment and water flux, but the overall reactivation of these geomorphic processes is expected to increase the longevity of constructed features and allow Dry Creek to create similar, natural features. Nuisance sedimentation of off-channel features is likely to occur as these areas are intended to create areas of low water velocity (hydraulic refuge) for juvenile coho salmon and steelhead. Lower water velocity in these areas will encourage sediment deposition within backwater channels, alcoves, and side channels, potentially leading to increases in bed elevation that disconnect the feature from the low-flow channel. This potential sedimentation is a design consideration that can be anticipated and is not considered an impact of or to the project.

Impact Significance: Less than Significant.

Impact 3.8.3. Construction, operation, and/or maintenance of the Dry Creek Project could alter drainage patterns to substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. (Less than Significant)

Combined Analysis for Miles 2–3 and Miles 4–6

Construction

Three of the enhancement tools to create habitat as part of the Dry Creek Project rely on altering the existing drainage pattern. Backwater channels, alcoves, and side channels are off-channel features that maintain a surface water connection to the main channel at the downstream end (see **Figures 2.3, 2.4, and 2.5** in **Chapter 2.0, Project Description**). The bottom grades of backwater channels, alcoves, and side channels would be constructed 4 feet below the summer water surface elevations to maintain a perennial surface water connection. In Dry Creek, these enhancement tools would be targeted to reaches with locally wide floodplains to accommodate the features and to ensure lower water velocities.

Construction of all enhancement features, including backwater channels, alcoves, and side channels will typically occur from June 15 to October 15, during water supply and

minimum flow releases from Warm Springs Dam. Construction would not occur during typically wet months (94% of rainfall occurs from October to April), and would not occur during storms leading to substantial runoff.

Construction activities associated with backwater channels, alcoves, and side channels would not create impervious surfaces that increase runoff on- or off-site. Preparation of work areas will follow appropriate BMPs that reduce runoff from exposed, non-vegetated surfaces, including placement of geotextile fabric and bio-logs to increase infiltration and impede runoff. With construction rules and implementation of BMPs, this impact would be less than significant.

Operation and Maintenance

Vegetation management, including the establishment of new native plantings adjacent to newly created off-channel habitats is one of the enhancement tools of the Dry Creek Project. While new native plantings would be primarily for ecological reasons, such as sediment filtering, shade, and to suppress invasive species, they would also maintain and potentially increase the infiltration capacity of off-channel habitat enhancement sites, reducing surface runoff that may lead to flooding on-or off-site. This impact would be less than significant.

Impact Significance: Less than Significant.

Impact 3.8.4. Construction, operation, and/or maintenance of the Dry Creek Project could create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. (Less than Significant)

Combined Analysis for Miles 2–3 and Miles 4–6

Construction

Construction of all enhancement features (backwater channels, alcoves, side channels, logjams, riffles, pool enhancements, and constructed streambanks) will typically occur from June 15 to October 15, during water supply and minimum flow releases from Warm Springs Dam. Construction would not occur during typically wet months (94% of rainfall occurs from October to April), and would not occur during storms leading to substantial runoff that may enter stormwater drainage systems..

Construction activities would not create impervious surfaces that increase runoff on- or off-site. Preparation of work areas will follow generally established erosion control BMPs for construction activities to reduce runoff from exposed, non-vegetated surfaces, including mulching, placement of geotextile fabric and bio-logs to increase infiltration and impede runoff. With construction rules and implementation of BMPs, this impact would be less than significant.

Operation and Maintenance

Vegetation management, including the establishment of new native plantings adjacent to newly created on- and off-channel habitats is one of the enhancement tools of the Dry Creek Project. While new native plantings would be primarily for ecological reasons, such as sediment filtering, shade, and to suppress invasive species, they would also maintain and potentially increase the infiltration capacity of on- and off-habitat enhancement sites, reducing surface runoff that could enter stormwater drainage systems. Implementation of the Dry Creek Project would not result in increased runoff as no impervious surfaces would be constructed. This impact would be less than significant.

Impact Significance: Less than significant.

Impact 3.8.5: Construction, operation, and/or maintenance of the Dry Creek Project could place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map. (Beneficial Impact)

Combined Analysis for Miles 2–3 and Miles 4–6

Construction of the Dry Creek Project would not alter the mapped 100-year flood hazard areas. The proposed project would include bank stabilization as well as the creation of backwater channels, alcoves, and other features that would reduce water velocity and may result in improved flood capacity for Dry Creek. As such, operation of the proposed project would not increase flood risk for people or structures and may provide flood-related benefits for the adjacent areas, such as reducing potential for bank loss or damage resulting from high flow events.

Impact Significance: Beneficial Impact

Impact 3.8.6: Construction, operation, and/or maintenance of the Dry Creek Project could place structures within a 100-year flood hazard area that would impede or redirect flood flows. (Less than Significant)

Combined Analysis for Miles 2–3 and Miles 4–6

Construction

Several of the tools to enhance habitat as part of the Dry Creek Project rely on structures that would be placed with a 100-year flood hazard area and impede or redirect flood flows. Log jams (**Figure 2-6** from **Chapter 2.0, Project Description**), large wood structures, boulder clusters and gardens, and constructed riffles (**Figure 2-7** from **Chapter 2.0, Project Description**) all rely on deflecting or impeding flow to enhance habitat. Log jams are complex large wood structures that are intended to affect the channel hydraulics by modifying flow paths in the mainstem, diverting water into a

side channel or as larger scale bank stabilization (ESA PWA 2014a,b). Large wood structures consist of one to three logs with intact rootwad and are used for scour, flow deflection, and edge complexity. Riffles play a key role in controlling the elevation of the streambed and construction of riffles in Dry Creek will stabilize the stream bed and control elevation to maintain connectivity to newly constructed backwater channels, alcoves, and side channels. Boulder clusters are small installations of a grouping of large boulders in the active channel to break up high flow and provided areas of variable velocity within the main flow of the channel. Boulder gardens are large installations of boulders that will only be located in the mainstem of Dry Creek. These features break up high flow fields by providing areas of variable velocity within the main flow of the channel. Boulder gardens will also be used to locally raise the water surface to maintain inundation of alcoves or secondary channels.

Construction of all enhancement features will typically occur from June 15 to October 15, during water supply and minimum flow releases from Warm Springs Dam. Construction would not occur during typically wet months (94% of rainfall occurs from October to April), and would not occur during storms leading to substantial runoff. As such, construction of log jams, large wood structures, boulder clusters and gardens, and constructed riffles would not impede or redirect flood flows. This impact would be less than significant.

Operation and Maintenance

Although placed within the 100-yr flood hazard area, log jams, large wood structures, boulder clusters and gardens, and constructed riffles would not increase the water surface elevation of the 100-yr flood. Log jams, large wood structures, boulder clusters and gardens, and constructed riffles are permeable, allowing some flow into and through the structure, and are low profile, situated along the bankline (ESA-PWA 2014a). The structures would be placed in conjunction with topographic adjustments (e.g., floodplain grading and lowering) that reduce the overall profile of the enhancement site. For each enhancement site the Water Agency would evaluate project designs and compare hydraulic model results estimating water surface elevations at the 100-yr flood for existing and project conditions (with enhancement features added). If results of the model show that proposed designs substantially increase the water surface elevation of the 100-yr flood, designs would be revised to reduce and minimize any increase in water surface elevation.

For each enhancement site using logjams, large wood structures, boulder clusters and gardens, and constructed riffles in Miles 2–3 the Water Agency evaluated project designs in comparison to hydraulic model results estimating 100-yr flood water surface elevations for existing and project conditions (with enhancement features added) (ESA-PWA 2014a, 2014b; Inter-Fluve 2014a, 2014b, 2014c) . Results of the model show that

proposed designs (at the 30% level) do not significantly increase the water surface elevation of the 100-yr flood. This impact would be less than significant.

Impact Significance: Less than Significant.

Impact 3.8.7: Construction, operation, and/or maintenance of the Dry Creek Project could expose people or structures to a significant risk of loss, injury, or death involving flooding. (Less than Significant)

Combined Analysis for Miles 2–3 and Miles 4–6

Construction

Construction of all enhancement features will typically occur from June 15 to October 15, during water supply and minimum flow releases from Warm Springs Dam. Construction would not occur during typically wet months (94% of rainfall occurs from October to April), and would not occur during storms that cause flooding. As such, no equipment or construction materials would become entrained in flood flows to expose people or structures to loss, injury, or death from collision or impact with waterborne materials. This impact would be less than significant.

Operation and Maintenance

Although placed within Dry Creek, log jams, large wood structures, boulder clusters and gardens, and constructed riffles are unlikely to become waterborne during high flows. Log jams and large wood structures are being designed using a variety of techniques, such as anchoring, cabling, weighted down (ballasted) with boulders, to reduce the risk of logs floating downstream during high flow events. Other structures, such as boulder clusters, boulder gardens/fields, and constructed riffles are designed with sufficiently sized material to prevent them from being mobilized and washed downstream during high flow events. For each enhancement sites in the Dry Creek Project, the Water Agency will evaluate the stability of each structure by: 1) estimating the potential amount of scour, 2) estimating the potential for structural member failure, overturning, and sliding (based upon the forces acting upon each log), and 3) estimating buoyancy under high flows to determine proper ballasting. If results of the analysis show structure instability, designs would be revised to increase stability to reduce or eliminate the probability of becoming entrained in flood flows, exposing people or structures to loss, injury, or death from collision or impact with waterborne materials. This impact would be less than significant.

Impact Significance: Less than Significant.

Impact 3.8.8: Construction, operation, and/or maintenance of the Dry Creek Project could contribute to inundation by seiche, tsunami, or mudflow. (No Impact)

Combined Analysis for Miles 2–3 and Miles 4–6

Construction

Construction of the Dry Creek Project would not contribute to potential inundation by a seiche or tsunami. The potential for inundation by seiche is very low as the project takes place downstream of the closest waterbody capable of generating a seiche (Lake Sonoma). During the construction period, water elevations at Lake Sonoma would be within the water conservation pool (451 feet msl or lower). Waves generated by a seiche would be unlikely to overtop the spillway at an elevation of 495 feet msl and impact the work area downstream. The project area is not within a tsunami inundation zone (California Geological Survey 2009). The relatively gentle topography of the Dry Creek alluvial valley does not present a hazard of inundation by a mudflow. No impact would occur.

Operation and Maintenance

Operation and maintenance of the Dry Creek Project would not contribute to potential inundation by a seiche or tsunami. The potential for inundation by seiche is very low as the project takes place downstream of the closest waterbody capable of generating a seiche (Lake Sonoma). Lake Sonoma is formed by Warm Spring Dam, which is designed for flood control and water supply. Even during periods of high runoff, the water surface elevation of Lake Sonoma would still allow Warm Springs Dam to contain waves generated by a seiche (top of dam spillway = 513,0 ft msl). The potential for inundation by tsunami is very low as the Project Area is not within a tsunami inundation zone (California Geological Survey 2009). The relatively gentle topography of the Dry Creek alluvial valley does not present a hazard of inundation by a mudflow. No impact would occur.

Impact Significance: No Impact

Impact 3.8.9: Construction, operation, and/or maintenance of backwater channels, alcoves, and side channels could violate water quality standards or waste discharge requirements or otherwise degrade water quality (Less than Significant)

Combined Analysis for Miles 2–3 and Miles 4–6

Construction

Construction activities associated with the Dry Creek Project could include temporary increases in suspended and settleable materials reaching the main channel and are described above in **Impact 3.8.1**. However, as observed during construction of the Demonstration Project (Mile 1) during the 2014 construction season, these increases and resulting spikes in turbidity were temporary and typically lasted from several minutes to a few hours following each occurrence. (Please refer to the Current

Conditions under the Water Quality section above for a discussion of Habitat Enhancement related turbidity.) As a result, daily median turbidity values were not significantly impacted and long-term chronic effects were not observed to occur as daily minimum turbidity values observed during construction continued to be consistent with daily minimum values observed before and after construction. In addition, these spikes in turbidity were not observed to cause significant changes to temperature and dissolved oxygen concentrations in the data collected during construction activities in 2014. Construction of the Dry Creek project will adhere to project BMPs, including those described above in **Impact 3.8.1**, resulting in a less than significant impact.

Impact Significance: Less than Significant.

Operation and Maintenance

The project consists of the creation of new habitat features within Dry Creek that would have favorable conditions for juvenile coho and steelhead. The operation of the project would not violate water quality standards or waste discharge requirements or otherwise degrade water quality. Maintenance activities may require work within the habitat feature at some point. If maintenance activities have the potential to impact water quality, then those activities will adhere to project BMPs, including those described above in **Impact 3.8.1**, resulting in a less than significant impact.

Impact Significance: Less than Significant with Mitigation.

Impact 3.8.10: Construction, operation, and/or maintenance of channel habitat enhancement features could substantially affect groundwater supplies or recharge resulting in reduced aquifer volume or a lowering of the local groundwater table level (Less than Significant).

Combined Analysis for Miles 2–3 and Miles 4–6

Construction

Construction of off-channel enhancement features (backwater channels, alcoves, and side channels) would be excavated within floodplains adjacent to Dry Creek. The bottom grades of these features would be constructed 4 feet below the summer water surface elevations to maintain a perennial surface water connection. Recent geotechnical investigation of potential off-channel enhancement areas (conducted for areas included in the Demonstration Project) found groundwater in floodplain test pits occurring at approximately the same elevation as the adjacent water surface (Inter-Fluve 2011). As such, excavation into the floodplain to create off-channel enhancement features with bottom elevations 4 feet below the summer water surface elevation would likely intersect the groundwater table. Intersected groundwater (surface water) in the bottom of excavated features would be pumped out during construction of localized work areas into adjacent areas (but still within the excavated feature) and allowed to

percolate back into the ground. Water would not be pumped out of the ground, rather relocated as surface water from one work area of the excavated feature to another. These activities would not result in reducing aquifer volume or lowering the local groundwater table. Further, as the enhancement features would be excavated in close proximity to the main channel of Dry Creek, groundwater surface elevation would still be controlled by water surface elevation in the main channel. Subsurface flow through underlying gravel and sand from the main channel into excavated features would still occur. This impact would be less than significant.

Construction could require diverting flows around instream work areas to construct instream habitat features (logjams, constructed riffle, boulder fields). This short-term diversion of flows around the work area is not anticipated to deplete groundwater supplies or interfere with groundwater recharge because of the limited distance of the proposed diversion area and underflow through the gravels beneath the work area would likely still occur. Proposed in-channel features (constructed riffles, boulder fields) would use rock that would not affect groundwater recharge along the river. This impact would be less than significant.

Impact Significance: Less than Significant.

Operation and Maintenance

Off-channel enhancement features (backwater channels, alcoves, and side channels) would be excavated within floodplains adjacent to Dry Creek to a depth of 4 feet below the summer water surface elevations to maintain a perennial surface water connection. As noted above, excavation would likely intersect the groundwater table, but features would be connected to the main channel at the downstream end (backwater channels and alcoves) or both ends (side channels). Groundwater would percolate into off-channel enhancement features, but water surface elevation in the features would be controlled by water surface elevations in main channel. Groundwater surface elevation in floodplains would also be controlled by the adjacent main channel water surface elevations. The operation of off-channel features would not have a significant impact on aquifer volume or a lowering of the local groundwater table level.

In-channel enhancement features will interact with surface flow in the main channel to create habitat for coho and steelhead juveniles. The features would create hydraulic and escape cover, but would not affect groundwater hydrology or hyporheic (groundwater) inputs into the main channel. This impact would be less than significant.

Impact Significance: Less than Significant.

3.8.5 General Plan and Consistency

Sonoma County General Plan 2020

The Sonoma County General Plan (PRMD 2008) sets forth the following goals, objectives, and policies related to water quality, groundwater supplies, drainage, and floodplains that are applicable to the project.

Land Use (LU) element

Goal LU-7: Prevent unnecessary exposure of people and property to environmental risks and hazards. Limit development on lands that are especially vulnerable or sensitive to environmental damage.

Objective LU-7.1: Restrict development in areas that are constrained by the natural limitations of the land, including but not limited to, flood, fire, geologic hazards, groundwater availability and septic suitability.

Goal LU-8: Protect Sonoma County's water resources on a sustainable yield basis that avoids long term declines in available surface and groundwater resources or water quality.

Objective LU-8.1: Protect, restore, and enhance the quality of surface and groundwater resources to meet the needs of all beneficial uses.

Objective LU-8.3: Increase the role of water conservation and re-use in meeting the water supply needs of both urban and rural users.

Policy LU-8a: Require that new development comply with applicable waste discharge requirements and minimize pollution of storm water, surface water and groundwater.

Policy LU-8f: Increase the role of water conservation, stormwater retention, and aquifer recharge for water supply purposes.

Policy LU-11d: Encourage methods of landscape design, landscape and park maintenance, and agriculture that reduce or eliminate the use of pesticide, herbicides, and synthetic fertilizers, and encourage the use of compost and conservation of water.

Policy LU-11f: Encourage conservation of undeveloped land, open space, and agricultural lands, protection of water and soil quality, restoration of ecosystems, and minimization or elimination of the disruption of existing natural ecosystems and flood plains.

Water Resources (WR) element

Goal WR-1: Protect, restore and enhance the quality of surface and groundwater resources to meet the needs of all beneficial uses.

Objective WR-1.4: Encourage new groundwater recharge opportunities and protect existing groundwater recharge areas.

Objective WR-1.5: Inform the public about practices and programs to minimize water pollution and provide educational and technical assistance to agriculture in order to reduce sedimentation and increase on-site retention and recharge of stormwater.

Objective WR-1.6: Conserve and recognize stormwater as a valuable resource.

Objective WR-1.7: Require consideration of naturally occurring and human-caused contaminants in groundwater in new development projects. Work with the Sonoma County Environmental Health Department (SCEHD) and RWQCB to educate the public on evaluating the quality of groundwater.

Policy WR-1c: Prioritize storm water management measures in coordination with the RWQCB direction, focusing first upon watershed areas that are urbanizing and watersheds with impaired water bodies. Work cooperatively with the RWQCB to manage the quality and quantity of stormwater runoff from new development and redevelopment in order to:

Prevent, to the maximum extent practicable, pollutants from reaching storm water conveyance systems.

Limit, to the maximum extent practicable, stormwater flows from post development sites to pre-development quantities.

Conserve and protect natural areas to the maximum extent practicable.

Policy WR-1d: Where appropriate, support RWQCB waste discharge requirements for all wastewater treatment systems and other point sources.

Policy WR-1g: Minimize deposition and discharge of sediment, debris, waste and other pollutants into surface runoff, drainage systems, surface water bodies, and groundwater.

Objective WR-2.3: Encourage new groundwater recharge opportunities and protect existing groundwater recharge areas.

Objective WR-2.5: Avoid additional land subsidence caused by groundwater extraction.

Policy WR-2e: Require proof of groundwater with a sufficient yield and quality to support proposed uses in Class II and IV water areas. Require test wells or the establishment of community water systems in Class IV water areas. Test wells may be required in Class III areas. Deny discretionary application in Class II and IV areas unless a hydrogeologic report establishes that groundwater quality and quantity are adequate and will not be adversely impacted by the cumulative amount of development and uses allowed in the area, so that the proposed use will not cause or exacerbate an overdraft condition in a groundwater basin or sub-basin. Procedures for proving adequate groundwater should consider groundwater overdraft, land subsidence, saltwater intrusion, and the expense of such study in relation to the water needs of the project.

Consistency

The Dry Creek Project would be consistent with goals, objectives, and policies of *Sonoma County General Plan 2020* because it would protect, restore, and enhance surface water resources and their associated threatened and endangered fish and could enhance groundwater resources through encouraging recharge in areas where new pools, alcoves, and backwaters are created.

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3.9 Land Use, Planning and Agricultural Resources

3.9.1 Introduction

This chapter describes the existing conditions relating to land use, planning, and agricultural resources within the Dry Creek Habitat Enhancement Project, Miles 2-6 (Dry Creek Project or proposed project) area. Section 3.9.2, “Environmental Setting” describes existing land uses, areas under agricultural production, and property ownership conditions. Section, 3.9.3, “Regulatory Framework” describes pertinent laws related to land use and agriculture near the Dry Creek Project area. Potential impacts to these resources resulting from the proposed project are analyzed in Section 3.9.4, “Impacts and Mitigation Measures” in accordance with the California Environmental Quality Act (CEQA) significance criteria (CEQA Guidelines, Appendix G) and mitigation measures are proposed that could reduce, eliminate, or avoid such impacts.

Other impacts to related resources are addressed in other chapters as follows: the effect of changes to visual resources is addressed in **Chapter 3.1, Aesthetics**; the effect of changes to traffic is addressed in **Chapter 3.13, Transportation and Traffic**; the effect of changes to sounds is addressed in **Chapter 3.10, Noise**; the effect of changes to air quality is addressed in **Chapter 3.2, Air Quality**; and the effect of changes to public services is addressed in **Chapter 3.11, Public Services and Utilities**.

3.9.2 Environmental Setting

The environmental setting for land use, planning, and agricultural resources includes all areas that could be affected by activities associated with the Dry Creek Project. As stated in **Chapter 2, Project Description**, habitat enhancement sites have been identified for Miles 2-3 but specific sites have yet to be determined for Miles 4–6. Projects could occur anywhere along the 14-mile length of Dry Creek from Warm Springs Dam to the Russian River (exclusive of sites already enhanced in Mile 1). Consequently, the environmental setting includes the Dry Creek basin downstream of Warm Springs Dam, including the 14 river miles (RMs) from the dam to the Russian River, adjacent riparian areas, and surrounding floodplains and terraces, either unvegetated or occupied by agricultural or residential land-uses.

The Dry Creek watershed is located in the interior coast range of northern Sonoma and southern Mendocino counties, approximately 30 miles from the Pacific Ocean and 60

miles north of San Francisco Bay and drains approximately 217 square miles of rugged terrain. The Dry Creek watershed is approximately 32 miles long and 7 miles wide and is in the southwestern portion of the Russian River Basin. Warm Springs Dam (WSD) is located on river mile 13.9, at the confluence of Dry Creek and Warm Springs Creek, and is considered the upstream extent of Dry Creek for this project. Downstream of the dam, the creek is a gravel bed river that flows through a low gradient agricultural valley 0.5 to 1 mile wide. Principle tributaries entering Dry Creek below WSD include Peña Creek and Mill Creek. Dry Creek flows into the Russian River just downstream of Healdsburg. Dry Creek Valley, located below WSD in Sonoma County, is primarily agricultural land with a focus on vineyards and is identified as scenic landscape unit in the *Sonoma County General Plan 2020*. The Dry Creek Project area is located within a 13.9 mile reach of Dry Creek from Lake Sonoma to the Russian River. The proposed project enhancement sites are distributed throughout the 13.9 mile length below Warm Springs Dam. Miles 2 and 3 will be analyzed at the project level whereas miles 4–6 will be analyzed at the program level since the exact locations of the project components for Miles 4-6 are undetermined.

Existing Land Uses

The Land Use Element of the *Sonoma County General Plan 2020* governs land uses in the unincorporated areas surrounding the project area. The Dry Creek Project lies within two planning areas.

Cloverdale/Northeast County Planning Area

The Cloverdale/Northeast County Planning Area includes the City of Cloverdale and the community of Geyserville. The rugged Coast Range to the west and Mayacamas Mountains to the east surround the Russian River, Dry Creek, and Alexander valleys. Rich in natural resources, the area contains streams and riparian corridors, fish and wildlife habitat, geothermal steam, construction aggregates and water for domestic and agricultural use. Lake Sonoma and the Russian River provide recreational opportunities such as boating, swimming and fishing while tourism in the Dry Creek Valley is primarily associated with the wine industry. Lands outside the valley floor are rugged and relatively inaccessible.

Healdsburg and Environs Planning Area

The Healdsburg and Environs Planning Area is located in north central Sonoma County. Land use designations are shown in **Figure 3.9-1**. The areas outside the valley floor and lower foothills are sparsely populated and relatively inaccessible. The area's economy depends heavily upon agriculture, manufacturing, and service industries. The valley areas outside of the urban centers are used primarily to grow high quality wine grapes. The Russian River and lands adjacent to the Russian River are used extensively for recreation and gravel mining operations. The steep and geologically

unstable hillsides of the Coast Range to the west have limited access and are primarily used as grazing lands.

Land Use Designations

Land use designations in the project vicinity are described as follows:

1. *Land Intensive Agriculture* is established to enhance and protect lands best suited for permanent agricultural use and capable of relatively high production per acre of land; and to implement the provisions of the land intensive agriculture land use category of the General Plan and the policies of the agricultural resources element.
2. *Resources and Rural Development* is established to provide protection of lands needed for commercial timber production, geothermal production, and aggregate resources production as well as lands needed for protection of watersheds, fish and wildlife habitat, biotic resources, and for agricultural production activities that are not subject to all of the policies contained in the agricultural resources element of the General Plan. This land use designation allows very low density residential development and recreational and visitor-serving uses where compatible with resource use and available public services.
3. *Public/Quasi-Public* allows for sites that serve the community or public need and are owned or operated by government agencies, non-profit entities, or public utilities. Uses include schools, places of religious worship, parks, libraries, governmental administration centers, fire stations, cemeteries, airports, hospitals, sewage treatment plants, waste disposal sites, etc.
4. *General Commercial* permits all types of commercial use and is applied only to lands within Urban Service Areas. The category provides locations for intense commercial uses that primarily serve a mix of business activities and the residential and business community as a whole rather than a local neighborhood. These uses provide for comparison shopping and services which are ordinarily obtained on an occasional rather than daily basis. This category also provides sites for a mix of residential and commercial uses in Urban Service Areas.
5. *Limited Commercial* allows a smaller range of commercial uses than does General Commercial and may be applied to areas either outside or inside the Urban Service Areas. In rural community areas, this category may limit commercial uses to retail and service uses that are local serving. In rural locations without water and sewer services, commercial activities may be further limited. Providing areas for retail sales and services necessary for the daily self-sufficiency of urban and rural areas in keeping with their character and to implement the objectives of adopted redevelopment plans within redevelopment project areas in the general plan.

Local Land Use

Dry Creek, a major tributary to the Russian River, flows 32 miles from its source at Snow Mountain near Hopland, CA to its mouth just downstream of Healdsburg, where it empties into the Russian River. Warm Springs Dam (WSD) at river mile (RM) 13.9 divides the rugged terrain and steeper channel of the upper watershed from the relatively flat agricultural valley and lower gradient channel that is present below the dam. The 13.9-mile reach of Dry Creek below WSD is the project area for the Dry Creek Project. Dry Creek Valley below WSD is held almost entirely in private ownership and is under agricultural production growing high quality wine grapes. The land use designation within the agricultural valley surrounding Dry Creek is land intensive agriculture, land adjacent to the agricultural zone on the east and west side of the valley floor is designated primarily for resources and rural development, as shown in **Figure 3.9-1**. Situated approximately ½ mile from the Dry Creek Project location, Lake Sonoma is designated public/quasi public land use. As a multi-purpose reservoir, it serves as a flood control, water supply, and recreation facility. The cities of Cloverdale and Healdsburg are the closest to the Dry Creek Project area. Land use designations within and adjacent to Cloverdale, as shown in **Figure 3.9-1**, include resources and rural development, diverse agriculture, land intensive agriculture, land extensive agriculture, rural residential, public/quasi-public, and limited and general industrial. Land use designations within and adjacent to the city of Healdsburg include land intensive agriculture, diverse agriculture, resources and rural development, public/quasi-public, rural residential, general industrial and general commercial.

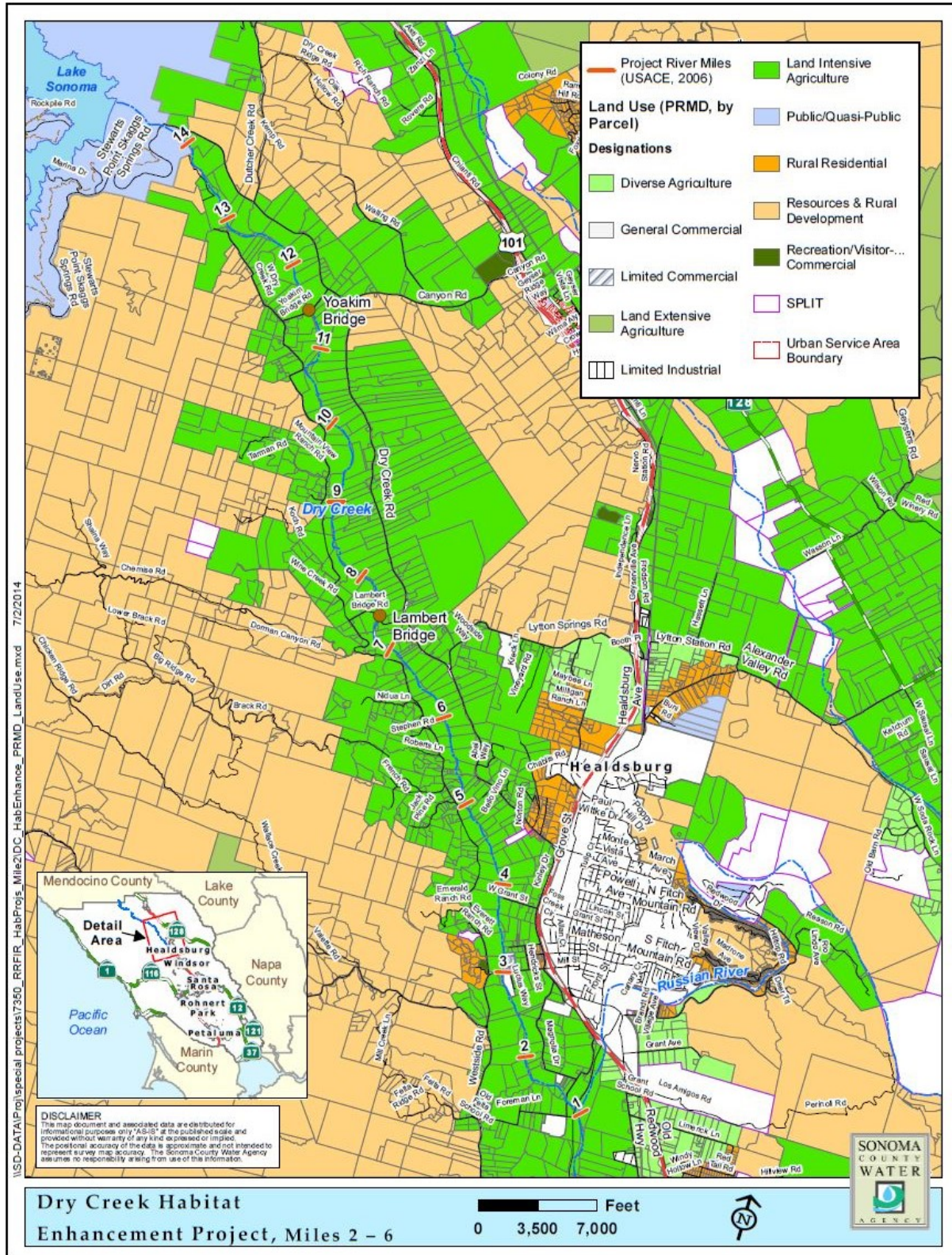


Figure 3.9-1. Local Land Use Adjacent to the Dry Creek Habitat Enhancement Project, Miles 2-6

Agricultural Resources

The existing agricultural environment is classified by:

1. The California Farmland Mapping and Monitoring Program (FMMP); and
2. Williamson Act contracts.

Farmland Mapping

The California Department of Conservation, under the Division of Land Resource Protection, has established the Farmland Mapping and Monitoring Program (FMMP). The FMMP identifies the state's priority farmlands and monitors the conversion of farmland to and from agricultural use. The California Department of Conservation, Office of Land Conservation, creates maps of important farmland throughout California and updates those maps every two years. Important farmlands are divided into the following five categories based on their suitability for agriculture:

1. *Prime Farmland* has the best combination of physical and chemical characteristics for crop production. It has the soil quality, growing season and moisture supply needed to produce sustained high yields of crops when appropriately treated and managed.
2. *Farmland of Statewide Importance* is land other than Prime Farmland that has a good combination of physical and chemical characteristics for crop production.
3. *Unique Farmland* does not meet the criteria for Prime Farmland or Farmland of Statewide importance, but is land which has been used for the production of specific high economic value crops.
4. *Farmland of Local Importance* is either currently producing crops, or has the capability of production, and does not meet the criteria of the categories above.
5. *Grazing Land* is land in which the existing vegetation is suited to the grazing of livestock.

Three categories of farmland are considered to be particularly valuable and any conversion of land within these categories is typically considered to be an adverse impact: (1) Prime Farmland, (2) Farmland of Statewide Importance, and (3) Unique Farmland.

Williamson Act

The California Land Conservation Act of 1965, also known as the Williamson Act, is designed to preserve agricultural and open space lands by discouraging the unnecessary conversion of these lands to urban uses. Landowners may contract with counties and cities to voluntarily restrict their land to agricultural and compatible open-space uses. In return, Williamson Act contracts offer tax incentives by ensuring that land will be assessed

for its agricultural productivity rather than its highest and best uses. Contracts run for a period of ten years, however, some jurisdictions exercise the option of making the term longer, up to twenty years. Contracts are automatically renewed unless the landowner files for non-renewal or petitions for cancellation. According to the California Department of Conservation 2012 Bi-annual report, a total of 272,151 acres of prime and non-prime agricultural land are held under Williamson Act contracts in Sonoma County (California Department of Conservation 2013). Williamson Act contract enrolled lands meet one the following descriptions:

1. *Prime Agricultural Land* is enrolled under California Land Conservation Act contract and meets any of the following criteria: (1) Land which qualifies for rating as class I or class II in the Natural Resources Conservation Service land use capability classifications; (2) Land which qualifies for rating 80 to 100 in the Storie Index Rating; (3) Land which supports livestock used for the production of food and fiber; (4) Land planted with fruit or nut-bearing trees, vines, bushes or crops and has an annual gross value of not less than two hundred dollars per acre, or (5) Land which has returned from the production of unprocessed agricultural plant production and has an annual gross value of not less than two hundred dollars per acre.
2. *Non-Prime Agricultural Land* is enrolled under California Land Conservation Act contract and does not meet any of the criteria for classification as Prime Agricultural Land. Non-Prime Land is defined as Open Space Land of Statewide Significance. Most lands have agricultural uses such as grazing or non-irrigated crops.

There are approximately 85 parcels directly adjacent to Dry Creek that are currently enrolled under Williamson Act contract, including several within proposed project sites for Miles 2 and 3, as shown in Figures 3.9-2. All of these, with the exception of one parcel, are categorized as Prime Farmland; the one exception is categorized as Farmland of Statewide Importance.

Locally Important Farmlands

The majority of the Dry Creek Project area is adjacent to areas that are currently in agricultural use, see Figure 3.9-2. Within the Dry Creek Valley, there are approximately 5,124 acres of Prime Farmland, approximately 550 acres of Farmland of Local Importance, 595 acres of Farmlands of Statewide Importance, 3,360 acres of Grazing land, 3,212 acres of Unique Farmland, 9,565 acres of Other Land and 2,340 of Urban and Built-up Land.

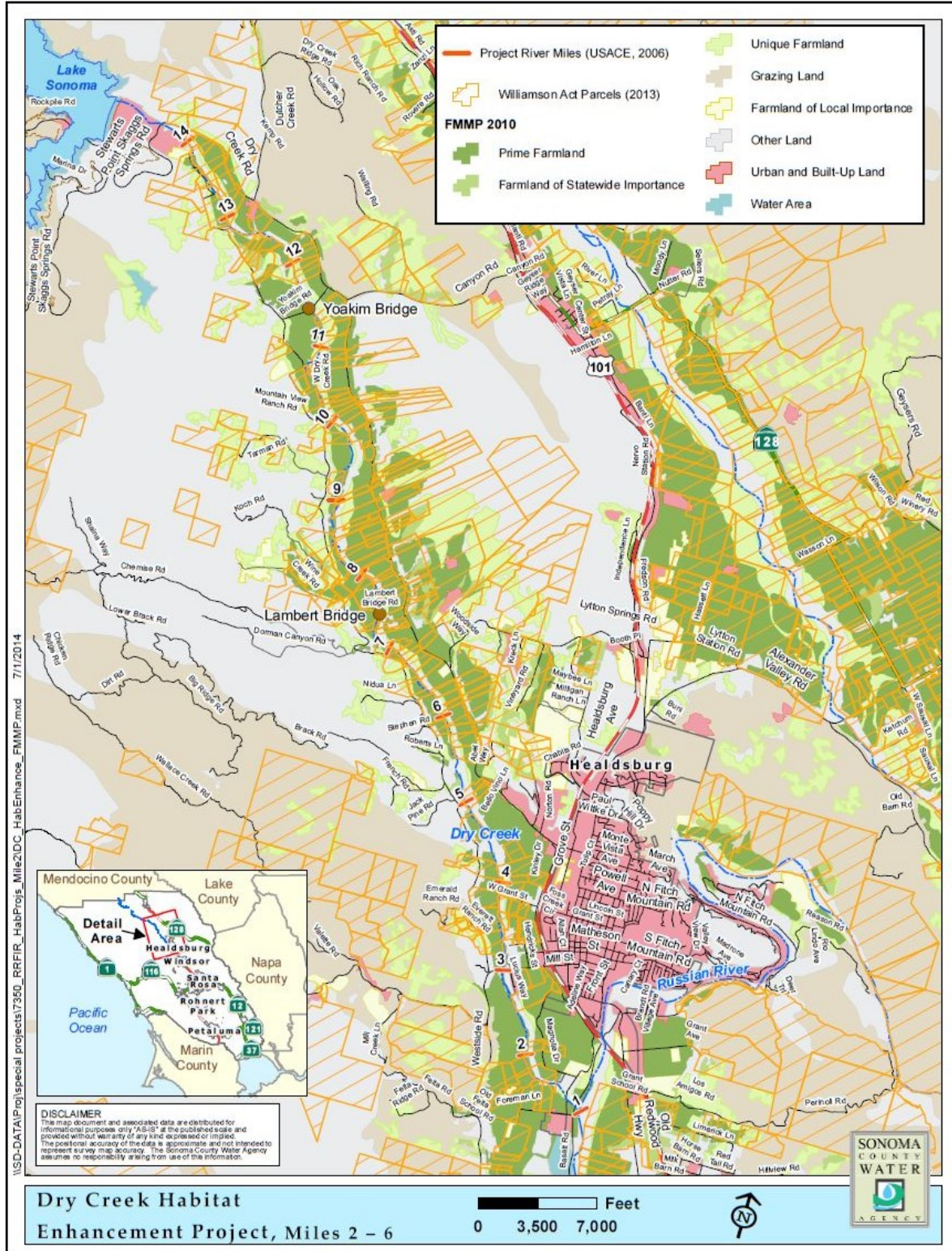


Figure 3.9-2
Local Area Farmlands and Williamson Act Protected Lands

Conservation Easements

A conservation easement is a permanent, recorded deed restriction that transfers certain property rights from the landowner to a land conservation entity. In Sonoma County, conservation easements are typically held by the Sonoma County Agricultural Preservation and Open Space District (SCAPOSD). These restrictions apply to development rights and certain land uses and are mutually agreed upon by the landowner and the SCAPOSD. A conservation easement stays with the land permanently and is binding on all future owners. The main purpose of a conservation easement is to “protect the unique resources of a particular property” (SCAPOSD n.d.).

To date, one property within the Dry Creek Habitat Enhancement Demonstration Project (Mile 1) is protected under a conservation easement. The SCAPOSD acquired a conservation easement over a portion of land on property upstream of Lambert Bridge. It consists of a narrow strip of vineyard land on the western bank of the Dry Creek channel. The conservation easement area is approximately 100 feet wide by 1,857 feet long within a riparian frontage zone and is on land designated as land intensive agriculture (SCWA 2014). No other conservation easements have been identified

3.9.3 Regulatory Framework

The following section discusses the local regulatory framework for managing land use and agricultural resources in the project area. No specific federal or state land use regulations apply to the land use resources associated with this project. The *Sonoma County General Plan 2020* is the local land use planning document for the project areas. The goals, objectives, and policies of the *Sonoma County General Plan 2020* were considered in this analysis to define sensitive land uses, prime agricultural resources, consider project consistency with policies, and determine significant impacts.

Local Regulations

Sonoma County General Plan 2020

The project area is located in unincorporated Sonoma County and, therefore, *Sonoma County General Plan 2020* (General Plan) is applicable to the proposed project. Within the General Plan, the Land Use, Agricultural Resources, and Open Space and Resource Conservation elements identify goals, objectives, and policies for preserving land and agricultural resources. Please refer to **Section 3.9.5. “General Plans and Consistency”** below for a detailed discussion.

3.9.4 Environmental Impacts and Mitigation Measures

Approach to Analysis

This EIR includes project-level analysis for the Dry Creek Project, Miles 2-3 and program-level analysis for the Dry Creek Project, Miles 4-6. Although the types and locations of proposed program-level components have not yet been identified, land use along the length of Dry Creek is relatively uniform and it is anticipated that impacts for Miles 4-6 will be similar to those identified for Miles 2-3. Therefore, analysis for project- and program-level components are combined where appropriate.

This analysis considers the effect of the Dry Creek Project on existing land use planning and agriculture based on review of the *Sonoma County General Plan 2020*, farmland classifications established under the FMMP and proximity to lands enrolled under the Williamson Act contracts.

Impacts to land use and agricultural resources were considered significant if the project resulted in any of the changes listed above in “Standards of Significance.” While the majority of regular maintenance work over the long term will consist of vegetation management, irrigation and other similar activities, maintenance activities could also include activities similar to construction activities, such as repair to damaged structures or adjustments to structures that are not functioning as intended. Therefore, maintenance activities are generally analyzed alongside construction activities in terms of their potential for impact.

Project implementation includes construction, operation, and maintenance of the proposed project. The majority of the ground disturbance would take place during the construction phase of the proposed project and it is anticipated that maintenance activities would primarily consist of vegetation management. However, there is a possibility that maintenance activities would also include activities similar to construction, such as repair to damaged structures or adjustments to structures if they are not functioning properly. Therefore, maintenance activities are considered alongside construction activities in terms of their potential for impact in the analysis below.

Land Use

This analysis evaluates short-term impacts on existing land uses resulting from project construction and maintenance activities. *Sonoma County General Plan 2020* and other relevant maps and planning documents were reviewed to characterize existing land uses in the project area. The evaluation of plan consistency is based on the applicability of relevant land use plans and policies to the implementation of the proposed project. The board or commission that enacted the plan or policy generally determines the

meaning of such policies and these interpretations prevail if they are “reasonable,” even though other reasonable interpretations are also possible.

Agricultural Resources

For the purposes of this analysis, each project element was considered in relation to farmland (identified on the FMMP Map) in the immediate site vicinity to identify any potential disruption that might be caused temporarily or permanently.

Significance Criteria

The following thresholds for determining the significance of impacts for this land use and agriculture analysis are based on the environmental checklist in Appendix G of the CEQA Guidelines. The project would be considered to have a significant impact on land use planning and agricultural resources if it would:

Land Use

1. Physically divide an established community;
2. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project, including, but not limited to the general plan, specific plan, local coastal plan, or zoning ordinance adopted for the purpose of avoiding or mitigating an environmental effect;
3. Conflict with any applicable habitat conservation plan or natural community conservation plan.

Agriculture

1. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use;
2. Conflict with existing zoning for agricultural use or a Williamson Act Contract;
3. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g));
4. Result in the loss of forest land or conversion of forest land to non-forest use;
5. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of designated farmland to non-agricultural use or conversion of forest land to non-forest use.

Several of the criteria included in Appendix G of the CEQA Guidelines do not apply to this analysis and are not discussed further, as explained below.

Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g)). The proposed project would not be located on forest land, timberland or timberland zoned Timberland Production. The proposed project would occur within the riparian corridor of Dry Creek which is adjacent to lands used for agricultural activities and rural residential uses. Therefore, this significance criterion is not applicable to the proposed project.

Result in the loss of forest land or conversion of forest land to non-forest use. The proposed project would not be located on or adjacent to, forest land. The proposed project would occur within the riparian corridor of Dry Creek which is adjacent to lands used for agricultural activities. Therefore, this significance criterion is not applicable to the proposed project.

Impacts and Mitigation Measures

The following section presents a detailed discussion of potential impacts associated within land use, planning, and agricultural resources resulting from the Dry Creek Project. Both program-level and project-level project components are analyzed. Impacts are summarized and categorized as either “less than significant,” “less than significant with mitigation,” or “significant and unavoidable.” Impacts are also identified as applicable to construction, operation, and/or maintenance phases of the project.

Impact 3.9.1: Construction and/or maintenance of the Dry Creek Project could physically divide an established community. (No impact)

Combined Analysis for Miles 2–3 and Miles 4–6

Dry Creek extends approximately 14 miles from Warm Springs Dam down the length of Dry Creek Valley to the confluence with the Russian River, creating a natural barrier for human transportation between the west and east sides of the valley. Residents and visitors cross the creek via bridges on four roads: Dry Creek Road/Skaggs Springs Road (Bord Bridge), Yoakim Bridge Road, Lambert Bridge Road, and Westside Road. For more information on traffic and transportation impacts, please refer to **Chapter 3.13, Transportation and Traffic**. The project would be implemented in several locations along Dry Creek. However, all habitat enhancement components would be installed within, or directly adjacent to, the creek and neither construction nor operation nor maintenance of the proposed project would reduce access from one side of the valley to the other. Therefore the proposed project would not physically divide an established community and no impact is anticipated.

Impact Significance: No Impact.

Impact 3.9.2: Construction and/or maintenance of the Dry Creek Project, could conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect. (Less than Significant)

Combined Analysis for Miles 2–3 and Miles 4–6

Land within the project area is primarily designated for agricultural uses but also has designations for resources and rural development, public/quasi-public land use, general commercial and limited commercial land use in unincorporated Sonoma County. The proposed habitat enhancement components would be located directly adjacent to existing agriculture. Implementation of the proposed project would include construction and maintenance activities that could generate temporary traffic, dust, and noise which could impact adjacent property owners. Please refer to **Chapters 3.13, Transportation and Traffic; 3.2, Air Quality...**; and **3.10, Noise** for more information. Additionally, some project components could include laying back the stream bank in some locations to create a more gentle slope and prevent erosion and eventual collapse of the streambank. This would occur in locations where active erosion of the streambank is evident and the property owner agrees to take measures to stabilize the bank. While some small unplanted areas adjacent to the riparian corridor would be converted to riparian corridor in these cases, the overall impact would be beneficial because acreage previously at risk to loss due to erosion would be preserved as a result of the project.

The purpose of *Sonoma County General Plan 2020* is to express policies which guide decisions on future growth, development and conservation of resources in a manner consistent with the goals and quality of life desired by the county's residents (PRMD 2008). The Dry Creek Project supports the land use objectives and policies of the General Plan. The project does not facilitate growth and is consistent with existing land uses including the broader goals of the General Plan to protect and conserve the quality of riparian environments, associated biotic resources and maintaining water quality. Therefore, conflict with applicable state and/or local land use plans, policies, or regulations would be less than significant.

Impact Significance: Less than Significant; no mitigation required.

Impact 3.9.3: Construction and/or maintenance of the Dry Creek Project could conflict with applicable habitat conservation plan or natural community conservation plan (Beneficial Impact).

Combined Analysis for Miles 2–3 and Miles 4–6

Although there is no specific habitat conservation plan affecting the project area, the NMFS' Russian River Biological Opinion has a similar goal of managing Dry Creek for the benefit of threatened and endangered salmonid species (NMFS 2008). The proposed project is a direct result of the Russian River Biological Opinion and would include the installation, monitoring, and maintenance of high quality salmonid rearing habitat enhancements. These actions would implement management strategies listed in the Russian River Biological Opinion with the goal of appreciably increasing the survival of juvenile salmonids in Dry Creek during both the summer and winter months. The Dry Creek Project is consistent with the NMFS management strategies and implements requirements of the Russian River Biological Opinion, therefore, project impacts are considered beneficial.

Impact Significance: Beneficial Impact.

Impact 3.9.4: Construction and/or maintenance of the Dry Creek Project could convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use. (Less than Significant)

Combined Analysis for Miles 2–3 and Miles 4–6

The proposed project will not result in the conversion of any farmlands to other uses. The California Department of Conservation designates nearly the entire Dry Creek Valley as Prime Farmland with some areas designated as Farmland of Statewide Importance and Unique Farmland. Prime Farmland is defined as having the best combination of physical and chemical features able to sustain long-term agricultural production. Prime Farmlands have the soil quality, growing season, and moisture supply needed to produce sustained high yields. The proposed project would include the installation, monitoring, and minor maintenance of high quality salmonid rearing habitat enhancements within the active flow area of the Dry Creek channel. None of the proposed enhancement sites are currently under agricultural production. Because the bank stabilization sites will require that the existing bank be excavated out and rebuilt, this may require encroachment during construction into adjacent vineyard areas. While this may impact some vineyard land during construction, the long-term effect to the bank stabilization work would be to protect the vineyard land from future losses as a result of continued erosion that would occur without the proposed project.

Impact Significance: Less than Significant; no mitigation required.

Impact 3.9.5: Construction and/or maintenance of the Dry Creek Project could conflict with existing zoning for agricultural use or a Williamson Act contract. (Less than Significant with Mitigation)

Combined Analysis for Miles 2–3 and Miles 4–6

The proposed project will not result in the conversion of any farmlands to other uses or require the cancellation of any existing Williamson Act contracts. However, implementation of the proposed project would include construction and maintenance activities that could generate temporary traffic, dust, and noise which could impact adjacent property owners. Please refer to **Chapters 3.1, Aesthetics; 3.2, Air Quality, Energy, Climate Change, and Sustainability; 3.10, Noise; and 3.13, Transportation and Traffic** for more information. Construction activities would take place during the summer and fall (generally between June 15th and October 15th) in areas directly adjacent to vineyards and may overlap the harvest season, which generally occurs in September and October. Therefore, noise, dust, and traffic associated with construction activities could result in a temporary conflict with existing agricultural activities. This impact would be less than significant with the implementation of **Mitigation Measures 3.1.1 and 3.1.2 from Chapter 3.1, Aesthetics, Mitigation Measure 3.2.1a from Chapter 3.2, Air Quality, Greenhouse Gas Emissions, Energy, and Sustainability, and Mitigation Measures 3.9.5a, b, and c** below.

Mitigation Measure 3.9.5a: The Water Agency will coordinate construction activities with adjacent landowners and vineyard managers in order to avoid potential conflicts with road use and agricultural activities.

Mitigation Measure 3.9.5b: Except in cases of emergency, the Water Agency will coordinate with property owners to schedule maintenance and monitoring activities to minimize conflicts with existing land uses.

Mitigation Measure 3.9.5c: Where appropriate and feasible, the Water Agency will avoid locating habitat enhancements in areas with the potential to encroach on existing land use and agricultural resources. Implementation of **Mitigation Measures 3.1.1 and 3.1.2 from Chapter 3.1, Aesthetics** would further reduce this impact.

Impact Significance: Less than Significant with Mitigation.

Impact 3.9.6: Construction and/or maintenance of the Dry Creek Project could involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use. (Less than Significant)

Combined Analysis for Miles 2–3 and Miles 4–6

The proposed project is not located within forest land and will not result in the conversion of any forest land to non-forest use. The proposed project will not result in the conversion of any farmlands to other uses. The Dry Creek Habitat Enhancement Project would include the installation, monitoring, and maintenance of high quality salmonid rearing habitat enhancements and is located within the active flow area of the Dry Creek channel and the associated riparian corridor. None of the proposed enhancement areas are currently under agricultural production. Because the bank stabilization sites will require that the existing bank be excavated out and rebuilt, this may require encroachment during construction into adjacent vineyard areas. While this may impact some vineyard land during construction, the long-term effect to the bank stabilization work would be to protect the vineyard land from future losses as a result of continued erosion that would occur without the bank stabilization. This impact, while less than significant, would be further reduced by the implementation of **Mitigation Measures 3.1.1** and **3.2.2** in **Chapter 3.1 Aesthetics** as well as **Mitigation Measure 3.9.5a, b, and c** described above.

3.9.5 General Plan and Consistency

Sonoma County General Plan 2020

The project area is located within Sonoma County. The following section lists goals, policies and objectives related to land use, agricultural resources, open space and other natural resources from *Sonoma County General Plan 2020* and ends with a brief analysis discussing consistency with this plan.

Land Use Element

The Land Use Element establishes policies for guiding land use and development in accordance with planned future growth, including the distribution, location, and extent of land uses and their associated standards of population density and building density. The Land Use Element provides goals and objectives that are relevant to the proposed project.

Goal LU-4: *Maintain adequate public services in both rural and Urban Service Areas to accommodate projected growth. Authorize additional development only when it is clear that a funding plan or mechanism is in place to provide needed services in a timely manner.*

Policy LU-4d: *Assure that physical services and infrastructure will accommodate the projected amount of growth authorized by the Land Use Element. Prepare facility master plans or equivalent documentation based upon the holding capacity of the land use plan plus generally accepted engineering contingency*

factors. Periodically, but no less than every 5 years, assess the status of public services in relation to growth. Encourage public facilities planning and design beyond the 2020 horizon if the additional capacity does not induce increased pressure for population or employment growth in excess of that projected in the land use plan. Facility plans shall clearly delineate the portion of capacity allocated to growth after 2020. Work with the cities, and, where applicable, other counties to assure that such services are adequate for existing and future residents. Use proposed annexations, redevelopment agreements, revenue sharing agreements, and the CEQA process as tools to ensure that development within cities pay its fair share toward provision of these services.

Policy LU-11f: *Encourage conservation of undeveloped land, open space and agricultural lands, protection of water quality, restoration of ecosystems and minimization or elimination of the disruption of existing natural ecosystems and flood plains.*

Objective LU-13.1: *Retain agricultural lands in Dry Creek, Alexander, Oat and Knights Valleys in agricultural production.*

Agricultural Resources Element

The Agricultural Resources Element establishes policies that protect the stability and productivity of agricultural lands and the agricultural industry in the County. This element provides goals and objectives that are related to the proposed project.

Goal AR-4: *Allow farmers to manage their operations in an efficient, economic manner with minimal conflict with nonagricultural uses.*

Policy AR-4a: *The primary use of any parcel within the three agricultural land use categories shall be agricultural production and related processing, support services, and visitor serving uses. Residential uses in these areas shall recognize that the primary use of the land may create traffic and agricultural “nuisance” situations, such as flies, noise, odors, and spraying of chemicals.*

Objective AR-8.1: *Continued participation in the Williamson Act and Farmland Security Zone Programs.*

Open Space and Resource Conservation Element

The Open Space and Resource Conservation Element provides goals and policies for the conservation of natural resources including water, forests, soils, rivers, harbors, fisheries, wildlife, minerals, and other natural resources. It supports the county’s economic base by promoting the production and the use of the county’s resources. It guides land use decisions that contribute to the long term maintenance of resource production.

Goal OSRC-7: *Protect and enhance the County's natural habitats and diverse plant and animal communities.*

Goal OSRC-8: *Protect and enhance of riparian corridors and functions along streams, balancing the need for agricultural production, urban development, timber and mining operations, and other land uses with the preservation of riparian vegetation, protection of water resources, flood control, bank stabilization, and other riparian functions and values.*

Objective OSRC-8.2: *Provide standards for land use and development in streamside conservation areas that protect riparian vegetation, water resources and habitat values while considering the needs of resident, agriculture, business and other land users.*

Consistency

The project would be consistent with *Sonoma County General Plan 2020*. Proposed habitat enhancements along Dry Creek require the acquisition of new property easements of lands zoned Resource and Rural Development, Land Intensive Agriculture, or Land Extensive Agricultural. The land uses that occur in this area are agricultural (mostly vineyards) and wineries, rural residential, and riparian areas. While temporary impacts to agricultural production could occur due to noise, dust, and traffic during construction and some maintenance activities, no permanent impacts to adjacent land uses are anticipated and no loss of agricultural lands or open space would occur.

3.9.6 References

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CHAPTER 3.10 Noise

3.10.1 Introduction

This chapter describes the existing conditions relating to noise conditions within the Dry Creek Habitat Enhancement Project, Miles 2-6 (Dry Creek Project or proposed project) area. Section 3.10.2, “Environmental Setting” describes the regional and project area environmental setting, focusing on noise conditions occurring therein. Section 3.10.3, “Regulatory Framework” details the federal, state, and local laws related to environmental noise. Potential impacts to these resources resulting from the proposed project are analyzed in Section 3.10.4, “Impacts and Mitigation Measures” in accordance with the California Environmental Quality Act (CEQA) significance criteria (CEQA Guidelines, Appendix G) and mitigation measures are proposed that could reduce, eliminate, or avoid such impacts.

Other impacts to related resources are addressed in other chapters as follows: impacts related to land use are addressed in **Chapter 3.9, Land Use, Planning, and Agricultural Resources** and traffic impacts are addressed in **Chapter 3.13, Traffic and Transportation**.

3.10.2 Environmental Setting

The environmental setting for noise includes all areas that could be affected by activities associated with the Dry Creek Project. As stated in **Chapter 2, Project Description**, habitat enhancement sites have been identified for Miles 2-3 but specific sites have yet to be determined for Miles 4–6. Projects could occur anywhere along the 14-mile length of Dry Creek from Warm Springs Dam to the Russian River (exclusive of sites already enhanced in Mile 1). Consequently, the environmental setting includes the Dry Creek basin downstream of Warm Springs Dam, including the 14 river miles (RMs) from the dam to the Russian River, adjacent riparian areas, and surrounding floodplains and terraces, either unvegetated or occupied by agricultural or residential land-uses.

Noise

Noise Fundamentals

Sound is mechanical energy transmitted by pressure waves through a medium such as air. Noise can be defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the

sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. Sound pressure level is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing, and 120 to 140 dB corresponding to the threshold of pain. The decibel measurement system is a logarithmic unit of measurement, such that a ten-fold change in sound pressure is represented by an increase of 10 dB.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude (sound power). When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a result, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to low and extremely high frequencies and focuses on the frequency mid-range. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). Frequency A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements. Some representative noise sources and their corresponding A-weighted noise levels are shown in **Figure 3.10-1**.

Figure 3.10-1. Typical Noise Levels for Common Outdoor and Indoor Activities

COMMON OUTDOOR ACTIVITIES	NOISE LEVEL (dBA)	COMMON INDOOR ACTIVITIES
Jet Fly-over at 300 m (1000 ft)	---110---	Rock Band
Gas Lawn Mower at 1 m (3 ft)	---100---	Food Blender at 1 m (3 ft) Garbage Disposal at 1 m (3 ft)
Diesel Truck at 15 m (50 ft), at 80 km/hr (50 mph)	---90---	Vacuum Cleaner at 3 m (10 ft)
Noisy Urban Area, Daytime	---80---	Normal Speech at 1 m (3 ft)
Gas Lawn Mower, 30 m (100 ft)	---70---	Large Business Office

Commercial Area	---60---	Dishwasher Next Room Theater, Large Conference Room (Background)
Heavy Traffic at 90 m (300 ft)	---50---	
Quiet Urban Daytime	---40---	
Quiet Urban Nighttime	---30---	
Quiet Suburban Nighttime		Library Bedroom at Night, Concert Hall (Background)
Quiet Rural Nighttime	---20---	
	---10---	
	---0---	Broadcast/Recording Studio

Source: California Department of Transportation 2009.

Noise Exposure and Community Noise

An individual's noise exposure is a measure of the noise experienced by the individual over a period of time. A noise level is a measure of noise at a given instant in time. The noise levels presented in **Figure 3.10-1** are representative of measured noise at a given instant in time, however, they rarely persist consistently over a long period of time.

Rather, community noise varies continuously with time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable.

Background noise levels change throughout a typical day, but do so gradually, corresponding with the addition and subtraction of distant noise sources and atmospheric conditions. The addition of short duration single event noise sources (e.g., aircraft flyovers, motor vehicles, sirens, etc.) makes community noise constantly variable throughout a day.

These successive additions and deletions of sound to the community noise environment change the community noise level from instant to instant requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts.

Noise Definitions

Time-varying characteristics of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

L_{eq}: The equivalent sound level is used to describe noise over a specified period of time, in terms of a single numerical value. The L_{eq} is the constant sound level which

would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).

L_{max}: The instantaneous maximum noise level measured during the measurement period of interest.

L50: The noise level that is equaled or exceeded 50 percent of the specified time period. The L50 represents the median sound level.

L90: The noise level that is equaled or exceeded 90 percent of the specified time period. The L90 is sometimes used to represent the background sound level.

L_{dn}: Day-Night Average Sound Level, or the energy average of the A-weighted sound levels occurring during a 24-hour period, and which accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night (“penalizing” nighttime noises). Noise between 10:00 p.m. and 7:00 a.m. is weighted (penalized) by adding 10 dBA to take into account the greater annoyance of nighttime noises. It should be noted that the L_{dn} is sometimes referred to as the DNL.

CNEL: The Community Noise Equivalent Level (CNEL) adds a 5-dBA *penalty* for the evening hours between 7:00 p.m. and 10:00 p.m. in addition to a 10-dBA penalty for the nighttime hours between 10:00 p.m. and 7:00 a.m.

As a general rule, in areas where the noise environment is dominated by traffic, the L_{eq} during the peak-hour is generally equivalent to the L_{dn} at that location (within +/- 2 dBA) (California Department of Transportation (Caltrans) 1998).

Effects of Noise on People

The effects of noise on people can be placed into three categories:

1. subjective effects of annoyance, nuisance, and dissatisfaction;
2. interference with activities such as speech, sleep, and learning; and
3. physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers at industrial plants often experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A wide variation exists in the individual thresholds of annoyance, and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way the new noise compares to the existing noise levels to which one has adapted: the so-called “ambient noise level.” In general, the more a new noise exceeds the

previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur (Caltrans 1998):

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference when the change in noise is perceived but does not cause a human response;
- A change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- A 10-dBA change is subjectively heard as approximately a doubling in loudness, and can cause an adverse response.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. A ruler is a *linear* scale, which has marks corresponding to equal quantities of distance, (i.e., the ratio of successive intervals is equal to one). A *logarithmic* scale is different in that the ratio of successive intervals is not equal to one. Each interval on a logarithmic scale is some common factor larger than the previous interval. A typical ratio is 10, so that the marks on the scale read: 1, 10, 100, 1,000, 10,000, etc., doubling the variable plotted on the x-axis. The human ear perceives sound in a non-linear fashion; hence, the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, rather they combine logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

Noise Attenuation

Stationary point sources of noise, including stationary mobile sources such as idling vehicles or onsite construction equipment, attenuate (lessen) at a rate of 6.0 dBA to 7.5 dBA per doubling of distance from the source, depending upon the type (i.e., soft or hard) of the ground surface between the source and receptor. Hard sites are those with a reflective surface between the source and the receiver such as parking lots or smooth bodies of water. No excess ground attenuation is assumed for hard sites and the changes in noise levels with distance (drop-off rate) is simply the geometric spreading of the noise from the source. Soft sites have an absorptive ground surface such as soft dirt, grass or scattered bushes and trees (Caltrans 1998).

Sensitive Receptors

Human response to noise varies considerably from one individual to another. Effects of noise at various levels can include interference with sleep, concentration, and communication, and can cause physiological and psychological stress and hearing loss. Given these effects, some land uses are considered more sensitive to ambient noise levels than others. California Government Code Section 65302 considers residences, schools, churches, libraries, office buildings, hospitals, and nursing homes to be the most sensitive to noise. Recreational areas can also be considered sensitive to noise. Commercial and industrial uses are considered the least noise-sensitive.

Vibration

Vibration Characteristics

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. There are several different methods that are used to quantify vibration. Vibration can be a serious concern, causing buildings to shake and rumbling sounds to be heard. In contrast to noise, vibration is not a common environmental problem. Some common sources of vibration are trains, buses on rough roads, and construction activities such as blasting, pile driving, and heavy earth-moving equipment.

Vibration Definitions

Several different measurements are used to quantify different aspects of vibration. One measurement is the peak particle velocity (PPV), which is most frequently used to describe vibration impacts to buildings. Another measurement is the root mean square (RMS) amplitude, which is most frequently used to describe the effect of vibration on the human body. A third measurement is decibel notation (V_{dB} or L_v), is commonly used to measure RMS amplitude (United States Department of Transportation's Federal Transit Administration Office of Planning and Environmental ((FTA) 2006).

Ground-Borne Noise

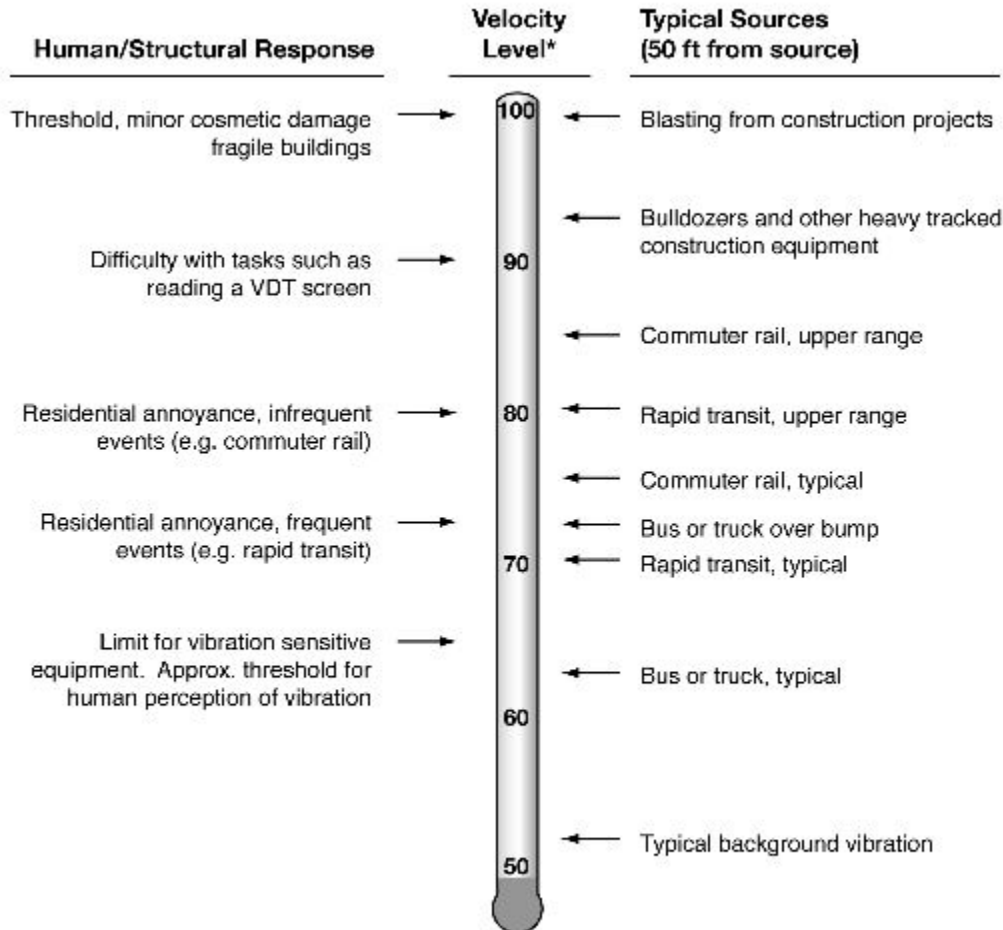
Ground-borne noise refers to the rumbling sound caused by the vibration of surfaces within a building. The annoyance potential of ground-borne noise is characterized in dBA units. Due to differences in the medium the sound is travelling through, ground-borne noises are characteristically of lower frequency sounds than air-borne noise. Due to the non-linearity of human hearing which causes sounds dominated by low-frequency components to seem louder, ground-borne noise with a level of 40 dBA typically sounds louder than 40 dBA air-borne noise. Therefore, limits for ground-borne noise are lower than for air-borne noise (FTA 2006).

Typical Perceptible Levels of Ground-Borne Vibration

In contrast to air-borne noise, ground-borne vibration is not a phenomenon that most people experience every day. The background vibration velocity level in residential areas is usually 50 VdB or lower, well below the threshold of perception for humans which is around 65 VdB. Most perceptible indoor vibration is caused by sources within buildings such as operation of mechanical equipment, movement of people or slamming of doors. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If the roadway is smooth, the vibration from traffic is rarely perceptible (FTA 2006).

Figure 3.10-2 illustrates common vibration sources and the human and structural response to ground-borne vibration. The range of interest is from approximately 50 VdB to 100 VdB. Background vibration is usually well below the threshold of human perception and is of concern only when the vibration affects very sensitive manufacturing or research equipment. Electron microscopes and high-resolution lithography equipment are typical of equipment that is highly sensitive to vibration.

Figure 3.10-2. Typical Levels of Ground-Borne Vibration



* RMS Vibration Velocity Level in VdB relative to 10^{-6} inches/second

Source: FTA 2006.

Structural Response to Vibration

Structural response to vibration is typically evaluated in terms of PPV, which is often used since it is related to the stresses that are experienced by buildings. Various general standards are contained in the International Standards Organization standards 3945, 4866, and 7626-1. The FTA identifies limit vibration damage threshold criteria set by these standards, which are listed below in **Table 3.10-1**. At a PPV of 0.5 inches per second for reinforced-concrete, steel or timber (no plaster), PPV of 0.3 inches per second on engineered concrete and masonry (no plaster), PPV of 0.20 inches per second for non-engineered timber and masonry buildings (i.e., fragile buildings), and PPV of 0.12 inches per second for buildings extremely susceptible to vibration (i.e., fragile historic buildings) (FTA 2006). Please refer to **Table 3.10-1**.

Table 3.10-1. Construction Vibration Damage Criteria

Building Category	PPV (in/sec)	Approximate L_v †
I. Reinforced-concrete, steel or timber (no plaster)	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Non-engineered timber and masonry buildings	0.2	94
IV. Buildings extremely susceptible to vibration damage	0.12	90
† RMS velocity in decibels (VdB) re 1 micro-inch/second Source: FTA 2006.		

Construction Vibration

Construction activities can result in varying degrees of ground vibration, depending on the equipment and methods employed. Operation of construction equipment causes ground vibrations that spread through the ground and diminish rapidly in strength with distance. Buildings founded on the soil in the vicinity of a construction site respond to these vibrations with varying results, ranging from no perceptible effects at the lowest levels, low rumbling sounds and perceptible vibrations at moderate levels, and slight damage at the highest levels.

Ground vibrations from construction activities do not often reach the levels that can damage structures, but they can achieve the audible and noticeable ranges in buildings very close to the site. A possible exception is the case of fragile buildings, many of them old, where special care must be taken to avoid damage. The construction activities that typically generate the most severe vibrations are blasting and impact pile-driving.

Existing Ambient Noise Environment

The primary contributors to the noise environment in the Dry Creek Project area include vehicle traffic on adjacent roads; vineyard and winery operations; airplane over-flights; sounds emanating from residences; and naturally occurring sounds such as wind and wildlife, etc.

Roadways in the project area include Dry Creek Road, West Dry Creek Road, Skaggs Spring Road, West Side Road, Lambert Bridge Road, Yoakim Bridge Road and Highway 101. The proposed project is located in an agricultural area that is subject to temporary and periodic increases in traffic-related noise as a result of the movement of farm equipment, the transport of grapes in heavy-duty trucks, tasting room operation, and special events.

In addition, noise related to vineyard and winery operations can be a concern during the harvest season, when farm equipment is used heavily and grapes are loaded and

unloaded using forklifts and heavy duty trucks. Truck deliveries associated with bulk wine or bottled wine can also be a source of noise complaint from adjacent residential uses. Noise producing equipment used at wineries includes air compressors, grape presses, exhaust fans, chillers and bottling plants. Use of this equipment and other related activities may create noise levels above and different from the ambient noise environment. File data indicate that average hourly noise levels from properly muffled vehicles and equipment operating at wineries are typically less than 60 dB at a distance of 300 feet from the source. Nearby residents may complain about the noise from these activities, but given the seasonal nature of winery activities, noise impacts from normal winery operations are usually considered to be less than significant (PRMD 2012). Additional noise sources may include other man-made localized sources or special events (i.e., weddings, the Annual Passport to Dry Creek Valley, the Annual Wine and Food Affair, the Annual Winter WINEland, and the Annual Barrel Tasting).

While airports can be a significant source of noise, the proposed project is located approximately 1.5 miles from the Healdsburg Municipal Airport, which does not generate a significant amount of noise in the project area. There are no private airstrips in the project area.

Existing Vibration Environment

The existing vibration environment is dominated by traffic from nearby roadways (e.g. Dry Creek Road). Heavy-duty trucks and equipment associated with winery operations can generate vibrations that vary depending on vehicle type, weight, and pavement conditions.

Noise Sensitive Land Uses

Sensitive receptors located within the Dry Creek area that may be impacted by the proposed project include the following:

Residential. Residential development in the action area includes various single-family residences located along the west and east banks of Dry Creek.

Parks and Recreation. Lake Sonoma, which includes a public resort area, Milt Brandt Visitor Center, and the Don Clausen Fish Hatchery (Warm Springs National Fish Hatchery) is located at the northern end of the project area.

Businesses. Businesses in the project area include various wineries located on adjacent roads and on properties along Dry Creek and the Dry Creek General Store, located at the intersection of Dry Creek Road and Lambert Bridge Road.

Water Agency staff performed a noise monitoring survey to ascertain the existing ambient noise levels in the project vicinity on October 13 and 14, 2014. Short-term noise measurements were obtained using the CEI-269 Digital Integrating Sound level

Meter. The sound level meter meets American National Standards Institute (ANSI) standard S1.4-1983. The meter was calibrated on October 13, 2014. The calibration meets ANSI standard S1.40-1984. Noise levels were measured at seven sensitive receptor locations (residences, a business, and a recreational area near a cultural ceremony site) throughout the proposed project area to determine the existing conditions for ambient noise to which estimated noise from the proposed project can be compared. **Table 3.10-2** depicts the ambient noise levels that were measured on October 13, 2014 at the seven sensitive receptor locations throughout the proposed project area. The closest residences average approximately 170 to 675 ft. to the east and west of Dry Creek. Ambient noise levels at residences in the vicinity of the proposed project area range from approximately 37 to 58 dBA in areas adjacent to Dry Creek.

Table 3.10-2.Existing Ambient Noise Levels in the Project Vicinity

Reading #	Description of Monitoring Location	Noise Level (dBA)	Approximate Distances from Project Sites (ft)
1	*Business within Reach 2b on Westside Rd, Healdsburg	58	360
2	*Residence within Reach 4a on W Dry Creek Rd, Healdsburg	43	400
3	*Residence within Reach 5 on W Dry Creek Rd, Healdsburg	43	200
4	*Residence within Reach 8 on W Dry Creek Rd, Healdsburg	37	197
5	*Residence within Reach 10 on Dry Creek Rd, Healdsburg	43	170
6	*Residence within Reach 13 and 14 on Dry Creek Rd, Healdsburg	45	455
7	*Recreational area below Warm Springs Dam near Reach 14	42	675
*Near or at sensitive receptor locations.			

3.10.3 Regulatory Framework

Federal, State, and local agencies regulate different aspects of environmental noise. Federal and State agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while local agencies regulate stationary sources. Local regulation of noise involves implementation of general plan policies and noise ordinance standards. Local general plans tend to identify general principles intended to guide and

influence development plans, while local noise ordinances establish standards and procedures for addressing specific noise sources and activities.

Federal

There are no federal noise standards that directly regulate environmental noise or vibration related to construction, maintenance or operation of the proposed project. With regard to noise exposure and the workplace, Office of Environmental Health and Safety regulations safeguard the hearing of workers exposed to occupational noise.

However, the FTA publication, *Transit Noise and Vibration Noise Impact Assessment* (2006), provides guidance on transit noise and vibration impact assessment and discusses ways of reducing excessive noise and vibration caused by mass transit projects. The assessment contains criteria that identifies thresholds for noise and vibration impacts from transit systems. These noise impact criteria are based on the change in ambient noise exposure. L_{dn} is used to characterize residential areas, and a maximum one-hour operational L_{eq} is used to characterize other noise sensitive areas, such as schools, parks, and outdoor amphitheaters. The vibration impact criteria identifies PPV thresholds for adverse human reaction and risk of architectural damage to buildings from construction transit projects. The criteria for acceptable ground-borne vibration are expressed in terms of RMS velocity levels in decibels.

State

The State of California adopted the California Noise Insulation Standards in 1974.¹ These standards set forth an interior standard Day-Night Average Sound Level (DNL)² of 45 dBA for habitable spaces. These standards may be applied to residences located near construction activities or stationary noise sources as a method of examining potentially intrusive noise.

There are no adopted state policies or standards for ground-borne vibration. However, the Caltrans vibration criteria identifies PPV thresholds for adverse human reaction and risk of architectural damage to buildings. Caltrans criteria is taken from the Transport and Road Research Laboratory in England, *A Survey of Traffic-induced Vibrations* (Caltrans 2002). The Transport and Road Research Laboratory has researched continuous vibrations to some extent and developed a summary of vibration levels and

¹ *California Code of Regulations*, Title 24, Part 2, Appendix Chapters 12 and 12A (known as Building Standards Administrative Code, California Building Code).

² The Day-Night Average Sound Level (L_{dn} or D_{NL}) is the average noise level over a 24-hour period. Noise between the hours of 10 p.m. and 7 a.m. is artificially increased by 10 dB. This noise is weighted to take into account the decrease in community background noise of 10 dB during this period. The Federal Aviation Authority has established this measure as a community noise exposure metric to aid airport noise analyses under Federal Aviation Regulation Part 150.

reactions of people and the effects on buildings that continuous vibration levels produce.

Local

Sonoma County General Plan

Noise

At the local level, noise is addressed through the implementation of general plan policies, including noise and land use compatibility guidelines, and through enforcement of noise ordinances. General plan policies provide guidelines for determining whether a noise environment is appropriate for a proposed or planned land use. Local noise ordinances regulate noise sources such as mechanical equipment and amplified sounds, as well as determine allowable hours of heavy equipment operation.

The Sonoma County General Plan 2020 Noise Element addresses operational noise and does not specifically address intermittent or short-term construction and maintenance noise and currently there is no adopted noise ordinance in the County of Sonoma Municipal Code. The *Sonoma County General Plan 2020* Policy NE-1h calls for the County to adopt a noise ordinance that would include noise performance standards with the intent of protecting people from existing or future excessive levels of noise which interfere with sleep, communication, relaxation, health or legally permitted use of property. A noise ordinance has not been adopted to date, but Policy NE-1h does allow that the noise ordinance may exempt or modify noise requirements for certain uses, including construction activities. General plan goals, objectives, and policies are listed in Section, 3.10.5, “General Plans and Consistency.”

Vibration

In addition, a numerical threshold to identify the point at which a vibration impact occurs has not been identified by Sonoma County standards or municipal codes. In the absence of local regulatory significance thresholds for vibration from construction equipment, it is appropriate to use the FTA’s vibration criteria listed in **Table 3.10-1**.

3.10.4 Environmental Impacts and Mitigation Measures

This section describes the impact analysis relating to noise for the proposed project. It describes the methods used to determine the impacts of the project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany each impact discussion, where applicable.

Approach to Analysis

Noise impacts are assessed based on a comparative analysis of the noise levels resulting from the project and the noise levels under existing conditions. Analysis of temporary construction noise effects is based on typical construction phases, equipment noise levels and attenuation of those noise levels due to distances, and any barriers between the construction activity and the sensitive receptors near the sources of construction noise.

Analysis of temporary vibration effects from construction is based on equipment vibration levels and attenuation of vibrations due to distances between the construction activity and the sensitive receptors near the source of construction vibration.

This EIR includes program- and project-level analysis. Because the types and locations of program-level habitat enhancements have not yet been identified, construction, operation, and maintenance impacts are addressed at a program-level in this EIR. Actual types and locations of these habitat enhancements will be determined in the future and will be described and analyzed in a future environmental document at the project (or site-specific) level. Impacts were considered significant if the proposed project would result in any changes or conditions identified above in the “Significance Criteria.”

Project implementation includes construction, operation, and maintenance of the proposed project. The majority of the ground disturbance would take place during the construction phase of the proposed project and it is anticipated that maintenance activities would primarily consist of vegetation management. However, there is a possibility that maintenance activities would also include activities similar to construction, such as repair to damaged structures or adjustments to structures if they are not functioning properly. Therefore, maintenance activities are considered alongside construction activities in terms of their potential for impact in the analysis below. Operation of the project is excluded from the analysis below because operation of the proposed project would resemble the natural functioning of Dry Creek and would not result in noise-related impacts.

Noise

Noise levels associated with the construction and periodic maintenance of the habitat enhancements within and adjacent to Dry Creek channel and on private properties from approximately one-half mile downstream of Warm Springs Dam to the confluence within the Russian River could result in substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

A substantial temporary or periodic short-term increase in ambient noise levels standards associated with construction and maintenance noise, such as that would

occur under the proposed project, is not addressed in Noise Element of *Sonoma County General Plan 2020* and the County of Sonoma does not have an adopted noise ordinance. For the purposes of this EIR, it is appropriate to use the numerical criterion identified in the FTA's Construction Noise Criteria General Assessment for transit projects (FTA 2006). Temporary impacts during construction and maintenance activities under the proposed project would be considered significant if they would substantially interfere with sensitive land uses, such as residences and businesses. Substantial interference could result from a combination of factors, including: exposing sensitive receptors to the generation of substantial (i.e., equal to or greater than 90 dBA in the daytime and equal to or greater than 80 dBA at nighttime for residence and 100 dBA in the daytime and at nighttime for commercial and industrial) noise levels at sensitive receptor locations; and/or construction activities that would affect noise-sensitive uses during the nighttime.

Vibration

A numerical threshold to identify the point at which construction equipment vibration impacts on a structure or humans occurs has not been identified by a local jurisdiction in the applicable standards or municipal codes. In the absence of local regulatory significance thresholds for vibration from construction equipment, it is appropriate to use the Construction Vibration Damage Criteria and Ground-Borne Vibration Impact Criteria on Sensitive Land Use of the FTA transit projects (FTA 2006).

Architectural damage to a structure from the generation of an excessive ground-born vibration impact will be considered significant if the architectural damage threshold goes above the FTA's Construction Vibration Damage Criteria numerical threshold for different types of buildings. The FTA identifies a vibration damage threshold criterion at a PPV of 0.5 inches per second for reinforced-concrete, steel or timber (no plaster), PPV of 0.3 inches per second on engineered concrete and masonry (no plaster), PPV of 0.20 inches per second for non-engineered timber and masonry buildings (i.e., fragile buildings), and PPV of 0.12 inches per second for buildings extremely susceptible to vibration (i.e., fragile historic buildings) (FTA 2006). Please refer to **Table 3.10-1**.

Exposure of persons to the generation of excessive ground-borne vibration levels will be considered a significant impact if the vibration exceeds the annoyance threshold in the FTA's Ground-Borne Vibration Impact Criteria on Sensitive Land Use numerical threshold criterion. Please refer to **Table 3.10-8**.

Significance Criteria

The criteria used to determine the significance of an impact are based on the environmental checklist in Appendix G of the CEQA Guidelines. For this analysis, implementation of the proposed Dry Creek Project would be considered to have a significant impact associated with noise or vibration if it would:

1. Expose persons to or generate noise levels in excess of standards established in the local general plan (*Sonoma County General Plan 2020*) or noise ordinance, or applicable standards of other agencies.
2. Expose persons to or generate excessive ground-borne vibration or ground-borne noise levels.
3. Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
4. Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing levels existing without the project.
5. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels.
6. For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

Several of the significance criteria included in Appendix G of the CEQA Guidelines and listed above do not apply to this analysis and are not used, as explained below.

Expose persons to or generate noise levels in excess of standards established in the local general plan (Sonoma County General Plan 2020) or noise ordinance, or applicable standards of other agencies. A substantial temporary or periodic short-term increase in ambient noise levels standards associated with construction and maintenance noise, such as that which would occur under the proposed project, is not addressed in the Noise Element of the *Sonoma County General Plan 2020* and the County of Sonoma does not have an adopted noise ordinance. *The Sonoma County General Plan 2020 Noise Element* only addresses operational noises, which would not differ from the ambient noise levels for the proposed project. In addition, there are no noise standards created by other agencies that would be applicable to the proposed project. Therefore, there is no potential that the proposed project would expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, and no impact would occur. This issue is not addressed further in this EIR.

For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels. Because implementation of the proposed project is not within an airport land use

plan or, where such a plan has not been adopted, or within two miles of a public airport or public use airport and would not expose people residing or working in such areas that have excessive noise levels, there are no noise impacts that would occur under the proposed project and this issue is not addressed further in this EIR.

For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels. Because implementation of the proposed project is not within the vicinity of a private airstrip or in such areas that have excessive noise levels, there are no noise impacts that would occur under the proposed project and this issue is not addressed further in this EIR.

Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project. The Dry Creek Habitat Enhancement Project, Miles 2-6 Project would not result in a permanent increase in ambient levels above levels existing without the proposed project. Therefore, there would be no impact associated with a permanent increase in noise levels and this issue is not addressed further in this EIR.

Impact Analysis and Mitigation Measures

The following section presents a detailed discussion of potential impacts associated within noise resulting from the Dry Creek Project. Both program-level and project-level project components are analyzed. Impacts are summarized and categorized as either “less than significant,” “less than significant with mitigation,” or “significant and unavoidable.” Impacts are also identified as applicable to construction, operation, and/or maintenance phases of the project.

Impact 3.10.1: Construction and maintenance of the Dry Creek Habitat Enhancement Project, Miles 2-6 would result in a substantial temporary or periodic increase in ambient noise levels. (Significant and Unavoidable)

Combined Analysis for Miles 2 – 3 and Miles 4 – 6

Construction activity noise levels at and near the construction areas would fluctuate depending on the particular type, number, and duration of uses of various pieces of construction equipment. Construction-related material haul trips would raise ambient noise levels along haul routes, depending on the number of haul trips made and types of vehicles used. In addition, certain types of construction equipment generate impulsive noises (such as pile driving), which can be particularly disruptive. **Table 3.10-3** depicts typical noise levels generated from various types of construction equipment at a reference distance of 50 feet from construction activity, according to the FTA.

Table 3.10-3. Noise Levels Associated With Typical Construction Equipment

Equipment Description	Noise Level at L _{max} 50 feet ^a (dBA, slow ^a)
Backhoe	80
Chain saw	85
Compactor (ground)	80
Compressor (air)	80
Crane (mobile or stationary)	85
Dozer	85
Dump truck	84
Excavator	85
Flatbed truck	84
Front end loader	80
Generator (25 kilovolt-amperes [kVA] or less)	70
Generator (more than 25 kVA)	82
Gradall	85
Grader	85
Jackhammer	85
Paver	85
Pickup truck	55
Pneumatic tools	85
Pumps	77
Rock drill	85
Scraper	85
Tractor	84
Vibratory pile driver	95
Welder/Torch	73
Notes: ^a Measurement taken from the loudest side of equipment. The construction noise levels represent conservative worst-case conditions in which the maximum amount of construction equipment would be operating during a one-hour period. These estimated maximum noise levels would not be continuous nor would they be typical noise levels throughout the construction period. Source: FTA 2006.	

For the purpose of this analysis, it is assumed that noise from a point source attenuates at a rate of 7.5 dBA per doubling of distance to account for the absorption of noise waves due to soft ground surfaces (e.g., dirt, grass, scattered vegetation) and intervening features and structures. For example, as shown in **Table 3.10-2**, the closest residence to a construction activity is located approximately 170 ft. away from the project site. The highest noise level generated from construction equipment is estimated to be 95 dBA, which would decrease to approximately 87.5 dBA at 100 ft., 80 dBA at 150 ft., 65 dBA at 200 ft., and so on. If the closest residence is located approximately 170 feet away, then the noise from the highest noise-generating piece of equipment, the vibratory pile driver, would likely measure between 80 and 65 dBA at the location of the residence. This noise level does not exceed the construction noise threshold described

by the FTA. However, noise impacts are subjective in nature and given the residential uses of the area as well the importance of a visitor's experience for winery operations, the project area is considered to have sensitive receptors for construction generated noises.

While most construction noise would take place only within daylight hours, pumps associated with stream diversions around work areas could in some instances, although unlikely, run on a 24-hour basis. There are residences adjacent to the proposed project sites that could be exposed to increased ambient noise levels during construction activities; however, the overall project area setting is agricultural. Existing noise-generating agricultural activities can and do occur at various hours over a 24-hour period depending upon needs (e.g. harvest, frost protection activities). The potential nighttime construction activities would be temporary and would not represent a significant new source of noise in the project area.

While it is not anticipated that the habitat enhancement structures will require regular maintenance work over the long term, temporary irrigation may be required to maintain newly-installed vegetation and periodic vegetation management may take place in certain locations to enhance fish habitat. Maintenance activities may also include repair to damaged structures or adjustments to structures if they are not functioning as intended. Given this, maintenance noise levels could intermittently and temporarily rise above existing ambient levels. Given the infrequent and temporary nature of these activities, and including the proposed mitigation measures, this impact would be less than significant with mitigation.

In addition to construction and maintenance activities at the proposed project sites, it is assumed that the proposed project would require up to 307 vehicle trips per day, including crew trips to and from work sites and hauling equipment and materials to and from the sites. Noise levels that would occur along the vehicle routes associated with a passing vehicle would range from a high 60-dBA to high 80-dBA range, depending on the type of vehicle and distance to the vehicle. Given the limited amount of vehicles that would be associated with construction and maintenance of the proposed project, the limited amount of days per year that trips would occur, and the dBA range would be below 90 dBA in the daytime, noise levels associated with off-site vehicle trips would be negligible and would result in a less than significant impact.

The potential dBA levels experienced at nearby sensitive receptors associated with construction and maintenance activities for the proposed project are below the FTA's residence significant criteria of 90 dBA in the daytime and 80dBA at nighttime, however; the ambient noise levels range from 42-58 dBA at sensitive receptor locations. Given that the noise levels from construction activities would be 10 dBA or more above the ambient noise level, there is a potential for the noise levels during construction to be

perceived as a nuisance for the closest residences to the project site. Implementation of **Mitigation Measure 3.10-1a-c** would insure that the periodic noise level increases in the vicinity of the proposed project sites would be less than significant in many cases. Although the noise generated during construction would be temporary in nature and the proposed mitigation measures would reduce the impact to less-than-significant levels in many cases, this impact could still be significant and unavoidable given the potential for sensitive receptors for noise sources in the project area.

Mitigation Measure 3.10.1a: Construction activities and potential maintenance activities will generally take place between the hours of 7:00 am – 6:00 pm, Monday through Friday. Weekend work and evening work is not anticipated; although may be necessary to complete work. If necessary, dewatering pumping may be allowed on a 24-hour basis in order to limit the time that diversion of stream flows is required. In such a case, prior notification of these activities will be given to residents.

Mitigation Measure 3.10.1b: Equipment and trucks used for construction will utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically attenuating shields or shrouds), wherever feasible.

Mitigation Measure 3.10.1c: Construction contractors will locate fixed construction equipment (such as compressors and generators) and construction staging areas as far as feasible from nearby sensitive receptors.

Although the proposed mitigation measures would reduce the impact to less-than-significant levels in many cases, in noise sensitive areas it may not. Therefore, this impact could be significant and unavoidable.

Impact Significance after Mitigation: Significant and Unavoidable.

Impact 3.10.2: Construction and maintenance activities of the Dry Creek Habitat Enhancement Project, Miles 2-6 would generate ground-borne vibration. (Less than Significant)

Combined Analysis for Miles 2–3 and Miles 4–6

Heavy construction equipment, such as large pile driving equipment, can produce vibration levels that can cause architectural damage to nearby structures or be annoying to nearby sensitive receptors. However, large pile driving equipment is unlikely to be utilized as part of the habitat enhancement construction efforts.

Vibration levels generated by the proposed project would vary based on types of equipment used and the geology of the site. Typical vibration levels for the equipment

types that would generally result in the highest vibration levels associated with the proposed project (i.e., large bulldozer or pile driver) are shown in **Table 3.10-4** and estimated at different distances in **Table 3.10.5**. **Table 3.10-6** provides the FTA's Construction Vibration Damage Criteria for structures in both PPV and approximate corresponding VdB values. **Table 3.10-7** describes the typical human response thresholds to different levels of ground-borne vibration.

Table 3.10-4. Vibration Velocities for equipment generally resulting in the highest vibration levels likely to be used for the Dry Creek Habitat Enhancement Project

Equipment	RMS ^a at 25 Feet (VdB) ^b
Pile Driver (sonic)	
Upper Range	105
Typical	93
Large bulldozer	87
Jackhammer	79
^a RMS – Root means squared amplitude is used to describe the effect of vibration on the human body. The human annoyance response level is 80 RMS. ^b VdB – Decibel notation used to measure RMS amplitude. It acts to compress the range of numbers required to describe vibration. Source: FTA 2006.	

Table 3.10-5. Estimated Construction Equipment Vibration Levels at Different Distances³

Equipment	L _v ¹ at 25 ft	L _v at 50 ft	L _v at 100 ft	L _v at 170 ft	L _v at 200 ft	L _v at 300 ft
Pile Driver (sonic)	105 VdB	96 VdB	87 VdB	80 VdB	78 VdB	68 VdB
Large bulldozer	87 VdB	78 VdB	69 VdB	62 VdB	60 VdB	50 VdB
Jackhammer	79 VdB	70 VdB	61 VdB	54 VdB	52 VdB	42 VdB
¹ The Decibel notation (VdB), also noted as L _v is commonly used to measure RMS amplitude.						

³ To estimate the potential vibration levels (L_v) at different distances the following equation was applied to the typical vibration velocities provided in Table 3.10.5:

$$L_v(D) = L_v(25ft) - 30 \log(D/25)$$

where: L_v = vibration level at any distance D and L_v(25ft) VdB values are applied

Table 3.10-6. Construction Vibration Damage Criteria

Building Category	PPV (in/sec)	Approximate VdB
I. Reinforced-concrete, steel or timber (no plaster)	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Non-engineered timber and masonry buildings	0.2	94
IV. Buildings extremely susceptible to vibration damage	0.12	90
<i>Source:</i> FTA 2006.		

Table 3.10-7. Human Response to Different Levels of Ground-Borne Vibration

Vibration Velocity Level L_v (VdB)	Human Response
65 VdB	Approximate threshold of perception for many humans. Low-frequency sound usually inaudible, mid-frequency sound excessive for quiet sleeping areas.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find transit vibration at this level annoying. Low-frequency noise acceptable for sleeping areas, mid-frequency noise annoying in most quiet occupied areas.
85 VdB	Vibration acceptable only if there are an infrequent number of events per day. Low-frequency noise annoying for sleeping areas, mid-frequency noise annoying even for infrequent events with institutional land uses such as schools and churches.
Notes: <i>Source:</i> FTA 2006.	

Based on estimated construction equipment vibration levels (Table 3.10-5) and predicted impacts on structures and people (Tables 3.10-6 and 3.10-7), vibrations anticipated to occur during construction are not anticipated to result in significant vibration impacts to structures or people. For impacts to structures, only a sonic pile driver operating closer than 100-feet from a structure is estimated to result in VdB levels greater than 90 (lowest threshold from Table 3.10-6). For impacts to humans, operation of equipment such as a pile driver within 200 feet, a large bulldozer within 50 feet, or a jackhammer within 50 feet are likely to result in VdB levels greater than 75 (annoying levels of vibration as defined in Table 3.10-8). The majority of project construction would occur greater than 170 feet from sensitive receptors and structures. In addition, large pile driving equipment is unlikely to even be utilized as part of the habitat enhancement construction efforts. Therefore, construction equipment vibration levels are not

anticipated to significantly exceed criteria thresholds for damage to structures or annoyance to people in the project area. Vibration impacts would be less than significant.

Impact Significance: Less than Significant; no mitigation measures required.

3.10.5 General Plan and Consistency

County of Sonoma General Plan 2020

The Noise Element of the *County of Sonoma General Plan 2020* establishes the following goals, objectives, and policies to reduce existing and future operational noise impacts and conflicts (Sonoma County 2012).

Goal NE-1: Protect people from the adverse effects of exposure to excessive noise and to achieve an environment in which people and land uses may function without impairment from noise.

Objective NE-1.1: Provide noise exposure information so that noise impacts may be effectively evaluated in land use planning and project review.

Objective NE-1.3: Protect the present noise environment and prevent intrusion of new noise sources which would substantially alter the noise environment.

Policy NE-1a: Designate areas within Sonoma County as noise impacted if they are exposed to existing or projected exterior noise levels exceeding 60 dB L_{dn}, 60 dB CNEL, or the performance standards of Table NE-2 (presented above as **Table 3.10-3**).

Policy NE-1c: Control non-transportation related noise from new projects. The total noise level resulting from new sources shall not exceed the standards in Table NE-2 (presented above as Table 4.10-3) as measured at the exterior property line of any adjacent noise sensitive land use. Limit exceptions to the following: (4) For short term noise sources which are permitted to operate no more than six days per year, such as concerts or race events, the allowable noise exposures shown in Table NE-2 (presented above as **Table 3.10-3**) may be increased by 5 dB. These events shall be subject to a noise management plan including provisions for maximum noise level limits, noise monitoring, complaint response and allowable hours of operation. The plan shall address potential cumulative noise impacts from all events in the area.

Consistency

The Dry Creek Project does not conflict with the goals, objectives, and policies pertaining to noise in *Sonoma County General Plan 2020*.

3.10-6 References

[Caltrans] California Department of Transportation. "Technical Noise Supplement." October 1998.

[Caltrans] California Department of Transportation. "Transportation Related Earthborne Vibrations." Technical Advisory, Vibration TAV-02-01-R9601. Rudy Hendriks. February 2002.

[Caltrans]. California Department of Transportation "Technical Noise Supplement." November 2009.

[EPA] United States Environmental Protection Agency. "Noise from Construction Equipment and Operations, Building Equipment and Home Appliances." December 1971.

[FTA] United States Department of Transportation, Office of Planning and Environment, Federal Transit Administration. "Transit Noise and Vibration Impact Assessment". May 2006.

[PRMD] Sonoma County Permits and Resources Management Department, *County of Sonoma General Plan 2020*, Noise Element. Adopted September 23, 2008 and Amended on October 23, 2012.

CHAPTER 3.11 Public Services and Utilities/Service Systems

3.11.1 Introduction

This chapter describes the existing conditions relating to public services, utilities, and service systems within the Dry Creek Habitat Enhancement Project, Miles 2-6 (Dry Creek Project or proposed project) area. Section 3.6.2, “Environmental Setting” describes the regional and project area environmental setting, focusing on the public services and utilities occurring therein. Section 3.6.3, “Regulatory Framework” details the federal, state, and local laws related to public services, utilities, and service systems. Potential impacts to these resources resulting from the proposed project are analyzed in Section 3.6.4, “Impacts and Mitigation Measures” in accordance with the California Environmental Quality Act (CEQA) significance criteria (CEQA Guidelines, Appendix G) and mitigation measures are proposed that could reduce, eliminate, or avoid such impacts

Other impacts to related resources are addressed in other chapters as follows: impacts to land use are addressed in **Chapter 3.9, Land Use and Agriculture**; and impacts to traffic and transportation are addressed in **Chapter 3.13, Traffic and Transportation**.

3.11.2 Environmental Setting

The environmental setting for public services, utilities, and service systems includes all areas that could be affected by activities associated with the Dry Creek Project. As stated in **Chapter 2, Project Description**, habitat enhancement sites have been identified for Miles 2-3 but specific sites have yet to be determined for Miles 4–6. Projects could occur anywhere along the 14-mile length of Dry Creek from Warm Springs Dam to the Russian River (exclusive of sites already enhanced in Mile 1). Consequently, the environmental setting includes the Dry Creek basin downstream of Warm Springs Dam, including the 14 river miles (RMs) from the dam to the Russian River, adjacent riparian areas, and surrounding floodplains and terraces, either unvegetated or occupied by agricultural or residential land-uses.

Public Services

Fire Protection

Federal and State

The U.S. Forest Service and the California Department of Forestry and Fire Protection (CAL Fire) protect the people of California from fires, responds to emergencies, and protects and enhances forest, range, and watershed values providing social, economic, and environmental benefits to rural and urban citizens within the project area (CAL FIRE...c2012)

Unincorporated Areas of Sonoma County

Fire protection services in Sonoma County are provided by 40 different local firefighting agencies. These include city fire departments, independent districts, volunteer fire companies, Sonoma County Fire and Emergency Services, and various other fire protection districts. The County of Sonoma (County) has established a Department of Fire Services to coordinate the service agencies in the County (PRMD, 2012).

The Sonoma County Fire and Emergency Services Department is comprised of four divisions: administration, fire services, hazardous materials and emergency management. The Emergency Management Division of the Department of Emergency Services is responsible for the planning, coordination of response, recovery, and mitigation activities related to county-wide emergencies and disasters.

The Geyserville Fire Protection District responds to emergency calls in the project area and protects over 200 square miles in Northern Sonoma County and serves Alexander Valley, Chalk Hill, Dry Creek Valley, the Geysers, Geyserville, parts of unincorporated Healdsburg and Lake Sonoma (Geyserville Fire, 2014).

Emergency Medical Services and Facilities

The Coastal Valleys Emergency Medical Services (EMS) Agency¹, provides administrative and regulatory oversight responsibilities for the local EMS system within unincorporated areas of the County, which includes the project area. The primary function of the EMS Agency is to plan, implement, and evaluate the local EMS system, which includes the licensing/permitting of ambulance provider companies, hospitals, coordination and monitoring of air and ground ambulances, certification/accreditation of pre-hospital care personnel such as EMTs and paramedics, policy development and

¹ The EMS Agency operates under State authority established in Division 2.5 of the California Health and Safety Code, and Title 22, Division 9 of the California Code of Regulations. Local regulation of the EMS system is effected through the County Emergency and Pre-Hospital Medical Services System Ordinances, and EMS Agency policies and procedures.

implementation, medical control, quality improvement, and disaster medical response preparedness.

Pursuant to the California Health and Safety Code, the Sonoma County Department of Health Services is designated as the Local Emergency Medical Services Agency. All ambulances are staffed at an advanced life support (ALS) level while most first responder services are at the basic life support (BLS) level. Nine ground ambulance provider agencies and two helicopter providers (one air ambulance and one ALS Rescue) provide emergency medical transportation in Sonoma and Mendocino counties. In July 1999, Sonoma County entered into an exclusive franchise contract with Sonoma Life Support (SLS) to provide emergency ambulance and advanced life support services to a specified portion of the County. A mix of fire department-based and private ambulance providers service the remainder of the unincorporated areas of the County, which includes the project area.

There are six hospitals in Sonoma County (Hospitals 2015). The project area is served by Healdsburg District Hospital.

Law Enforcement

The Sonoma County Sheriff's Office provides law enforcement, security services, and detention services for cities and unincorporated areas in Sonoma County.

Headquartered in the City of Santa Rosa, the Sheriff's Office is divided into seven zones. The project area is located in Zone 2, which is comprised of 534.63 square miles. The zone is staffed from the main office and includes the unincorporated areas surrounding the cities of Healdsburg, Cloverdale, and Windsor (Sonoma County Sheriff's Office...2015).

Schools

Schools within a five mile range of the project area include the Geyserville Elementary School, Geyserville Educational Park High School, Geyserville Middle School, Healdsburg High School, and Rio Lindo Adventist Academy.

Libraries

Sonoma County library system is comprised of 15 participating library branches and serves unincorporated areas in the County and participating cities. The project area is served by the Healdsburg Regional library (Sonoma County Library 2015).

Postal Service

The United States Postal Service (USPS) is responsible for delivering mail to both municipal and unincorporated areas in Sonoma County. The project area is served by the post offices located at 160 Foss Creek Circle in Healdsburg and 116 School House Lane in Geyserville.

Parks

The various types of parklands found in Sonoma County are classified based upon the National Recreation and Parks Association (NRPA) category recommendations. Federal Recreation Areas and State Parks provide recreation opportunities intended to serve national or statewide populations. Regional parks provide opportunities for a broad range of recreational activities generally within a 30-60 minute drive from urban areas at a rate of 20 acres per 1,000 persons. Community parks are large enough to accommodate a variety of activities within a 30 minute drive of population centers at a rate of 2.5 acres per 1,000 persons. Neighborhood parks are smaller, multi-use facilities within one-half mile of the population serviced. The NRPA recommendation for neighborhood parks is 2.5 acres per 1,000 persons.

Badger and Gibbs parks are located within five miles of the project area.

Utilities and Service Systems

Water and Sewer

Water

Potable water in the Dry Creek Valley includes private wells (PRMD 2012). The City of Healdsburg potable water sources are well fields along the Russian River and Dry Creek directly affected by surface water flow (City of Healdsburg 2005).

Sewer

The project area is located within the unincorporated area of Sonoma County where sewage disposal is not served by a sanitation district or included within a sanitation zone. Therefore it is generally handled by private onsite facilities, primarily consisting of septic tanks and leach field systems (PRMD 2012).

Solid Waste Processing and Disposal and Hazardous Waste Facilities

The Integrated Waste (Reuse) division of the Sonoma County Department of Transportation and Public Works (TPW) provides ecological solutions to solid waste disposal, natural gas recovery, electrical generation, recycling, community hazardous waste disposal, and composting in unincorporated areas of Sonoma County, including the project area. TPW Integrated Waste Division operates the Sonoma County Central Landfill, which houses facilities for recycling, material reuse, natural gas and electrical generation, and composting of organic materials (TPW: Integrated Waste 2015). It operates a large central landfill, located outside of Petaluma as well as four smaller transfer stations, located in Annapolis, Guerneville, Healdsburg, and Sonoma. TPW Integrated Waste Division also oversees the regulation of two commercial hauling companies (TPW: Disposal sites 2015).

The Household Toxics Facility is located at the Central Disposal Site and is operated by Clean Harbors through a contract with the Sonoma County Waste Management Agency (TPW: Household Toxics Disposal 2015).

Solid waste collection and disposal services are provided by several private companies in Sonoma County and typically involve curbside pick-up and transfer of refuse by garbage truck to one of Sonoma County's maintained transfer stations or the Sonoma County Central Landfill (TPW: Household Toxics Disposal 2015).

Electricity

Pacific Gas and Electric (PG&E) is the primary electric service provider for businesses and residences in the project area (California Energy Commission 2014). PG&E also purchases power from the Water Agency's Warm Springs Dam 2.6 megawatt Hydroelectric Power Facility. Electric power is supplied through overhead lines and smaller underground lines. In addition to these sources, some homes and businesses are self-powered through solar electricity or other means. Some of these may generate enough electricity to return power to the utility system grid.

PG&E also provides natural gas in the project area through a network of underground transmission lines and electric power is supplied through overhead lines and smaller underground lines. A more detailed discussion of power supplies in the project area can be found in Section 3.2, "Air Quality, Energy, Climate Change, and Sustainability."

Cable, Telecommunications and Internet Access

Cable television and internet service in the project area are provided through a combination of underground and overhead lines by several companies including AT&T, Incorporated (AT&T) and Comcast. Many households subscribe to satellite television as well (PRMD, 2012).

Telephone communications are provided to the project area by AT&T. Although telephone lines in newer developments are typically underground, the majority of telephone lines in the project area are overhead. Residents and businesses also have access to cellular phone services supplied by various providers, although service in some areas is not available (PRMD, 2012).

Internet access via telephone lines, digital subscriber line (DSL), satellite, and television cable is available to residents and businesses in the project area (PRMD, 2012).

Mosquito Abatement

The Marin/Sonoma Mosquito and Vector Control District (MSMVCD) includes an area of 2,300 square miles, with a human population of 715,000 (MSMVCD, 2007). The mission of the MSMVCD is to protect the comfort and health of the public through the abatement of mosquitoes and other vectors. In July 2004, the MSMVCD adopted an Integrated

Vector Management Program and expanded the area of coverage to include all of Marin and Sonoma Counties. The MSMVCD's Integrated Vector Management Program (IVMP) establishes guidelines for incorporating six types of activities to facilitate an effective mosquito and vector control program. These activities include: 1) surveillance, 2) communication, 3) education, 4) physical control, 5) biological control, and 6) chemical control (MSMVCD 2004).

3.11.3 Regulatory Framework

Public Services

Federal, State and Local

Federal, state, and local agencies regulate different aspects of public services. Fire protection services are the most heavily regulated of the public services listed below, with requirements for disaster preparedness and response, regulations for service ratios, fire prevention building codes, and written goals for response time to emergencies. More information on fire protection regulations is provided below. Law enforcement has responsibilities similar to fire protection services related to disaster response and preparedness and response time to emergencies.

Fire Protection

Federal and state agencies generally set standards for provision of large-scale, disaster-level fire protection services, public land fire protection, and general fire safety, while planning and implementation of municipal and site-specific fire protection services is the responsibility of county and municipal agencies. The Federal Emergency Management Agency (FEMA) manages federal response to large scale emergencies, and requires that local emergency responders are trained in FEMA's National Incident Management System (NIMS) (FEMA 2014).

Local regulation of fire protection services involves implementation of federal and state regulations, in addition to fire department general plan policies and standards. The proposed project area is under the jurisdiction of Sonoma County and the Geyserville Fire Protection District. The fire protection services for these areas are subject to the requirements of the respective county and city plans. For more information on fire hazards in the project area, please refer to **Chapter 3.7, Hazards and Hazardous Materials**.

Local

For a discussion of local general plan policies related to public services resources, please refer to **Section 3.11.5, General Plans and Consistency**.

Utilities and Service Systems

Federal

United States Department of Transportation, Federal Highway Administration

Utility facilities, unlike most other fixed objects that may be present within the highway environment, are not owned nor are their operations directly controlled by State or local highway agencies. Because of this, highway authorities have developed policies and practices which govern when and how utilities may use public highway right-of-way, and under what conditions public funds may be used to relocate utility facilities to accommodate highway construction. Federal laws and Federal Highway Administration (FHWA) regulations contained in title 23 of the United States Code and the Code of Federal Regulations, respectively, have been developed to reflect this situation.

Two sections of Federal highway law in Title 23 of the United States Code (cited 23 U.S.C.) deal specifically with utilities:

23 U.S.C. 109(l) deals with the accommodation of utilities on the right-of-way of Federal-aid highways.

23 U.S.C. 123 deals with reimbursement for the relocation of utility facilities necessitated by the construction of a project on any Federal-aid highway.

Present FHWA regulations, policies, and practices dealing with utility relocation and accommodation matters have evolved from basic principles established decades ago, with many of the policies remaining unchanged. Present utility regulations in part 645 of title 23 of the Code of Federal Regulations (cited 23 CFR 645) and non-regulatory supplements are contained in Chapter I, subchapter G, part 645 of the Federal-Aid Policy Guide (FAPG) (Government Publishing Office...c2014).

Subpart A of part 645 deals with utility relocations, adjustments, and reimbursement.

Subpart B of part 645 deals with the accommodation of utilities.

Local

For a discussion of local general plan policies related to utilities resources, please refer to Section **3.11.5, General Plan and Consistency**.

3.11.4 Environmental Impacts and Mitigation Measures

This section describes the impact analysis relating to public services and utilities and service systems for the proposed project. It describes the methods used to determine the impacts of the project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany each impact discussion, where applicable.

Approach to Analysis

This EIR includes project-level analysis for the Dry Creek Project, Miles 2-3 and program-level analysis for the Dry Creek Project, Miles 4–6.

Project implementation includes construction, operation, and maintenance of the proposed project. The majority of the ground disturbance would take place during the construction phase of the proposed project and it is anticipated that maintenance activities would primarily consist of vegetation management. However, there is a possibility that maintenance activities would also include activities similar to construction, such as repair to damaged structures or adjustments to structures if they are not functioning properly. Therefore, maintenance activities are considered alongside construction activities in terms of their potential for impact in the analysis below.

Public Services

Public services impacts were evaluated by determining the impact of the proposed project on service ratios for each of the public services, determining if new or altered public services would be required as a result of the proposed project, and by evaluating the delivery and availability of existing public services as determined by the impacts discussed in **Chapter 3.13, Transportation and Traffic**. Impacts were considered significant if the project resulted in any of the changes or conditions listed above in "Significant Criteria."

Utilities and Service Systems

Impacts to utilities were evaluated by determining if new or altered utilities and/or service systems would be needed as a result of the proposed project. Impacts were considered significant if the proposed project resulted in any of the changes of conditions listed above in "Significant Criteria."

Significance Criteria

Public Services

According to the State CEQA Guidelines, a project would normally have a significant impact to public services if it would:

1. Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: fire protection, police protection, schools, parks, and other public facilities.

In addition to the above significant Criteria, the Water Agency also considered whether the proposed project would:

1. Result in a need for alterations to existing public services; and
2. Result in disruption in the delivery or availability of existing public services.

Utilities and Service Systems

In addition, according to the State CEQA Guidelines, a project would normally have a significant effect on utilities and service systems if it would:

1. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board.
2. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
3. Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
4. Have insufficient water supplies available to serve the project from existing entitlements and resources, requiring new or expanded entitlements.
5. Result in a determination by the wastewater treatment provider which serves the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments.
6. Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs.
7. Comply with federal, state, and local statutes and regulations related to solid waste.

Issues Not Discussed Further

Several of the criteria included in Appendix G of the CEQA Guidelines do not apply to this analysis and are not used, as explained below.

Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: fire protection, police protection, schools, parks, and other public facilities. No new facilities or changes in operation of existing facilities would be needed to implement the proposed project. Additionally, no construction-, operation-, or maintenance-related activities would impact emergency response times because roadways would not be blocked during such activities. Please see **Chapter 3.13, Transportation and Traffic** for more information. Consequently, no changes to service ratios, response times or other public services would occur; therefore, no construction, operation, or maintenance impacts related to public services have been identified for the proposed project.

Result in a need for alterations to existing public services. No new facilities or changes in operation of existing facilities would be needed to implement the proposed project. Consequently, no changes to existing public services would occur; therefore, no construction, operation, or maintenance impacts related to public services have been identified for the proposed project.

Result in disruption in the delivery or availability of existing public services. No new facilities or changes in operation of existing facilities would be needed to implement the proposed project. Additionally, no interruption of flow in Dry Creek would occur, and, therefore, no disruption in water supply would occur. Therefore, no construction, operation, or maintenance impacts related to disruption of public services have been identified for the proposed project.

Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board. No new facilities or changes in operation of existing facilities would be needed to implement the proposed project. Consequently, no changes in wastewater would occur; therefore, no construction, operation, or maintenance impacts related to wastewater have been identified for the proposed project.

Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects. No new facilities or changes in operation of

existing facilities would be needed to implement the proposed project. Consequently, no new water or wastewater treatment facilities or expansion of existing facilities would be required to implement the proposed project; therefore, no construction, operation, or maintenance impacts related to water and wastewater treatment facilities have been identified for the proposed project.

Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects. No new facilities or changes in operation of existing facilities would be needed to implement the proposed project. Consequently, no new stormwater drainage facilities or expansion of existing facilities would be required; therefore, no construction, operation, or maintenance impacts related to stormwater drainage facilities have been identified for the proposed project.

Result in a determination by the wastewater treatment provider which serves the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments. No new facilities or changes in operation of existing facilities would be needed to implement the proposed project. Consequently, no changes in wastewater would occur; therefore, no construction, operation, or maintenance impacts related to wastewater have been identified for the proposed project.

Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs. While excavation at project sites would require removal of materials such as dirt, gravel, and rocks, those materials would be reused at other locations either by the Water Agency or other public or private entities and would not require disposal. Any car bodies or other materials excavated that would not be reused would be taken to the landfill, however the volume of material anticipated is minimal. Therefore, no construction, operation, or maintenance impacts related to solid waste disposal are anticipated.

Comply with federal, state, and local statutes and regulations related to solid waste. While excavation at project sites would require removal of materials such as dirt, gravel, and rocks, those materials would be reused at other locations either by the Water Agency or other public or private entities and would not require disposal. Any car bodies or other materials excavated that would not be reused would be taken to the landfill, however the volume of material anticipated is minimal. Therefore, no construction, operation, or maintenance impacts related to solid waste disposal are anticipated.

Impacts Analysis and Mitigation Measures

The following section presents a detailed discussion of potential impacts associated with public services and utilities and service system resources resulting from the Dry Creek Project. Both program-level and project-level project components are analyzed. Impacts are summarized and categorized as either “less than significant,” “less than significant with mitigation,” or “significant and unavoidable.” Impacts are also identified as applicable to construction, operation, and/or maintenance phases of the project.

No new facilities would be needed to implement the proposed project. Consequently, no change in public services or utility system activities would occur; therefore, no construction, operation, or maintenance impacts to public services and utility systems have been identified for the proposed project.

Public Services

Impact 3.11.1: Construction, operation, and maintenance activities of the Dry Creek Habitat Enhancement Project, Miles 2–6 could have insufficient water supplies available to serve the project from existing entitlements and resources, requiring new or expanded entitlements. (No Impact)

Combined Analysis for Miles 2–3 and Miles 4–6

No new facilities or changes in operation of existing facilities would be needed to implement the proposed project, therefore no new permanent water supply would be needed for the proposed project. However, landowners, contractors, and/or the Water Agency would irrigate newly planted areas during the two to three dry seasons following plant installation. Water supplies for irrigation could include existing landowner water rights or water trucked into the project area for irrigation or stored temporarily in tanks onsite for irrigation later. Water use would be temporary and irrigation would cease once plants are established, therefore no impacts to water supplies are anticipated.

Impact Significance: No Impact.

3.11.5 General Plan and Consistency

The project area is located within Sonoma County. The following section lists goals, policies and objectives related to public services, utilities, and service systems from *Sonoma County General Plan 2020* and ends with a brief analysis discussing consistency with this plan.

Sonoma County General Plan 2020

Public Safety Element

Goal PS-3: Prevent unnecessary exposure of people and property to risks of damage or injury from wildland and structural fires.

Objective PS-3.2: Regulate new development to reduce the risks of damage.

Public Facilities and Services Element

Goal PF-1: Assure that water and wastewater services are available where necessary to serve planned growth and development without promoting unplanned growth.

Objective PF-1.1: Operate county water and wastewater facilities in accordance with planned growth and in compliance with applicable State and Federal standards.

Goal PF-2: Assure that park and recreation, public education, fire suppression and emergency medical, and solid waste services, and public utility sites are available to meet future needs of Sonoma County residents.

Consistency

The proposed project does not include additional facilities or changes in operation of existing facilities and would not impact public services resources or utility and service systems in the project area. Therefore, the proposed project appears to be consistent with the Sonoma County General Plan.

3.11.6 References

[CAL FIRE] California Department of Forestry and Fire Protection. n.d. 8 Jan. 2015. <<http://www.fire.ca.gov/index.php>>.

California Energy Maps: California Energy Commission. n.d. 19 Nov. 2014. <http://www.energy.ca.gov/maps/serviceareas/electric_service_areas.html>.

Control List: Marin/Sonoma Mosquito & Vector Control District. n.d. 11 June 2015. <<http://www.msosquito.com/adult-mosquito-control-notification>>.

Disposal Sites: County of Sonoma Transportation and Public Works. n.d. 8 Jan. 2015. <<http://sonomacounty.ca.gov/TPW/Integrated-Waste/Disposal-Sites/>>.

Electronic Code of Federal Regulations: U.S. Government Publishing Office. 19 Dec. 2014. 23 Dec. 2014. <<http://www.ecfr.gov/cgi-bin/text-idx?SID=a21f71c9ebbb716f03ef313aa6c526f8&node=pt23.1.645&rgn=div5>>.

Final Urban Water Management Plan: City of Healdsburg 2005

Geyserville Fire: Geyserville Fire Protection District. n.d. 19 Nov. 2014. <<http://www.geyservillefire.com/>>.

Hospitals: Sonoma County, Public Safety. n.d. 5 Jan. 2015. <<http://sonomacounty.ca.gov/Public-Safety/Hospitals/>>.

Household Toxics Disposal: County of Sonoma Transportation and Public Works. n.d. 8 Jan. 2015 < <http://sonomacounty.ca.gov/TPW/Integrated-Waste/Household-Toxics-Disposal/>>.

Integrated Waste: County of Sonoma Transportation and Public Works. n.d. 8 Jan. 2015. <<http://sonomacounty.ca.gov/TPW/Integrated-Waste/>>.

Law Enforcement Division: Sonoma County Sheriff's Office. n.d. 19 Nov. 2014. <http://www.sonomasheriff.org/about_law_enforcement.php>.

Locations: *Sonoma County Library*. n.d. 31 July. 2014. <<http://sonomalibrary.org/locations>>.

[MSMVCD] Marin Sonoma Mosquito and Vector Control District. Integrated Vector Management Program (IVMP) 2004.

Policies: Federal Emergency Management Agency. n.d. 19 Nov. 2014. <<http://www.fema.gov/policies>>.

[PRMD] Sonoma General Plan 2020. Public Facilities and Services Element. Adopted September 23, 2008 and Amended on October 23, 2012.

[PRMD] Sonoma General Plan 2020. Public Safety Element. Adopted September 23, 2008 and Amended on October 23, 2012.

Chapter 3.12 Recreation

3.12.1 Introduction

This chapter describes the existing conditions relating to recreation resources within the Dry Creek Habitat Enhancement Project, Miles 2-6 (Dry Creek Project or proposed project) area. Section 3.12.2, “Environmental Setting” describes the regional and project area environmental setting, focusing on the recreation conditions occurring therein. Section 3.12.3, “Regulatory Setting” details the federal, state, and local laws related to recreation resources. Potential impacts to these resources resulting from the proposed project are analyzed in Section 3.12.4, “Impacts and Mitigation Measures” in accordance with the California Environmental Quality Act (CEQA) significance criteria (CEQA Guidelines, Appendix G) and mitigation measures are proposed that could reduce, eliminate, or avoid such impacts.

Other impacts to related resources are addressed in other chapters as follows: impacts to visual quality are addressed in **Chapter 3.1, Aesthetics**; impacts to air quality are addressed in **Chapter 3.2, Air Quality, Greenhouse Gas Emissions, Energy, and Sustainability**; fisheries-related impacts are discussed in **Chapter 3.5, Fisheries Resources**; construction-related safety hazards are discussed in **Chapter 3.7, Hazards and Hazardous Materials**; impacts to water resources are discussed in **Chapter 3.8, Hydrology and Water Quality**; impacts resulting from project-related noise are addressed in **Chapter 3.10, Noise**; impacts to schools are addressed in **Chapter 3.11, Public Services**; and impacts to bicycle lanes and vehicle access to recreational facilities are addressed in **Chapter 3.13, Traffic and Transportation**.

3.12.2 Environmental Setting

The environmental setting for recreation includes all areas that could be affected by activities associated with the Dry Creek Project. As stated in **Chapter 2, Project Description**, habitat enhancement sites have been identified for Miles 2-3 but specific sites have yet to be determined for Miles 4–6. Projects could occur anywhere along the 14-mile length of Dry Creek from Warm Springs Dam to the Russian River (exclusive of sites already enhanced in Mile 1). Consequently, the environmental setting includes the Dry Creek basin downstream of Warm Springs Dam, including the 14 river miles (RMs) from the dam to the Russian River, adjacent riparian areas, and surrounding floodplains and terraces, either unvegetated or occupied by agricultural or residential land-uses.

Regional Setting

There are a variety of land- and water-based recreational opportunities in the Russian River watershed. Land-based opportunities include wine tasting, which is a major tourism draw in Sonoma County; road cycling and mountain bike riding, another major draw for tourists; hiking; camping; and team sporting events, often held at regional and municipal parks in the region. Water-based recreational pastimes are pursued along the Russian River, coastal beaches, at Lake Mendocino and Lake Sonoma (the watershed's two largest reservoirs), as well as in many of the smaller lakes and ponds located in the municipal, regional, and state parks in the Russian River basin.

In the Russian River, water-based recreational pursuits include canoeing, kayaking, swimming, sunbathing, and fishing. Based on areal imagery, there are approximately 45 public access points along the Russian River between Ukiah and the Pacific Ocean, including public boat ramps, regional parks, vehicle pullouts along public roads (Highway 101 and Geysers Road), public road crossings, and privately owned campgrounds. In addition to these public access points, there are a number of companies that offer rental canoes, kayaks, and inflatable boats as well as shuttle services and guided boating trips. These companies include Rivers Edge Kayak and Canoe Trips and Russian River Adventures in Healdsburg, Gateway Adventures in Santa Rosa, Burke's Canoe Trips, SUP Odyssey and Mirabel Park in Forestville, Johnson's Beach and King's Sport and Tackle in Guerneville, Monte Rio Community Beach in Monte Rio, Lotus Kayak Rentals and Watertreks Eco Tours in Jenner. In addition to canoeing and kayaking, some private powerboating is done in the Russian River. Powerboating generally takes place near Guerneville, Monte Rio and Jenner where public boat ramps and suitable depths exist.

Water-based recreational activities are pursued in the small lakes and ponds located at state and regional parks in the Russian River watershed as well as at the larger reservoirs, Lake Sonoma and Lake Mendocino. Canoeing and kayaking, swimming and sunbathing, and fishing are common recreational activities that can be practiced in some of the small lakes and ponds located at parks in the watershed. These pastimes are also pursued in Lake Mendocino and Lake Sonoma, along with powerboating, and waterskiing. Lake Mendocino, located near the city of Ukiah, has two public boat ramps as well as a public campground. Lake Sonoma draws in more than 554,000 visitors per year and is located near Healdsburg. Lake Sonoma is a popular destination because of its variety of water-based and land-based recreational activities such as pleasure boating, kayaking, waterskiing, swimming, and fishing as well as hiking, camping, picnicking, backpacking, horseback riding and mountain biking (USACE 2014).

The Dry Creek Valley is a popular vacation destination within the Russian River basin and draws visitors from outside of the area. Recreation opportunities in the valley

include winetasting at its numerous vineyards, sightseeing, and cycling. Lake Sonoma, owned and operated by the US Army Corps of Engineers (USACE), is located at the north end of Dry Creek Valley and offers a variety of outdoor activities. As mentioned earlier, water sports are popular at Lake Sonoma and include canoeing, kayaking, swimming, boating, waterskiing, fishing, and boat-in camping. The land immediately surrounding the lake is operated as a park by the USACE and land-based activities such as picnicking, hiking, mountain biking, horseback riding, camping, and backpacking are popular. The USACE operates a small municipal-type park near the base of the Warm Springs Dam at Lake Sonoma. This park has picnic benches, gazebos, a volleyball court, a disc golf course, and a large grass field suitable for team sports such as soccer (USACE 2014).

Project Area Setting

The project area extends from approximately one-half mile downstream of the Warm Springs Dam to the confluence with the Russian River and contains the wetted portion of Dry Creek, the riparian corridor, the surrounding lands, public roads on the valley floor, as well as Dutcher Creek, Canyon and Lytton Springs roads to the east of Dry Creek Valley and Skaggs Springs Road to the west of Dry Creek Valley. Individual project sites are located within the wetted channel of Dry Creek and within the riparian corridor adjacent to the creek.

Cycling on Dry Creek Roadways

While the roads in Dry Creek Valley are used by vehicles and cyclists to access Lake Sonoma and wineries in the valley, the roads are also a destination in and of themselves for cyclists. Cycling is a popular activity, particularly on the weekends and during the summers. Please refer to **Chapter 3.13, Transportation and Traffic** for additional analysis on potential impacts to traffic and transportation.

Public Access to Dry Creek for Recreation

Fishing

Fishing is not legal in Dry Creek. The mainstem Russian River downstream from the confluence of the east branch and the tributaries flowing into Lake Sonoma and Lake Mendocino are the only streams open to recreational fishing in the Russian River Basin (CDFW, 2014). These rules protect threatened and endangered anadromous salmonids that spawn and rear in tributaries to the Russian River. Since it is illegal to fish in Dry Creek downstream of Lake Sonoma, this EIR will not analyze the effects the project may have on recreational fishing in Dry Creek.

Public Creek Access

Unlike the Russian River, there is no public access to Dry Creek and, consequently, there are very few recreational opportunities along the creek itself. Nearly all of the land

adjacent to Dry Creek is privately held and used for agriculture, particularly viticulture. The USACE owns and operates a small park immediately downstream of Warm Springs Dam but a fence blocks access to the creek. The City of Healdsburg owns land adjacent to the creek, but these parcels are used for municipal purposes and are not open to the public. There are four county roads in Dry Creek Valley that cross Dry Creek (Dry Creek Road near Warm Springs Dam, Yoakim Bridge Road, Lambert Bridge Road, and Westside Road), but these locations do not include public access to Dry Creek.

Private Access to Dry Creek

While the creek is unavailable to the general public for recreation, private access does allow for some use of Dry Creek for recreational purposes. For example, some wine tasting rooms along the creek provide limited access to the riparian corridor for customers to picnic and view the creek. Additionally, many private landowners along the creek enjoy direct access for picnicking, swimming, boating, and other recreational activities. Therefore, for the purposes of this analysis, it is assumed that most of the recreation that occurs in the wetted portion of Dry Creek is by private entities.

A site visit to the section of Dry Creek from Warm Springs Dam to Lambert Bridge found 36 sites that appear to be used by private landowners for recreation. These sites range from trails that led to gravel beaches to areas that contain stairways, tables, chairs, fire rings, rope swings, and small boats such as kayaks and inflatable rafts (Table 3.12-1). Typically these activities are limited to landowners, but the general public does have access to a few sections of the riparian corridor where they can access the stream while wine tasting.

Table 3.12-1. The number and type of recreational items observed in each mile of the project during a site visit to the 6.7 mile section of Dry Creek between Warm Springs Dam and Lambert Road Bridge on January 14, 2015.

Project Miles	Beach	Fire ring	kayak/ canoe/ boat on bank	Patio	Rope swing	Stairs to water	Table/ Chairs/ Bench
1	2		1	1		3	
2-3	3	1			2		2
4-6	5	3	1			2	4

Some of the wineries in Dry Creek are open to the public and have tasting rooms and other facilities for their guests. In total, nine wineries are located within 1000 feet of Dry Creek based on aerial photos). Three of these wineries appeared to provide access for their guests to visit the creek to wine taste and picnic while viewing the stream (Site visit

January 14, 2015 and (Martorana Family Winery, 2015), Table 3.12-2).

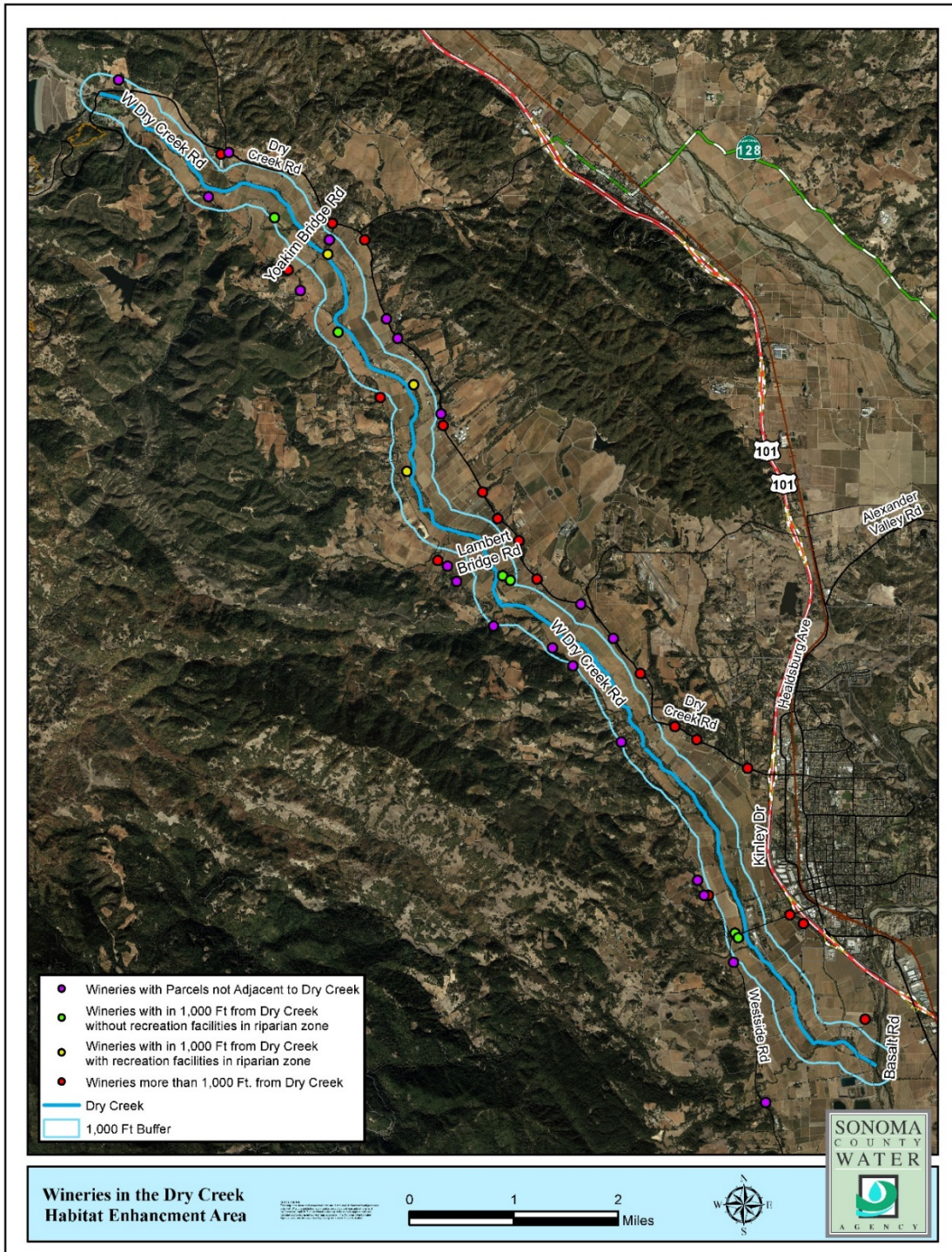


Figure 3.12.1. A map of Dry Creek showing the location of wineries that are located on nearby roads, but do not have access to the creek (parcel does not reach the creek, or winery is located across a public road from the creek), wineries that are within 1000 feet of the creek, but do not have recreation facilities, wineries that are within 1000 feet of the

creek and have recreational facilities, and wineries that are have access to the creek, but are beyond 1000 feet from the creek.

Table 3.12-2. Wineries that are relatively close to Dry Creek (less than 1000 ft), the project mile in which they occur, the distance from the creek based on aerial photographs, observations made from the stream channel and number and type of recreational items observed during a site visit to Dry Creek on January 14, 2015.

Project Mile	Name	Approximate distance from creek (ft)	Comments
1	Dry Creek Vineyard	910	Part of the demonstration mile
	Passalacqua Winery	530	Across Lambert Bridge Road from creek, no stream access, in demonstration mile reach
2-3	Davero Farm and Winery	420	Steep, nearly vertical bank approximately 15 feet high, no evidence of recreation seen from the stream channel during site visit
	Göpfrich Winery	270	Tasting by appointment only, did not see evidence of recreation from stream channel during site visit
	Talty Vineyards and Winery	150	Table and chairs at top of bank
	Truett-Hurst	410	Five sets of tables and chairs
	Uptick Vineyards	530	Thick riparian forest, no evidence of recreation seen from stream channel during site visit
4-6	Martorana Family Winery	340	Picnic area on website, did not see it from the creek during site visit, but can be seen on aerial photos
	Preston Vineyards	900	Large gravel bar at the mouth of Peña Creek, but did not observe trails down to the gravel bar or evidence of recreation from stream channel during site visit

Despite access to the creek by private landowners, recreational boating (kayaking, canoeing, rafting) and swimming remains uncommon in Dry Creek due to difficult navigational and environmental conditions.

Boaters and swimmers face navigational obstacles along the wetted portion of Dry Creek. For boaters, Dry Creek has many obstacles to navigate, including partially submerged logs and channel-spanning log jams. A survey of Dry Creek found an average of 183 pieces of wood (> 6 inches in diameter) per mile (Inter-Fluve, 2010, p. 76). Partially submerged logs are hazardous as boaters can become trapped on the logs. Channel-spanning log jams often require boaters to exit their boat and portage (walk around). In addition to logs, boulders and riffles are other naturally occurring features which boaters must be capable of navigating. Historical bank stabilization projects implemented by private landowners often included car bodies, concrete rubble and other unnatural materials that can be hazardous to boaters. Boaters who choose to recreate in Dry Creek must be highly skilled in order to safely navigate around these obstacles. In addition to the natural and unnatural obstacles in Dry Creek, managed releases from Warm Springs Dam result in present day stream velocities that are much higher in the summer than what historically occurred prior to the construction of the dam.

Environmental conditions related to water velocity also limit recreation. Flows in Dry Creek are augmented by releases from Warm Springs Dam, particularly in the summer when boat-based recreation would be most likely to occur. These augmented flows are swift and difficult to navigate in a boat. Before the Warm Springs Dam was constructed, Dry Creek would have flowed intermittently. Now that creek flow is determined largely by releases from Warm Springs Dam, typical summer flows at the mouth of Dry Creek are approximately 80 cubic feet per second (cfs). The swift current can increase the chance of an inexperienced boater colliding with a submerged log, capsizing, and becoming trapped. While boaters who recreate in Dry Creek must be highly skilled in order to properly navigate the swift current in the stream Dry Creek, does not contain “white water” conditions that would attract highly skilled boaters. The water released from Lake Sonoma not only affects stream velocities in Dry Creek, but also water temperatures.

The cold water in Dry Creek may be another deterrent to both boaters and swimmers. The water entering Dry Creek from Lake Sonoma is released from near the bottom of the lake, making it much colder than the water that would have historically occurred in Dry Creek. The water temperatures during the summer range from approximately 51 to 63°F based on June, July, and August minimum and maximum daily water temperature from 2012 to 2014 as reported on the United States Geological Survey (USGS) gage at Lambert Bridge). These conditions may deter potential boaters from recreating in Dry Creek.

The Russian River and Lake Sonoma are nearby and offer greater recreational opportunities, likely drawing potential boaters and swimmers away from Dry Creek. The Russian River is a popular boating and swimming destination that has many public access points. Based on areal imagery there are approximately 45 public access points along the Russian River between Ukiah and the Pacific Ocean, including public boat ramps, regional parks, vehicle pullouts along public roads (Highway 101 and Geysers Road), permanent public road crossings, county-maintained temporary summer road crossings, and privately-owned campgrounds. Commercial boating operations also maintain launch and landing locations, canoe and kayak rentals, and shuttling services. In addition to the recreational opportunities in the Russian River, Lake Sonoma also offers many recreational opportunities. Lake Sonoma is a popular waterskiing, pleasure boating, and fishing destination with two public boat ramps, a privately owned marina, a designated swimming area, and 110 boat-in camp sites (USACE 2014).

Surrounding Lands

The lands surrounding Dry Creek and the road network within Dry Creek Valley are recreationally important to wine tasters, cyclists, and people accessing Lake Sonoma. Wine tasting in Dry Creek Valley draws many people from outside the area. Many of these wineries are in the project area and some of the project sites occur on parcels that also house winetasting facilities.

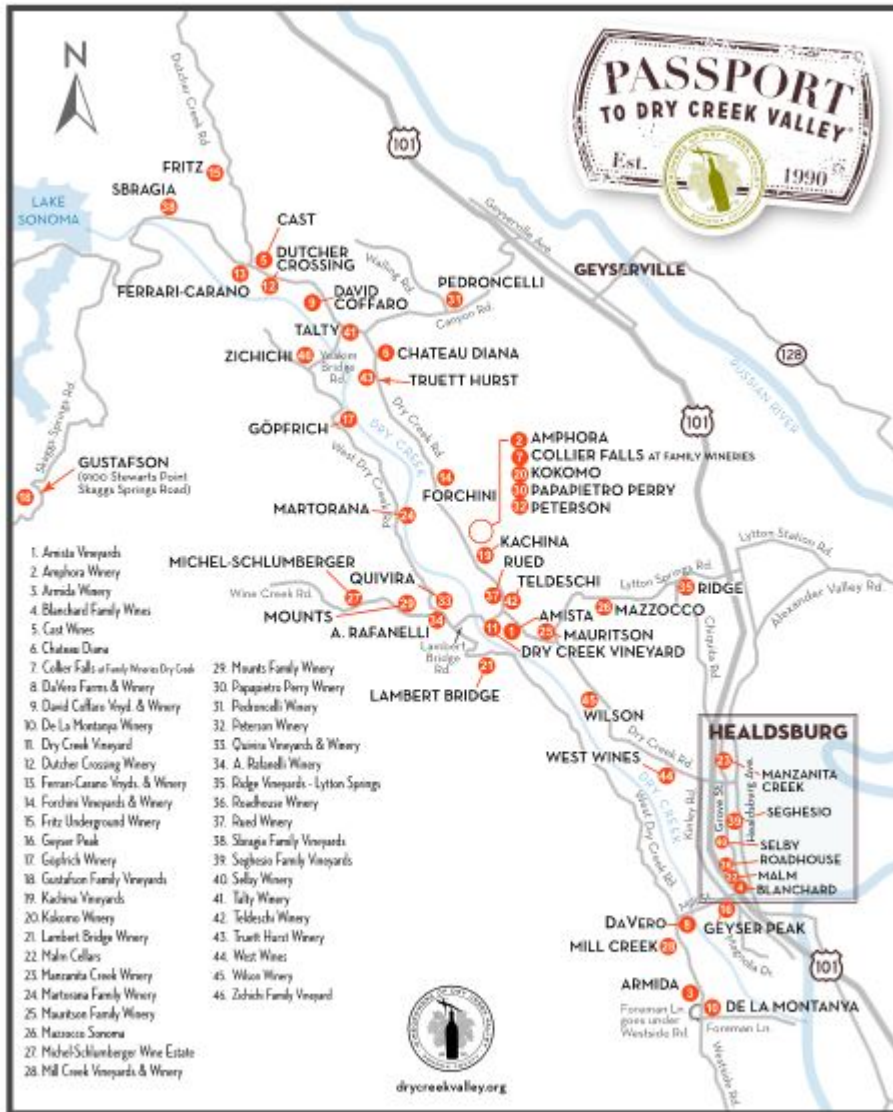
Wineries

Several wineries are located on lands near the habitat enhancement construction sites. Many of the wineries offer wine tastings, some offering both indoor and outdoor facilities for their guests' use. Hours of operation range from being open by appointment only to open 7-days a week. These wineries are a popular tourist attraction and bring many people to Dry Creek Valley. Sonoma County Tourism estimates that there are more than 70 wineries in Dry Creek valley (Sonoma County Tourism 2014). A site visit found that from Warm Springs Dam to the mouth of Dry Creek there are 44 wineries located along Dry Creek Road, West Dry Creek Road, West Side Road, Lambert Bridge Road, and Yoakim Bridge Road. Of these, 25 are located between a county road and the creek. Often, wine tasters will visit multiple wineries in one day by driving the roads in Dry Creek Valley.

Roads

The road network in Dry Creek Valley is heavily relied upon by wine tasters to access wineries in Dry Creek Valley. Patrons often visit many wineries in one trip by traveling Dry Creek Road, West Dry Creek Road, Lambert Bridge Road, and Yoakim Bridge Road, and Dutcher Creek Road. An example of touring Dry Creek Valley for wine tasting is the Passport to Dry Creek Valley. This event occurs each spring on a weekend. Wine tasters can purchase a ticket giving them access to participating wineries. In 2014, over 45 wineries participated in the Passport to Dry Creek Valley

event (Winegrowers of Dry Creek Valley 2014). Wine tasters can visit multiple wineries over the course of the weekend by traveling the roads in Dry Creek Valley (Figure 3.12-2).



The Winegrowers of Dry Creek Valley® encourage you to drink responsibly.

Figure 3.12-1. A road map showing the vineyards participating in the 2015 Passport to Dry Creek Valley event. Image Credits: Winegrowers of Dry Creek Valley (2014).

Cycling is a popular form of recreation in Dry Creek Valley and cyclists rely on the road network in Dry Creek Valley. The Santa Rosa Cycling Club writes that the Dry Creek, Alexander Valley ride is the "...essential, definitive 'Wine Country' ride" (2014a). Cycling tours are available through companies such as Wine Country Bikes Touring Center and Getaway Adventures that offers bike rentals as well as a one day tours of the Dry Creek

Valley. There are a number of organized rides and cycling events that pass through the Dry Creek Valley, such as the Wine County Century and the Terrible Two that are hosted by Santa Rosa Cycling Club (2014b, 2014c). Many of these same roads are used by recreational enthusiasts to reach Lake Sonoma.

Lake Sonoma is a popular destination because of its variety of water-based and land-based recreational activities. Lake Sonoma draws in more than 554,000 visitors a year (USACE 2014). While the recreational facilities at Lake Sonoma occur outside of the project area and would not be effected by the project, the main access road to Lake Sonoma is Dry Creek Road and is located within the project area. Impacts as a result of the Dry Creek Project to traffic on Dry Creek Road, whether for recreational or other uses, is discussed in **Chapter 3.13, Traffic and Transportation**.

3.12.3 Regulatory Framework

Local

Sonoma County Bicycle and Pedestrian Plan

The Sonoma County Bicycle and Pedestrian Plan (Plan) (Helfrich 2010) described projects, programs and policies that support the development and maintenance of a bicycle and pedestrian transportation system. The Plan includes the creation of a Class II¹ Bikeway along Dry Creek Road from the Healdsburg city limits to Skaggs Springs Road for a total distance of a little over 10 miles, which is listed at a high priority. For a detailed analysis of impacts to bicycling related to the proposed project see **Chapter 3.13, Traffic and Transportation**.

Sonoma County General Plan 2020

The *Sonoma County General Plan 2020* includes Land Use, Agricultural Resources, and Open Space and Resource Conservation Element that identifies goals, objectives and policies supporting recreation in the county (Sonoma County PRMD 2008). Please refer to Section 3.12.5, “General Plans and Consistency” below for a detailed discussion of goals, policies, and objectives related to recreational resources.

¹ A Class II Bikeway, or bike lane, provides a striped lane for one-way bike travel on a street or highway.

3.12.4 Environmental Impacts and Mitigation Measures

Approach to Analysis

This EIR includes project-level analysis for the Dry Creek Project, Miles 2-3 and program-level analysis for the Dry Creek Project, Miles 4–6.

Project implementation includes construction, operation, and maintenance of the proposed project. The majority of the ground disturbance would take place during the construction phase of the proposed project and it is anticipated that maintenance activities would primarily consist of vegetation management. However, there is a possibility that maintenance activities would also include activities similar to construction, such as repair to damaged structures or adjustments to structures if they are not functioning properly. Therefore, maintenance activities are considered alongside construction activities in terms of their potential for impact in the analysis below.

Impacts to recreation were determined by identifying how the proposed project could affect existing recreational uses. Water Agency staff floated much of Dry Creek to estimate the extent of recreational activity by private landowners along the creek. Impacts were considered significant if the project resulted in any of the changes or conditions identified in "Standards of Significance."

Significance Criteria

Based on the Appendix G of the CEQA Guidelines, project implementation would have significant impacts and environmental consequences on recreational resources if it would result in any of the following:

1. Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; or
2. Include recreational facilities or require the construction or expansion of recreational facilities, which might have adverse physical effects on the environment.ⁱ

Due to the nature of the proposed project, there would be no impacts related to the following CEQA criteria; therefore no impact discussion is provided in relation to these criteria for the reasons described below:

Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated. The project does not propose to alter existing

recreation facilities and, therefore, would not impact the use of existing recreational facilities.

Include recreational facilities or require the construction or expansion of recreational facilities, which might have adverse physical effects on the environment. The project does not propose the construction or expansion of recreation facilities and would not result in the need for new or expanded recreational facilities. Thus, impacts related to the construction or expansion of recreational facilities is not applicable to the project.

For the purposes of this analysis, an additional criterion is established to evaluate significant impacts associated with the proposed Dry Creek Project. Project implementation would have a significant impact if it would:

1. Permanently restrict access to or the beneficial use of existing recreational sites or facilities.
2. Permanently eliminate or modify an existing recreational resource so that it no longer satisfies the recreational use for a significant number of the users.

Impacts and Mitigation Measures

The following section presents a detailed discussion of potential impacts associated within recreation resources resulting from the Dry Creek Project. Both program-level and project-level project components are analyzed. Impacts are summarized and categorized as either “less than significant,” “less than significant with mitigation,” or “significant and unavoidable.” Impacts are also identified as applicable to construction, operation, and/or maintenance phases of the project.

Impact 3.12.1: Construction and/or maintenance of habitat enhancements on Dry Creek could temporarily alter the ability for people to operate canoes, kayaks and rafts. (Less than Significant)

Combined analysis for Miles 2–3 and Miles 4-6

The ability for people to operate canoes, kayaks, and rafts in Dry Creek, while challenging under baseline conditions, may be made more difficult or impossible at project sites during project construction and/or maintenance. The 10% design for Miles 2-3 calls for 22 habitat enhancements sites or 11 habitat enhancements per mile. Using the same ratio for future miles, approximately 33 habitat enhancements would be constructed throughout the 3 miles of enhancements for Miles 4-6. Many enhancement sites would require heavy equipment work including excavation and grading (ESA 2014a, 2014b; Inter-Fluve 2014a, 2014b, 2014c). While the exact construction techniques have not been selected for Miles 2-3 and Miles 4-6, it may be necessary to isolate the banks of the stream with sheet pilings at some sites. Occasionally, it may be necessary to divert the creek around the work site by using a combination of sheet

piling and piping. These diversions would be limited to the summer months for many reasons including concerns regarding adult fish passage in the fall and winter as well as the occurrence of high flows in the winter and spring.

The habitat enhancement work completed in Mile 1 is useful for determining the frequency that the stream may need to be diverted. During the construction of Mile 1, which took place in 2012-2014, 11 habitat enhancements were constructed with features similar to those proposed for Miles 2-3 and Miles 4-6. Construction activities, such as stream diversions or heavy equipment operation, could make Dry Creek impassable during construction. Worksites are located on private land and boaters would not likely have permission to portage around the work site. Therefore there may be periods of time during the construction of habitat enhancements in Dry Creek where boating may be limited to discontinuous sections of stream which would be located between the work sites. The period of time that these construction activities take place is limited to the summer months.

Based on experience from Mile 1, construction of habitat enhancements may limit boaters' movements in Dry Creek during construction. The intensity of the impact of general construction practices on boating in Dry Creek is likely low, however, because Dry Creek is not commonly used for boating, kayaking, or rafting, as mentioned in Section 3.12.2. "Environmental Setting" above. Furthermore, it is important to note that, as was the case during construction of Mile 1, the Water Agency would use a variety of methods to keep property owners and visitors updated on construction activities in the area, including direct mailings and roadside billboards.

Maintenance activities could range from minor vegetation management to projects similar in scale to construction activities, particularly if repairs are required following a high flow event. Therefore, while maintenance activities are less likely to result in impacts, maintenance activities are included here as some infrequent, large-scale maintenance projects could resemble construction activities and produce similar effects.

Therefore, this impact would be temporary and low in intensity due to the infrequency of kayaking, canoeing, and rafting in the project area. This impact is anticipated to be less than significant.

Impact Significance: Less than significant; no mitigation measures required.

Impact 3.12.2: The operation of habitat enhancement features such as constructed backwaters, side channels, logs, boulders, and riffles would alter the stream channel and could affect the ability for people to operate canoes, kayaks and rafts. (Less than Significant)

Combine analysis for Miles 2–3 and Miles 4–6

The addition of habitat enhancements including riffles, boulders, and logs would add stream complexity and people operating boats, such as canoes, kayaks, and rafts, would need to navigate around these objects. The exact design and material requirements for Miles 2-3 and Miles 4-6 are still in development, but the 10% design documents are available to help determine the number of habitat enhancements that would likely occur in Miles 2-3 and Miles 4-6. The 10% design for Miles 2-3 calls for 22 habitat enhancement sites or 11 habitat enhancements per mile. An estimated 33 habitat enhancements would be constructed throughout the 3 miles of habitat enhancements for Miles 4-6. Generally these sites include a number of different habitat enhancement features such as constructed backwaters, side channel enhancements, boulder clusters, boulder gardens, pool enhancements, riffle construction, stream bank stabilization, tributary enhancements, winter habitat, log placements, riparian vegetation management, planting slopes, and riffle enhancements (ESA 2014a, 2014b; Inter-Fluve 2014a, 2014b, 2014c). Please refer to **Chapter 2, Project Description** for detailed information about these different habitat features. The habitat enhancement features discussed below have the potential to impact recreational boating. Feature numbers are based off of existing conceptual designs, however, the actual number of the different features may differ as designs are further developed.

Backwaters

The 10% design calls for 16 backwaters in Miles 2-3, or 8 backwaters per mile (ESA/PWA 2014a, 2014b; Inter-Fluve 2014a, 2014b, 2014c). It is anticipated that a similar number of backwaters per mile would be built for Miles 4-6. An estimated 24 backwater features is anticipated throughout the 3 miles of stream enhancements for Miles 4-6. Aside from the possibility of limiting boat traffic during the construction phase (as discussed in Impact 3.12.1) the presence of backwaters is likely to improve boating in Dry Creek. Backwaters create small sections of still water that could be used for boating.

Side Channels

The 10% design calls for 20 side channel enhancements in Miles 2-3, or 10 side channels per mile (ESA 2014a, 2014b; Inter-Fluve 2014a, 2014b, 2014c). A similar number of side channels per mile would likely be built for Miles 4-6. An estimated 30 side channel features is anticipated throughout the 3 miles of stream enhancements for Miles 4-6. Other than construction related effects on boat traffic (discussed in Impact 3.12.1), the presence of additional side channels would likely slightly improve boating in Dry Creek by dissipating some of the stream's energy and slightly reducing stream velocities overall. This may improve conditions for boating as slightly slower water would be easier to navigate.

Log placements

A variety of habitat enchantments are considered types of log placements and may affect recreational boating. These include log jams, habitat wood, large wood, and floodplain wood. The 10% design plans for Miles 2-3 include approximately 678 groups of logs or 339 groups of logs per mile. These groups often consist of more than one log. This estimate includes floodplain wood which occurs outside of the stream channel during all but the highest flows (ESA 2014a, 2014b; Inter-Fluve 2014a, 2014b, 2014c). A similar number of log groups per mile would likely be used in Miles 4-6. An estimated 1000 groups of logs is anticipated throughout the 3 miles of stream enhancements for Miles 4-6. The addition of logs to the stream would increase the number of objects around which boaters would need to navigate. However, boaters in Dry Creek are accustomed to such objects as they are common in Dry Creek under baseline conditions. The addition of logs to the stream would increase the roughness in the stream channel and likely slightly decrease stream velocity overall. Slightly reduced stream velocity would likely make the navigating the stream channel slightly easier.

Boulder Gardens and Boulder Clusters

Boulder gardens and bolder clusters may improve boating in Dry Creek by decreasing stream velocities. The 10% design calls for 1 boulder garden and 19 boulder clusters in Miles 2-3, or 0.5 boulder garden and 9.5 boulder clusters per mile (ESA 2014a, 2014b; Inter-Fluve 2014a, 2014b, 2014c). A similar number of boulder gardens and boulder clusters per mile would likely be used in Miles 4-6. An estimated 2 boulder gardens and 28 boulder clusters is anticipated throughout the 3 miles of stream enhancements for Miles 4-6. The resulting added roughness to the channel may slow water velocities in the creek overall and may slightly improve conditions for boating in Dry Creek. Boaters would need to navigate around boulders added to the stream, but as mentioned in Section 3.12.2, "Environmental Setting," Dry Creek is a challenging waterway to navigate under baseline conditions due to high velocities and numerous rocks and large woody debris. Therefore, boaters frequenting Dry Creek would be accustomed to encountering and navigating around objects in the stream channel.

Pool Enhancement

The 10% design calls for 9 pool enhancements in Miles 2-3, or 4.5 pool enhancements per mile (ESA 2014a, 2014b; Inter-Fluve 2014a, 2014b, 2014c). A similar number of pool enhancements per mile would likely be used in Miles 4-6. An estimated 14 pool enhancements is anticipated throughout the 3 miles of stream enhancements for Miles 4-6. The enhancement of pools would likely improve boating in Dry Creek. The addition of pools would likely decrease velocities at the location of the pools and may slightly decrease velocities in the creek as a whole, which is a secondary goal of the project. Slower stream velocities would make boating Dry Creek slightly less challenging and may slightly improve boating in Dry Creek. The addition of logs to the stream channel as

part of pool enchantments would require boats to navigate around the logs. However, as mentioned in Section 3.12.2, “Environmental Setting,” Dry Creek is a challenging waterway to navigate under baseline conditions due to high velocities and numerous rocks and large woody debris. Therefore, boaters frequenting Dry Creek would be accustomed to navigating around logs in the stream channel.

Riffle Construction

The 10% design calls for 66 constructed riffles in Miles 2-3, or 33 riffles per mile (ESA 2014a, 2014b; Inter-Fluve 2014a, 2014b, 2014c). A similar number of riffles per mile would likely be constructed in Miles 4-6. It is anticipated that approximately 99 riffles features would be constructed throughout the 3 miles of stream enhancements for Miles 4-6. Riffles consist of higher stream gradient and swifter current, however they help in reducing stream velocity in the adjacent pools by dissipating some of the stream’s energy. Stream velocities may be higher within the riffle making boating slightly more difficult at these individual locations. However, riffles would aid in slowing down stream velocities throughout the other portions of Dry Creek thereby slightly improving conditions for boating overall. Furthermore, riffles occur naturally in Dry Creek and approximately 26% of the lower 13.7 miles of Dry Creek is composed of riffles (Inter-Fluve 2010, p. 69). Therefore, boaters frequenting Dry Creek would be accustomed to encountering and navigating riffles.

Stream Bank Stabilization

Eroding stream banks would be repaired by excavating the damaged areas and rebuilding the damaged areas with logs, boulders, and cobbles, and soil. Historic bank stabilization techniques often relied on using unnatural materials such as car bodies to armor stream banks. The unnatural materials would be removed and replaced by natural materials as they are encountered. The upper parts of the stream bank would be further stabilized by using fabric blankets that aid in retaining these materials. Native plants would be planted to further stabilize the bank. The 10% design calls for 3 stream bank stabilization sites in Miles 2-3, or 1.5 stream bank stabilization sites per mile (ESA 2014a, 2014b; Inter-Fluve 2014a, 2014b, 2014c). A similar number of bank stabilizations would likely occur per mile in Miles 4-6. It is anticipated that 5 bank stabilization features would be constructed throughout the 3 miles of stream enhancement for Miles 4-6. The addition of logs and boulders to the toe of the bank may require boaters to navigate around these objects; however, Dry Creek currently includes several sections in which eroding banks have resulted in trees falling into the stream, which, in turn, must be avoided by boaters under baseline conditions. Furthermore unnatural bank stabilization materials like car bodies would be replaced by logs. Car bodies contain jagged and rusty metal edges which need to be avoided by boaters for safety reasons. The removal of these unnatural bank stabilization materials would be a benefit to boating.

As mentioned in Section 3.12.2, “Environmental Setting,” boaters who recreate in Dry Creek must be highly skilled as they commonly encounter navigational obstacles such as naturally occurring log jams, riffles, and boulders. The types of structures that would be added to the stream as part of the project already occur in Dry Creek under baseline conditions and boaters frequenting Dry Creek would currently be familiar with the need to navigating around such features.

The construction of habitat enhancements in Miles 2-3 may slightly improve boating conditions overall. One of the goals of the project is to slow velocities in the creek as a whole. This would be accomplished through a number of ways, including the construction of riffles and side channels to dissipate stream energy, and by adding logs and boulders, which increase channel roughness. Slower velocities would make navigating Dry Creek slightly less challenging. In addition to slowing velocities in the creek as a whole, some historic unnatural bank stabilization materials such as metal car bodies would be replaced with natural materials reducing hazards to recreationists. Therefore this impact would be less than significant.

Impact significance: Less than Significant; no mitigation measures are required.

Impact 3.12.3: The construction and maintenance of habitat enhancements on Dry Creek could block access to some swimming sites. (Less than Significant)

Combined Analysis for Miles 2–3 and Miles 4–6

The intensity of work to build individual habitat enhancement sites in Miles 2-3 and 4-6 would vary by site, but the work sites would be unsafe for recreation during construction and maintenance activities. The 10% design for Miles 2-3 calls for 22 habitat enhancements sites (ESA/PWA 2014a, 2014b; Inter-Fluve 2014a, 2014b, 2014c), or approximately 11 sites per mile. It may be assumed that Miles 4-6 would have a similar frequency of habitat enhancement sites as Miles 2-3, therefore, 3 miles of habitat enhancement would likely contain approximately 33 habitat enhancement sites. Construction activities would range from relatively low-intensity work, such as riparian vegetation management, to relatively high-intensity work, such as earth-moving to construct alcoves and winter habitat. Riparian vegetation management consists of the removal of selective trees and understory as well as the plantings of native vegetation. The construction of backwaters, side channels, winter habitats, constructed riffles, log placements, boulder clusters, boulder gardens, stream bank stabilization, and winter habitat would often require heavy equipment and earth moving. Since these would be active worksites, it would be unsafe to allow people to swim in areas where construction or maintenance activities are in progress or equipment is being stored. However, the intensity of this impact is likely low due to the lack of public access to Dry Creek and the cold water temperatures.

The majority of people swimming in Dry Creek and, therefore, potentially affected by the proposed project, are residents living along the creek. It is important to note that participation is voluntary and landowners can choose to take an active role during site selection and design of the project. Water Agency staff is working with landowners to incorporate landowner input into project designs in order to avoid impacts to existing recreational areas while still creating beneficial steelhead and coho habitat.

The project may also result in beneficial recreational impacts in that the construction of backwaters, alcoves and other such features may provide additional swimming opportunities.

Any impacts related to swimming resources would be temporary as it would only occur during the construction period and during occasional maintenance of the sites. This impact is anticipated to be less than significant.

Impact Significance: Less than Significant; no mitigation measures required.

Impact 3.12.4: The construction of off-channel habitat enhancements along Dry Creek could result in the loss of beaches that are used by private landowners for recreation. (Less than Significant)

Combined Analysis for Miles 2–3 and Miles 4–6

Off-channel habitat enhancements may be constructed in areas that contain beaches that are used by the corresponding landowner. Off-channel habitats such as backwaters, winter habitat, and side channels are built by excavating sections of the riparian corridor down to, or below, the stream bed.

Backwaters

Backwaters are built by excavating sections of bank near the stream, adding logs, planting aquatic vegetation and management of surrounding vegetation. While the actual number of backwaters may differ as designs are further developed, the 10% design calls for 16 backwaters in Miles 2-3, or 8 per mile (ESA/PWA 2014a, 2014b; Inter-Fluve 2014a, 2014b, 2014c). A similar number of backwaters per mile would likely be constructed in Miles 4-6. Miles 4-6 consist of 3 miles of stream enhancements. Approximately 24 backwaters would likely be constructed in Miles 4-6. Some of these backwaters may occur in sections of the stream that have beaches used by private land owners. It is worth noting that while the construction of backwaters may convert some beaches to backwaters this process would create small sections of still water that can be used by people for boating and swimming.

Winter habitat

While the actual number may differ as designs are further developed, the 10% design for Miles 2-3 show 6 winter habitat features, or 3 per mile (ESA/PWA 2014a, 2014b;

Inter-Fluve 2014a, 2014b, 2014c). A similar number of winter habitat features per mile would be constructed in Miles 4-6. Miles 4-6 consist of 3 miles of stream enhancements and would likely include approximately 9 winter habitat features. Winter habitat features are constructed in flood plain areas and are designed to be inundated at high flows. As a result, winter habitat features are only inundated during the winter and spring months when recreation is likely infrequent. Winter habitat features would be dry during the summer when people would be most likely use beaches for recreation.

Side Channels

Side channels are constructed by excavating a secondary channel that runs parallel to the mainstem channel. Logs are added to the side channel and the surrounding vegetation is managed to improve fish habitat. The 10% design calls for 20 side channel enhancements in Miles 2-3, or 10 per mile, however the actual number may differ as designs are further developed (ESA/PWA 2014a, 2014b; Inter-Fluve 2014a, 2014b, 2014c). A similar number of side channels per mile would be constructed in Miles 4-6. Miles 4-6 consist of 3 miles of stream enhancements and would likely include approximately 30 backwaters. Some constructed side channels may occur in sections of the stream that have beaches used by private land owners.

Occasionally these off channel habitats may be built in areas that are used by the landowner for beach-going activities. However, it is important to note that participation is voluntary and landowners can choose to take an active role during site selection and design of the project. If a landowner feels that the project could eliminate a valuable recreational resource he or she can provide input into site selection and project design. If the landowner feels that, even after providing input, the project design still impacts a valuable recreational resource he or she can choose to not participate in the project. This impact is anticipated to be less than significant.

Impact significance: Less than Significant; no mitigation measures required.

Impact 3.12.5: Construction of off-channel habitat enhancements along Dry Creek could result in the relocation of, or loss of, winery picnic areas. (Less than Significant)

Combined Analysis for Miles 2–3 and Miles 4–6

The construction of off-channel habitats such as side channels, alcoves, and winter habitat require significant earth moving and re-contouring of sections of the riparian corridor. Some of these off-channel habitat enhancements could overlap areas that are currently occupied by winery picnic areas

Backwaters

Backwaters are built by excavating sections of bank near the stream, adding logs, planting aquatic vegetation and management of surrounding vegetation. While the

actual number of backwaters may differ as designs are further developed, the 10% design calls for 16 backwaters in Miles 2-3, or 8 per mile (ESA/PWA 2014a, 2014b; Inter-Fluve 2014a, 2014b, 2014c). A similar number of side channels per mile would be constructed in Miles 4-6. Miles 4-6 consist of 3 miles of stream enhancements and would likely include approximately 24 backwaters. A site visit on January 14, 2015 found that one winery, Truett-Hurst, has picnic accommodations for their guests located in an area that the 10% design includes as a location for constructed backwaters. The accommodations at Truett-Hurst consists of five sets of tables and chairs located near the creek. One set of these tables and chairs is located where a portion of the backwater is planned in the 10% design. Water Agency staff is working with landowners to incorporate landowner input into project designs in order to avoid impacts to existing recreational areas while still creating beneficial steelhead and coho habitat.

There are two wineries that are located relatively close to Dry Creek within areas potentially available for projects to be constructed for Miles 4-6 (sections of stream that are not already occupied by projects for Mile 1 or shown as habitat enhancement sites for Miles 2-3 on the 10% design plans, see Table 3.12.2 and Figure 3.12.1). No picnic facilities along the section of creek were observed during site visits to these wineries on January 14, 2015. However one of these wineries, Martorana Family Winery, shows picnic areas for their guests on their website (Martorana Family Winery 2015). It is possible that off-channel habitat features may be designed on properties with picnic areas as the construction plans are developed for Miles 4-6.

It is important to note that participation is voluntary and landowners can choose to take an active role during site selection and design of the project. If a landowner feels that the project could eliminate a valuable recreational resource he or she can provide input into site selection and project design. If the landowner feels that, even after providing input, the project design still impacts a valuable recreational resource he or she can choose to not participate in the project. These impacts could be reduced by relocating winery picnic areas that overlap a project site to locations adjacent to a project site in project design or avoided by modifying off channel habitat designs to avoid winery picnic areas. This impact would be less than significant.

Impact Significance: Less than Significant; no mitigation measures are required.

3.12.5 General Plan and Consistency

Sonoma County General Plan 2020

The *Sonoma County General Plan 2020* (General Plan) includes the Open Space and Resource Conservation Element (Sonoma County PRMD 2008). This element includes

goals, objectives, and policies related to trail networks, bikeways, riparian corridors, outdoor recreation and other topics related to recreation in Sonoma County. Those goals, objectives, and policies are listed below along with a discussion regarding the proposed projects' consistency with them.

Trail Networks

The General Plan describes a trail network being developed by the Sonoma County Regional Parks Department. This trail network is intended to link many of the County Regional Parks together with hiking and riding trails. There are no trails in the Dry Creek Project area that are described in the General Plan. In addition to hiking and riding trails, existing and proposed waterway trails are described in the General Plan which are composed of navigable sections of rivers. The General Plan describes the recreational opportunities in the navigable sections of the Gualala River, the Russian River, and the Petaluma River. These areas provide boating opportunities for the general public. Dry Creek is not listed as an existing or proposed waterway trail (Sonoma County PRMD 2008).

Bikeways

The General Plan recognizes the benefits of an improved bicycle network. While Dry Creek Valley is a common destination for many cyclists, there are currently no Class I, Class II, or Class III Bikeways in the Dry Creek Project area. A goal of the General Plan is to establish a network of bikeways in Sonoma County.

GOAL OSRC-18: Establish a Bikeways Network that provides safe and convenient recreational opportunities for all bicyclists and enhances Sonoma County's reputation as a world-class bicycling destination.

The General Plan intends to accomplish this goal through the implementation of the following objective and policies.

Objective OSRC-18.1: Design, construct and maintain a comprehensive Bikeways Network that links the County's cities, unincorporated communities, and other major activity centers including schools, recreational areas and employment centers.

Policy OSRC-18a: Use the adopted Sonoma County Bicycle and Pedestrian Plan as the detailed planning document for existing and proposed bikeways.

Policy OSRC-18b: Develop a comprehensive system of bikeways through implementation of the Sonoma County Bicycle and Pedestrian Plan as described in the Circulation and Transit Element.

The Sonoma County Bicycle and Pedestrian Plan describes bikeways proposed in Dry Creek Valley, including a Class II bikeway proposed for Dry Creek Road. The bikeways proposed in the Sonoma County Bicycle and Pedestrian Plan are prioritized. The Class II bikeway proposed for Dry Creek Road is listed as a priority one project. This project would require widening Dry Creek Road to allow for a bike lane (Helfrich 2010). It appears that the Dry Creek Project would be consistent with the Sonoma County Bicycle and Pedestrian Plan and the General Plan as the Dry Creek Project would not preclude the construction of Class II bikeways on Dry Creek Road. Bikeways are described in more detail in **Chapter 3.13, Traffic and Transportation**.

Riparian Corridors

The General Plan identifies riparian corridors as areas that provide opportunities for recreation in urban areas. The General Plan lists the following goals and objectives related to riparian corridors:

GOAL OSRC-8: *Protect and enhance Riparian Corridors and functions along streams, balancing the need for agricultural production, urban development, timber and mining operations, and other land uses with the preservation of riparian vegetation, protection of water resources, flood control, bank stabilization, and other riparian functions and values.*

Objective OSRC-8.1: *Designate all streams shown on USGS 7.5 minute quadrangle topographic maps as of March 18, 2003, as Riparian Corridors and establish streamside conservation areas along these designated corridors.*

Objective OSRC-8.2: *Provide standards for land use and development in streamside conservation areas that protect riparian vegetation, water resources and habitat values while considering the needs of residents, agriculture, businesses and other land users.*

Objective OSRC-8.3: *Recognize and protect riparian functions and values of undesignated streams during review of discretionary projects.*

Consistency

Sonoma County General Plan 2020 shows Dry Creek as a designated waterway on the Healdsburg and environs open space map. The General Plan lists eight activities that should be allowed or considered to be allowed within a stream side conservation area. One of these activities is “Stream side maintenance and restoration” (PRMD 2008). The Dry Creek Project appears to be consistent with the General Plan as the Project is a restoration project.

3.12.6 References

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CHAPTER 3.13 Traffic and Transportation

3.13.1 INTRODUCTION

This section evaluates whether implementation of the Dry Creek Habitat Enhancement Project, Miles 2-6 (Dry Creek Project or proposed project) would result in potential adverse impacts related to transportation and traffic. Section 3.13.2, “Environmental Setting” describes regional and local access to the project area. Section 3.13.3, “Regulatory Framework” describes pertinent state and local laws related to traffic considerations of the proposed project. Potential impacts to traffic and transportation resulting from the proposed project are analyzed in Section 3.13.4, “Impacts and Mitigation Measures” in accordance with the California Environmental Quality Act (CEQA) significance criteria (CEQA Guidelines, Appendix G) and mitigation measures are proposed that could reduce, eliminate, or avoid such impacts.

Other impacts related to traffic and transportation are addressed in sections as follows: impacts to air quality are addressed in **Chapter 3.2, Air Quality, Energy, Climate Change, and Sustainability**; impacts to land use are addressed in **Chapter 3.9, Land Use, Planning, and Agricultural Resources**; and impacts to recreation are addressed in **Chapter 3.12, Recreation**.

3.13.2 Environmental Setting

Sonoma County is generally considered a rural, low-density region. Because major trip attractors are dispersed throughout the County, the dominant mode of transportation is the private automobile. The Dry Creek Project area itself is one of the more rural areas of the County.

Many of the traffic trips passing through northern Sonoma County are regional in nature via U.S. Highway 101 (U.S. 101). In the Dry Creek Project area, many of the traffic trips are related to agricultural operations, recreation and tourism, particularly for wine tasting and outdoor activities at Lake Sonoma (refer to **Chapter 3.12, Recreation** for more information), and residents of the Dry Creek Valley via Dry Creek Road and West Dry Creek Road.

The regional roadway network includes roads ranging from freeways to rural roads. With the exception of U.S. 101, roadways in the Dry Creek Valley are two lane roadways, some with blind curves, and traffic patterns are often affected by recreational

travel associated with the wine industry, especially on weekends during the summer and fall (PRMD 2010). Due to the type of agricultural activities in the area, local and rural roads may also carry large farm-related trucks and other heavy equipment.

Transportation networks generally contain six primary types of roadways, each of which serves a different function in terms of movement and access. They are described below along with a brief discussion of their relevance to the proposed project. For the purposes of traffic and transportation resources, the Dry Creek Project area includes Dry Creek Valley and the surrounding roadways used to access it.

Freeways

Freeways generally carry long distance intercity and intracity traffic and are designed to separate two or more travel lanes with a median to prohibit access from adjacent properties, and to limit access from cross streets by providing grade separations. Access to cross streets is provided at a select number of grade-separated interchanges via ramps.

U.S. 101 serves regional and countywide travel as the major north-south through route for the North Coast region. It provides regional access to Mendocino County to the north and to Marin County and the San Francisco Bay area to the south. U.S. 101 is a commuter corridor between Sonoma County and the San Francisco Bay area and is heavily traveled during the morning and evening peak times. U.S. 101 provides access to the Dry Creek Valley from other regions. At Dry Creek Road, the average daily traffic on U.S. 101 is approximately 28,000 to 36,500 vehicle trips (Caltrans 2012). **Table 3.13-1** lists the most recent data regarding total traffic volumes on U.S. 101 at Dry Creek Road.

Table 3.13-1. Most Recent Highway 101 (U.S. 101) Total Traffic Volumes at Dry Creek Road.

Location	Peak Hour* (vehicles/hour)	Peak Month ADT** (vehicles/day)	Annual ADT*** (vehicles/day)
U.S. 101, South of Dry Creek Road	2,950	37,500	36,500
U.S. 101, North of Dry Creek Road	2,250	28,500	28,000

Source: Caltrans 2012

*Peak Hour estimates represent an estimate of the heaviest traffic flow, northbound and southbound combined, which usually occurs between 7:00 to 9:00 a.m. and 5:00 to 7:00 p.m..

**Peak Month Average Daily Traffic (ADT) is the average daily traffic for the month of heaviest traffic flow, usually July or August.

*** Annual ADT is the total volume for the year divided by 365 days.

Primary Arterials

Arterials are relatively high speed (30 to 45 miles per hour [mph]) roads that provide access to regional transportation facilities and serve relatively long trips within a community. Although they are primarily intended to serve intercity travel, they may also provide routes of regional significance in less heavily traveled corridors and some local traffic in larger urban areas. Arterials are intended to serve a through-traffic function and not to provide access to property. Arterial streets typically carry in excess of 15,000 vehicle trips on a daily basis. In the vicinity of freeway and highway connections, these daily volumes may be as high as 40,000 vehicle trips. As defined in the *Sonoma County General Plan 2020, Circulation and Transit Element* (2010), State Route (SR) 128 is the nearest primary arterial. SR 128 runs from Geyserville southeast through Napa County to U.S. 505 in the Central Valley. Dry Creek Valley does not contain primary arterials.

Secondary Arterials

Secondary arterials in general serve the same function as primary arterials but either carry a lesser volume of traffic or carry a higher proportion of local traffic over shorter distances. The Dry Creek Project area does not include secondary arterials.

Major Collectors

Major collectors primarily serve internal traffic within a community and carry traffic to the arterial system. In urban areas, collectors may carry traffic volumes in excess of 10,000 vehicles per day, although traffic volumes in rural areas are considerably less. As defined in the *Sonoma County General Plan 2020, Circulation and Transit Element* (2010), Stewarts Point - Skaggs Springs Road, Dry Creek Road, Canyon Road, and Westside Road are the Rural Major Collectors within the project area.

Minor Collectors

Minor collectors serve the same function as major collectors, but are located primarily in rural areas where traffic volumes tend to be lower but the length of roadway trips is generally longer.

As defined by the *Sonoma County General Plan 2020, Circulation and Transit Element* (2010), Dutcher Creek Road, Yoakim Bridge Road, West Dry Creek Road, Lambert Bridge Road, Lytton Springs Road, and Westside Road are the Rural Minor Collectors within the project area.

Local Roads

The purpose of these roadways is to provide access to adjacent land. A large percentage of the County's roadway network is comprised of local roads, although local roads only carry a small proportion of the total vehicle miles of travel (PRMD 2010). Several rural roads are located in the project area, particularly near the confluence of

Dry Creek with the Russian River, including Lucius Way, Magnolia Drive, and Foreman Lane.

Project Area Roads

While construction activities would take place within the Dry Creek riparian corridor and on private property, construction-related traffic will utilize area roadways to varying degrees. **Table 3.13-2** identifies the majority of the roadways in the project area that construction-related vehicles could utilize.

Table 3.13-2. Roadway Classifications Within the Project Area.

Roadway	Freeway	Major Rural Collector	Minor Rural Collector	Rural Road
U.S. 101	X			
Dry Creek Road		X		
Stewarts Point - Skaggs Springs Road		X		
Canyon Road		X		
Westside Road		X		
Dutcher Creek Road			X	
Yoakim Bridge Road			X	
West Dry Creek Road			X	
Lambert Bridge Road			X	
Lytton Springs Road			X	
West Grant Street				X
Kinley Drive				X
West North Street				X
Hendricks Street				X
West Matheson Street				X
Lucius Way				X
Felta Road				X
Magnolia Drive				X
Foreman Lane				X
Bramkampo Road				X
Skinner Road				X
Skinner Road Magnolia				X

Source: Sonoma County General Plan 2020, Circulation and Transit Element (2010).

Existing Traffic Volumes

The weekday travel patterns within the project area are typical of unincorporated areas adjacent to cities and towns. The primary peak periods of travel are between 7:00 and 9:00 A.M. and between 4:00 to 6:00 P.M. There are a significant number of commuters that travel south during the morning peak and return during the evening peak. The existing peak periods are a result of the combination of local traffic and long distance commute traffic.

In addition to these weekday peaks, the project area also has very high weekend traffic volumes due to the recreational and tourist traffic in the area, particularly for access to wineries in the area and to Lake Sonoma. **Table 3.13-3** lists the most recent traffic counts performed by Sonoma County Transportation and Public Works in the Dry Creek Valley.

Table 3.13-3. Traffic Counts in the Dry Creek Valley

Roadway	Location	Direction	24-hour Volume (vehicle trips per 24-hour period)	24-hour Volume: Combined North- and South-bound (vehicle trips per 24-hour period)	Date
Dry Creek Road	North of Kinley Drive	North-bound	2,621	5,315	Tuesday June 26, 2012
		South-bound	2,694		
	North of Lambert Bridge Road	North-bound	1,440	3,002	Thursday August 25, 2011
		South-bound	1,562		
	North of Dutcher Road	North-bound	668	1,319	Thursday August 25, 2011
		South-bound	651		
West Dry Creek Road	North of Lambert Bridge Road	North-bound	368	749	Wednesday April 14, 2010
		South-bound	381		
	North of Yoakim Bridge Road	Total North- and South-bound	287	287	Wednesday July 9, 2008

Source: Steve Eldridge, Sonoma County Transportation and Public Works, personal communication, July 9, 2014.

Traffic in Dry Creek Valley also includes frequent use of large vehicles to support agriculture in the valley. There are approximately 66 wineries and 135 winegrape growers located in Dry Creek Valley (Winegrowers of Dry Creek Valley 2015). Growers that do not produce wine onsite must transport grapes on project area roadways using large trucks particularly in the late summer and fall months.

Transit

Sonoma County Transit Route 60 runs through the cities of Cloverdale, Asti, Geyserville, Healdsburg, and the Town of Windsor to the transit mall in the City of Santa

Rosa. Route 67 runs within the City of Healdsburg. Route 68 runs within the City of Cloverdale. No bus routes serve the Dry Creek Valley.

Bicycle and Pedestrian Facilities

The Dry Creek Valley is a popular destination for bicyclists. Under the *Sonoma County General Plan 2020, Circulation and Transit Element* (2010) bikeways are classified into three types denoting the degree of separation from traffic on the roadway, as follows:

1. Class I: completely separated right-of-way designated for the exclusive use of bicycles;
2. Class II: a striped lane (right-of-way) on the roadways, designated for use by bicyclists; and
3. Class III: a shared right-of-way within the road width, designated as a bicycle route by signing or stenciling on pavement.

Dry Creek Road, portions of West Dry Creek Road, and Canyon Road have stripes and shoulders but other roadways in the Dry Creek Valley lack such improvements. Class II Bikeways¹ are proposed along Dry Creek Road and Dutcher Creek Road in the *Sonoma County General Plan 2020, Circulation and Transit Element* (2010) and the Sonoma County Transit Authority (SCTA) *Countywide Bicycle and Pedestrian Master Plan* (updated 2014). No specific timeline is proposed to implement such improvements.

While some project area roadways are flanked by shoulders, pedestrian access is limited as roads are sometimes winding and provide limited sight distances.

SCTA began collecting data manually on bicycle and pedestrian activity during commute hours at approximately 20 locations in Sonoma County. The results are summarized in **Table 3.13-4** below and suggest an increase in commute-related pedestrian and bicycle traffic during commute hours from 2009 to 2013. No data is available for non-commute weekday travel hours or weekends (SCTA 2014).

Table 3.13-4. SCTA Countywide Bicycle and Pedestrian Counts*

	2009	2010	2011	2012	2013
Total Bicycle Counts	994	1,243	1,341	3,307	1,397
Total Pedestrian Counts	2,525	6,341	5,007	6,623	4,322

* Pedestrian and bicycle traffic was counted over the course of four hours during commute hours at 20 locations throughout Sonoma County.

Source: SCTA Countywide Bicycle and Pedestrian Master Plan, 2014

¹ Class II Bikeways are one-way bike lanes separated from vehicular traffic by a stripe on the roadway.

Pedestrian facilities provide safety to pedestrians against vehicular traffic and generally include sidewalks, pathways, recreational trails, Class I multi-use trails, and, informally, roadway shoulders (SCTA 2014). Roadway shoulders are the primary mode of pedestrian travel in the Dry Creek Valley. Due to the long distances separating amenities in the area and the lack of pedestrian-focused infrastructure, pedestrian traffic is minimal in the Dry Creek Valley.

Railroad Transportation

The Northwestern Pacific Railroad (NWP), sometimes called the “Redwood Empire Route,” was an amalgamation of sixty or more different companies. The NWP Railroad was opened for the purpose of moving lumber. Owned jointly by Southern Pacific Railroad and Atlantic & Santa Fe, it was opened by Northwestern Pacific in 1907. The NWP mainline generally parallels US 101 and Highway 37 from Marin and Sonoma counties northward to Humboldt County. While the line played a major role in the growth of Northern California and was essential to the timber industry for many decades, portions of the NWP proved to be expensive to maintain due to landslides, flooding, and other problems. Passenger service ceased in the mid-1950s and freight service was discontinued in the 1990s. In the 1980s, Southern Pacific Railroad filed for abandonment of the branch line to Sebastopol and sold the portion south of the City of Novato to the Golden Gate Bridge Highway and Transportation District. The segment between Novato and Healdsburg was sold to the Northwestern Pacific Railroad Authority (NWPRA), a joint powers public agency (Northwestern Pacific Railroad Historical Society, 2011). In 1990, California voters passed Proposition 116 which provided funding to make improvements to NWP rail. Current freight service on the NWP is under the jurisdiction of the North Coast Railroad Authority (NCRA), which owns the NWP north of Healdsburg and has easements on the line south of Healdsburg.

Sonoma-Marín Area Rail Transit (SMART), created in 2002 by state legislation and approved by voters in 2008, is scheduled to begin providing passenger service from San Rafael to North Santa Rosa in 2016. Phase 2 will extend service to Windsor, Healdsburg and Cloverdale in the future (SMART 2014). The alignment parallels U.S. 101 and runs north-south through Windsor, Healdsburg, and Cloverdale.

3.13.3 Regulatory Framework

Federal Regulations

The only road in Sonoma County within the Federal Highway System is U.S. 101. Projects involving improvements to U.S. 101 must meet federal highway standards and are subject to the National Environmental Policy Act (NEPA). The project does not

propose modifications to U.S. 101 and; therefore, is not subject to Federal Highway Administration review and approval.

State Regulations

The California Department of Transportation (Caltrans) manages interregional transportation, including management and construction of the California State highway system and is responsible for several highways under the State system in Sonoma County: Highways 1, 12, 37, 101, 116, 121, and 128. Modifications and improvements to these roads must meet Caltrans standards and are subject to CEQA. Funding is also programmed through the regional Metropolitan Transportation Commission and SCTA.

Caltrans is also responsible for permitting and regulation of the use of state roadways. U.S. 101 falls under Caltrans' jurisdiction and would be used to transport crews, equipment, and materials to the project area. Caltrans' construction practices require temporary traffic control planning during any time the normal function of a roadway is suspended (Caltrans 2014). In addition, Caltrans requires that permits be obtained for transportation of oversized loads and transportation of certain materials, and for construction-related traffic disturbance. Caltrans regulations would apply to the transportation of construction crews, equipment, and materials to the project area (Caltrans 2014).

Local Regulations

Sonoma County Transportation Authority (SCTA)

The SCTA was formed as a result of legislation passed in 1990 and is comprised of representatives of the County and each of the nine cities. The SCTA serves as the coordinating and advocacy agency for transportation funding for Sonoma County. The SCTA acts as the countywide planning and programming agency for transportation related issues: securing funds, project oversight and long term planning.

The SCTA's 2009 Countywide Transportation Plan for Sonoma County provides guidance for transportation planning and associated goals and policies (SCTA, 2009). This plan refines the goals, objectives, and policies for improving mobility on Sonoma County's streets, highways, and transit system and bicycle/pedestrian facilities, as well as to reduce transportation related impacts.

The SCTA Countywide Bicycle & Pedestrian Master Plan was first adopted in 2008. An updated plan was approved by the SCTA Board of Directors in April 2014. The plan described projects, programs and policies that support the development and maintenance of a bicycle and pedestrian transportation system. It also includes the creation of a Class II Bikeway along Dry Creek Road from the Healdsburg City limits to

Skaggs Springs Road for a total distance of a little over 10 miles, which is listed at a high priority.

Sonoma County Road Maintenance Districts

The road maintenance districts provide maintenance services on non-County roads in private subdivisions. The permanent road districts were established prior to the passage of Proposition 13. Road maintenance work within these districts is done on an as-needed basis, subject to the availability of funds which are collected through property assessment fees. The project area is located within Sonoma County Road Maintenance District 4.

Sonoma County General Plan 2020

Local policies established in the *Sonoma County General Plan 2020* that govern traffic and transportation resources in the project area are summarized in the *Sonoma County General Plan 2020, Circulation and Transit Element*. The purpose of the *Circulation and Transit Element* is to plan for future travel demand and to attempt to alleviate traffic congestion resulting from growth in employment and population, changes in transportation patterns, and recreational use. This element provides a policy framework for future transportation facilities that will: 1) help accomplish the planned pattern of future land uses, 2) not be growth inducing, 3) serve the needs of all population groups and enable transport of goods and materials, and 4) contribute to environmental quality and achieve environmental goals. For additional information, please refer to Section 3.13.5, "General Plans and Consistency."

Level of Service Concept

Level of service (LOS) is a quantitative measure describing operational conditions for intersections and roadways. The descriptions of individual levels of service characterize these conditions in terms of such factors as travel speed (and thus travel time), freedom to maneuver, traffic interruptions, and comfort and convenience. The six levels of service, A through F, represent driving conditions from best to worst, respectively. In general, LOS A represents free-flow conditions with no congestion, and LOS F represents severe congestion and delay under stop-and-go conditions. LOS standards are typically used to evaluate long-term (operational) traffic impacts resulting from residential, employment-generating, industrial, and institutional development projects. According to *Sonoma County General Plan 2020 Draft EIR* (2010), no roadways within the Dry Creek Valley currently experience recurring weekday congestion. However, *Sonoma County General Plan 2020, Circulation and Transit Element* (2010) states that Dry Creek Road is affected to some extent during peak weekend hours. The Dry Creek Project is not a residential, employment-generating, industrial, or institutional development project, and long-term operation of the project would generate a minor number of vehicular trips distributed throughout a large area. Therefore LOS standards

were not used in this analysis. Instead, this analysis focuses on short-term, construction-related traffic effects on existing roadways.

3.13.4 Environmental Impacts and Mitigation Measures

The following section presents a detailed discussion of potential impacts associated with traffic and transportation resulting from the Dry Creek Project. This Environmental Impact Report includes project-level analysis for miles two and three and program-level analysis for miles four through six. The locations of proposed program-level components have not yet been identified; however, because habitat enhancement components for miles four through six will be similar in scope to those proposed for miles two and three, analysis of potential impacts for project-level and program-level project components are combined where appropriate.

Significance Criteria

The following thresholds for determining the significance of impacts for this transportation and circulation analysis are based on the environmental checklist in Appendix G of the CEQA Guidelines and are relevant to the project. The proposed project would be considered to have a significant impact on transportation and circulation if it would:

1. Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;
2. Conflict with an applicable congestion management program, including, but not limited to, level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;
3. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
4. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
5. Result in inadequate emergency access;
6. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

Several of the criteria included in Appendix G of the CEQA Guidelines do not apply to this analysis and are not used, as explained below.

Conflict with an applicable congestion management program and exceedance of LOS standards established by the county congestion management agency. No Congestion Management Program or LOS standards have been set for the project area. Further, LOS standards are generally used to evaluate long-term (operational) traffic impacts resulting from development projects that include residential, commercial, industrial, or other employment-generating components. The proposed project, however, does not include any such components and long-term operation of the proposed project or any of the alternatives would generate a small number of vehicle trips in the area. Therefore, LOS standards were not used in this analysis; instead, this analysis focuses on short-term construction-related traffic effects on existing roadways.

Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks. The Charles M. Schultz Sonoma County Airport is located within ten miles of the southern end of the project area; however, the Dry Creek Project would not result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.

Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment). The Dry Creek Project would not include new design features within public roadways (e.g., new facilities or obstructions) or alterations of existing features (e.g., road realignment). Where necessary, and in coordination with the landowner, new driveway access onto sites may be necessary during construction due to limited existing access or large vehicle ingress and egress safety concerns with existing driveway access locations. Depending on the site, and landowner permission, new driveway access locations built during construction may be left on a permanent basis to allow for future potential access for monitoring and maintenance activities. Traffic generated by the project would be compatible with the mix of vehicle types (autos and trucks) currently using project area roads. Therefore, the proposed project would not result in hazards caused by a design feature or incompatible use.

Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities. The Dry Creek Project would not directly or indirectly eliminate alternative transportation corridors or facilities (e.g., bike paths,

lanes, bus turnouts, etc.). In addition, the proposed project would not include changes in policies or programs that support alternative transportation. Therefore, the proposed project would not conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

In addition to the above-listed criteria, the following criteria are derived from common engineering practice to apply to the project-specific analysis presented herein:

1. Substantially increase traffic safety hazards due to increased traffic volumes; or
2. Cause substantial damage or wear of public roadways by increased movement of heavy vehicles.

Approach to Analysis

This analysis focuses on the potential for project construction and maintenance activities to affect roadways and traffic within the Dry Creek Valley. While the majority of regular maintenance work over the long term will consist of vegetation management, temporary irrigation and other similar activities, maintenance could also include activities similar to construction activities, such as repair to damaged structures or adjustments to structures if they are not functioning as intended. Therefore, maintenance activities are generally analyzed alongside construction activities in terms of their potential for impact. Operation of the project is excluded from traffic analysis as operation would include only occasional vehicular activity.

This analysis relies upon field reconnaissance of roadway characteristics as well as available literature, including documents published by Federal, State, and County agencies that document traffic conditions and transportation infrastructure, were reviewed for this analysis. Appropriate agency staff were also consulted for traffic data specific to the project area. The information obtained from these sources was reviewed and summarized to establish existing conditions and to identify potential environmental effects based on the significance criteria presented above.

In order to estimate traffic resulting from construction of Miles 2-6, actual traffic generated from construction of Mile 1, the Dry Creek Habitat Enhancement Demonstration Project (Demonstration Project), was calculated. Construction logs from the Demonstration Project, which describe vehicle and equipment activity during construction of Mile 1, were used to estimate vehicle trips during construction of the first mile of habitat enhancement (**Appendix 9.8**).² Construction-related traffic generated during the construction of the Demonstration Project is summarized in **Table 3.13-5**

² Vehicle data from detailed construction logs were used to estimate vehicle trips during construction of Mile 1, however detailed construction logs were not available for the portion of the project built in 2012 at Quivira Winery.

below. Because habitat enhancements proposed as part of Miles 2-6 are similar in size and complexity to those installed as part of Mile 1, these calculations represent an accurate estimate for construction-related traffic that would occur during construction of the proposed project. Construction of Mile 1 took place over the course of over two construction seasons but construction of Miles 2-6 could take place at the accelerated rate of up to one to two miles per construction season (generally June 15 through October 15).

This EIR includes project-level analysis for Miles 2-3 and program-level analysis for Miles 4-6. The locations of proposed program-level components have not yet been identified; however, because habitat enhancement components for Miles 4-6 will be similar in scope to those proposed for Miles 2-3, analysis of potential impacts for project-level and program-level project components are combined where appropriate.

Impacts and Mitigation Measures

The following section presents a detailed discussion of potential impacts to transportation and traffic resulting from the Dry Creek Project. Both program-level and project-level project components are analyzed. Impacts associated with traffic and transportation are summarized and categorized as either “less than significant,” “less than significant with mitigation,” or “significant and unavoidable.” Impacts are also identified as applicable to construction, operation, and/or maintenance phases of the project. Operation of the project is generally excluded from the analysis below because operation of the proposed project would resemble the natural functioning of Dry Creek and would not result in traffic or transportation related impacts.

Impact 3.13-1: Construction and/or maintenance of the Dry Creek Project could conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit. (Less than Significant with Mitigation)

Combined Analysis for Miles 2–3 and Miles 4–6

Construction of the Dry Creek Project would result in increased light-duty and heavy-duty truck traffic on project area roadways. Traffic would include transportation of crews to and from the project sites, including Water Agency employees, contractors, and subcontractors; transportation of heavy equipment, such as excavators, cranes, and dozers; transportation of materials, such as rootwads, logs, and boulders; movement of construction-related vehicles such as water trucks and crew trucks; and off-haul of soil and gravel excavated from project sites using dump trucks.

The vehicles would use U.S. 101, Dry Creek Road, West Dry Creek Road, Canyon Road, and rural roads adjacent to project sites. Private roads would be utilized to access project sites with landowner permission. Heavy-duty trucks related to project construction would avoid Lambert Bridge, which received a sufficiency rating³ of 17.5 percent in the 2009 report entitled *The Bridges of Sonoma County: 2009 Strategic Planning* (Department of Transportation and Public Works 2009).

Table 3.13-5 below summarizes construction-related traffic during construction of the Demonstration Project. Because habitat enhancement features included in the proposed project are similar to those included in the Demonstration Project, construction-related traffic experienced during the construction of Mile 1 can function as a good predictor for traffic that would result from construction of the proposed project. Construction of Mile 1 took place over the course of over two construction seasons but construction of Miles 2-6 could take place at the accelerated rate of up to two miles per construction season (generally June 15 through October 15). If construction of Miles 2-6 takes place at a rate of two miles per year (assuming a typical construction season of June 15 to October 15), then approximately 307 additional daily vehicle trips would be added to surrounding roadways during construction of the proposed project.

Table 3.13-5. Construction-Related Vehicle Trips for Dry Creek Habitat Enhancement Demonstration Project (Mile 1) and Estimated Construction-Related Traffic for Miles 2-6

Total Vehicle Trips 2012 ^a	Total Vehicle Trips 2013 ^b	Total Vehicle Trips 2014 ^c	Total Vehicle Trips for Mile 1 (2012-2014)	Total Construction Days for Mile 1 (2012-2014)	Average Daily Vehicle Trips for Mile 1 (2012-2014)	Average Daily Vehicle Trips Projected for Miles 2-6 ^d
1228	3340	8,938	13,506	297	45	307

^aAn estimate for total vehicle trips for 2012 was calculated based on the actual number of construction days (27) and vehicle data for 2013 and 2014 construction seasons because detailed construction logs were not available for 2012.

^bThe 2013 construction season included 85 construction days. This number was used to calculate average daily vehicle trips for the 2013 construction season.

^cThe 2014 construction season included 185 construction days. This number was used to calculate average daily vehicle trips for the 2014 construction season.

^dAverage daily trips for Miles 2-6 were calculated assuming installation of two miles per construction season, June 15 through October 15 (88 days in calendar year 2016), 5 work days per week.

These vehicle trips would be spread out over the course of a full day and over a larger geographical area than was the case for Mile 1 because multiple project sites would be under construction along the length of Dry Creek simultaneously. Construction activities would generally take place between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday. No construction would take place during evening or nighttime hours,

³ Sufficiency ratings reflect four separate factors to obtain a numeric value indicating the bridge sufficiency to remain in service. The resulting value is a percentage in which 100 percent would represent an entirely sufficient bridge and zero percent would represent an entirely insufficient or deficient bridge.

with the exception of the occasional use of pumps for dewatering instream work areas, which would not generate traffic. Occasional work may take place on Saturdays or Sundays. Because the majority of construction activities would take place on weekdays and the majority of Dry Creek Valley traffic occurs on weekends due to recreation associated with Lake Sonoma and area wineries (see **Chapter 3.12, Recreation** for more information), the potential for impacts is reduced.

As described in **Table 3.13.3** above, according to Sonoma County Transportation and Public Works, Dry Creek Road experienced approximately 1,319 vehicle trips at Dutcher Creek Road, 3,002 vehicle trips at Lambert Bridge Road, and 5,315 vehicle trips at Kinley Drive during a 24-hour period on a typical weekday (personal communication, Steve Eldridge, 2014). Locations in the northern portion of Dry Creek Valley would experience a moderate increase in traffic due to local construction activities but Dry Creek Road functions as a major collector and the primary access to U.S. 101, therefore it is likely that Dry Creek Road at Kinley Drive (near U.S. 101) would experience the majority of the estimated 307 additional daily vehicle trips. This additional traffic would increase weekday traffic volume by approximately 5.7 percent at this location during the construction season. Given that Dry Creek Valley does not experience traffic congestion on a typical weekday, a temporary addition of up to 307 vehicle trips per day would not cause a significant change in the performance of roadways in Dry Creek Valley. Maintenance-related traffic would be periodic and would not result in significant increases in traffic volumes on roadways in the project area.

Because the majority of project-related traffic would be temporary, the proposed project would not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system. Additionally, the proposed project would not interrupt mass transit service or pedestrian paths in the project area and is unlikely to significantly interrupt intersections, streets, highways, or bicycle paths in the project area and is unlikely to significantly alter the effectiveness of the circulation system in the project area. Although it is unlikely, localized significant impacts could be possible depending on the intensity of construction activities as well as the location of construction activities. The following mitigation measure is proposed to reduce potential impacts to a less than significant level. This impact would be less than significant with implementation of **Mitigation Measure 3.13.1** described below.

Mitigation Measure 3.13.1: The contractor will prepare a Traffic Control Plan in coordination with the Water Agency to ensure safe and efficient traffic movement throughout the project area during project construction and major repair projects. The Traffic Control Plan will identify alternative emergency access routes, where feasible and necessary, to avoid areas most affected by construction-related traffic. The Contractor will provide alternative route information signage and other information to alert motorists, cyclists, and pedestrians of potential delays.

Impact Significance: Less than Significant with Mitigation.

Impact 3.13.2: Construction and/or maintenance of the Dry Creek Project could substantially impede access to local streets or adjacent uses, including access for emergency vehicles. (Less than Significant with Mitigation)

Combined Analysis for Miles 2–3 and Miles 4–6

The Dry Creek Project would require vehicle and equipment use during the installation and maintenance of the project. The vehicles would use U.S. 101, Dry Creek Road, West Dry Creek Road, Canyon Road, and adjacent rural roads.

As described in the analysis for **Impact 3.13.1**, above, the volume of traffic would temporarily increase to varying degrees during construction activities. This change is unlikely to be significant. However, a portion of the additional construction- and maintenance-related traffic would include heavy-duty vehicles such as dump trucks and trucks hauling logs and other materials. Such vehicles usually travel more slowly than regular traffic and require more time to enter and exit the flow of traffic.

Temporary lane closures that would have the potential to impede access to local streets or adjacent areas and disrupt emergency vehicle response times are not anticipated. Equipment and materials would be staged away from roadways and would not impede emergency vehicle movement or public use of streets or adjacent uses. In addition, for one site within the Mile 2 project area that has limited access off of Dry Creek Road (Meyers property, Reach 8), a new driveway access location exists that could be constructed off of Dry Creek Road that would improve safety by having increased line of site conditions for vehicle traffic entering or leaving the project site. **Figures 3.13.1** and **3.13.2** show the proposed location of the new driveway location onto the Meyers property. **Figure 3.13.3** shows a view of the driveway access location from Dry Creek Road and **Figure 3.13.4** shows the same location from the vineyard side.



Figure 3.13.1. Showing location of proposed new driveway location necessary for construction access to a portion of the Mile 2 project area (Meyers property, Reach 8).



Figure 3.13.2. Showing location of proposed new driveway (Meyers property, Reach 8).



Figure 3.13.3. Location of proposed new driveway as seen from Dry Creek Road in the Mile 2 project area (Meyers property, Reach 8), March 16, 2015.



Figure 3.13.4. Location of proposed new driveway as seen from the vineyard side of Dry Creek Road in the Mile 2 project area (Meyers property, Reach 8) , March 16, 2015.

Implementation of a Traffic Control Plan prepared by the contractor in coordination with the Water Agency would ensure safe and efficient traffic movement throughout the project area. The Traffic Control Plan would identify alternative emergency access

routes, where feasible, to avoid areas most affected by construction-related traffic. The Water Agency would provide alternate route information signage and other information to alert motorists, cyclists, and pedestrians of potential delays. Access along transportation routes would be maintained at all times during construction and maintenance of the proposed project, and, therefore, impacts to emergency access would be less than significant with implementation of **Mitigation Measure 3.13.1** described above.

Impact Significance: Less than Significant with implementation of Mitigation.

Impact 3.13.3: Construction and/or maintenance of the Dry Creek Project could substantially increase traffic safety hazards due to increased traffic volumes. (Less than Significant with Mitigation)

Combined Analysis for Miles 2–3 and Miles 4–6

As described for **Impact 3.13.1**, construction-related traffic could add up to 307 daily vehicle trips to project area roadways during construction activities. The traffic associated with construction activities would be temporary.

As stated previously, while there would be a temporary increase in traffic volume during construction and maintenance activities, it is unlikely that that these increases would significantly impact the functioning of the roadways in the Dry Creek Project area or result in exceedance of the capacity of Highway 101, Dry Creek Road, West Dry Creek Road, Canyon Road, or surrounding rural roads. With the implementation of **Mitigation Measure 3.13.1**, the traffic volumes associated with construction or maintenance of the project would not substantially increase traffic safety hazards along transportation routes, therefore this impact would be less than significant with mitigation.

Impact Significance: Less than Significant with implementation of Mitigation.

Impact 3.13.4: Construction and/or maintenance of the Dry Creek Project could cause substantial damage or wear of roadways by increased movement of heavy vehicles. (Less than Significant with Mitigation)

Combined Analysis for Miles 2–3 and Miles 4–6

The equipment and vehicle use associated with the Dry Creek Project could potentially cause damage and wear to roadway pavements. The degree to which this impact would occur depends on the existing roadway design (pavement type and thickness) and how many (and over what period of time) heavy vehicles would be generated by project activities. State highways such as U.S. 101 are designed to accommodate a mix of vehicles types, including heavy trucks. The project's impact would be negligible on U.S. 101. Other public roadways in the Dry Creek Valley are designed to withstand traffic associated with the operation of over 9,000 acres of vineyards. Such operations

routinely involve the use of heavy-duty vehicles similar to those used for the Dry Creek Project and the number of vehicle and equipment trips made in association with the project would be negligible on those roads.

However, vehicles associated with construction and maintenance of the project could also use private roads immediately adjacent to project sites with landowner permission. All such roadways and other private infrastructure would be returned to its pre-construction condition upon the completion of construction activity. The construction and maintenance activities would, therefore, have a less-than-significant impact on roadway pavements with the implementation of **Mitigation Measure 3.13.4**.

Mitigation Measure 3.13.4: Private roadways utilized during construction and/or maintenance activities for the Dry Creek Project will be inspected for damage and returned to their previous condition per landowner agreements following completion of project-related activities at the site.

Impact Significance: Less than Significant with Mitigation.

3.13.5 General Plan and Consistency

Sonoma County General Plan 2020

The project area is located within Sonoma County. The following section lists goals, policies and objectives related to traffic and transportation from *Sonoma County General Plan 2020* and ends with a brief analysis discussing consistency with this plan.

Objective CT-4.1: Maintain LOS C or better on roadway segments unless a lower LOS has been adopted.

Objective CT-4.2: Maintain LOS D or better at roadway intersections.

Objective CT-4.3: Allows the above levels of service to be exceeded if it is determined to be acceptable due to environmental or community values, or if the project(s) has an overriding public benefit that outweighs lower levels of service and increased congestion.

Consistency

The proposed project is consistent with *Sonoma County General Plan 2020* because project-related traffic would be temporary and would not impact the long-term functioning the project area roadways.

3.13.5 REFERENCES

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- Winegrape Growers of Dry Creek Valley. (2015, April 29). Winegrape Growers. Retrieved from <http://www.drycreekvalley.org/winegrape-growers/>

CHAPTER 4 Cumulative Impacts

4.1 Introduction

The purpose of this chapter is to provide an analysis of the cumulative impacts that may result from the implementation of the Dry Creek Habitat Enhancement Project, Miles 2-6 (Dry Creek Project or proposed project) in combination with the effects of other related projects and to determine if additional mitigation measures are necessary and feasible to reduce the incremental contributions of the proposed project to significant cumulative impacts.

This chapter begins with a description of the California Environmental Quality Act (CEQA) analysis requirements, then discusses the approach to identifying related projects, followed by a description of related projects and their relationships to the proposed project. The chapter ends with the Impacts and Mitigation Measures section, which defines significance criteria used for the impact assessment and presents a discussion of project-related impacts. In addition, the section summarizes the cumulative impacts in each resource-specific area, and recommends feasible mitigation measures that may reduce, eliminate or avoid such impacts.

4.2 CEQA Analysis Requirements

The CEQA Guidelines require that environmental impact reports (EIRs) discuss the cumulative impacts of a project when the project's incremental effects are considerable when viewed in combination with the effects of past, current, and probable future projects. The purpose of the analysis is to disclose significant cumulative impacts resulting from the proposed project in combination with other projects or conditions, and to indicate the severity of the impacts and the likelihood of occurrence (CEQA Guidelines Sections 15130 (a) and (b)).

(a) An EIR shall discuss cumulative impacts of a project when the project's incremental effects are "cumulatively considerable" (i.e., the incremental effects of an individual project are considerable when viewed in combination with the effects of past, current, and probable future projects, including those outside the control of the agency, if necessary). Where a lead agency is examining a project with an incremental effect that is not "cumulatively considerable," a lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.

(1) As defined in Section 15355, a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts. An EIR should not discuss impacts which do not result in part from implementation of the project being evaluated in the EIR.

(2) When the combined cumulative impact associated with the project's incremental effect and the effects of other projects is not significant, the EIR shall briefly indicate why the cumulative impact is not significant and is not discussed in further detail in the EIR. A lead agency shall identify facts and analysis supporting the lead agency's conclusion that the cumulative impact is less than significant.

(3) An EIR may determine that a project's contribution to a significant cumulative impact will be rendered less than cumulatively considerable and thus is not significant. A project's contribution is less than cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact. The lead agency shall identify facts and analysis supporting its conclusion that the contribution will be rendered less than cumulatively considerable.

(b) The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by the standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact. The following elements are necessary to an adequate discussion of significant cumulative impacts:

(1) Either:

(A) A list of past, present, and probable future projects producing related or cumulative impacts; or

(B) A summary of projections contained in an adopted general plan or similar document, or in an adopted or certified environmental document, which described or evaluated conditions contributing to a cumulative impact;

(2) A discussion of the geographic scope of the area affected by the cumulative effect;

- (3) A summary of expected environmental effects to be produced by these projects, with specific references to additional information stating where that information is available; and
- (4) Examine reasonable, feasible options for mitigating or avoiding the project's contribution to any significant cumulative effects.

4.3 Approach to Identifying Related Projects

The analysis in this chapter uses the “list” approach described in the State CEQA Guidelines (14 CCR 15130(b)(1)(A)) for identifying and evaluating potential cumulative impacts. As recommended in the CEQA Guidelines Section 15130(b)(2), the factors considered in determining whether to include a related project included the nature of each environmental resource being examined (i.e., whether the project has the potential to affect the same resources as the proposed project), the location of the project, and its type. Additionally, the list of projects considers the timing and duration of project implementation and resulting impacts.

4.3.1 Geographic Scope

The geographic scope of the area affected by cumulative impacts is delineated based on the resource topic affected and is described under each topical section below. For each resource, the geographic scope of analysis is based on the natural boundaries and physical conditions relevant to the resource affected, rather than jurisdictional boundaries. The geographic scope of cumulative effects often extends beyond the scope of the direct impacts, but not beyond the scope of the indirect impacts of the proposed project.

4.3.2 Project Timing

In addition to their geographic relationship, cumulative impacts are determined by timing of the other projects relative to the proposed project. Potential short-term impacts (e.g., construction-related noise) and long-term impacts (e.g., permanent changes in streamflow) of the proposed project are considered in the cumulative impacts analysis if they could combine in both space and time with similar impacts of related projects. Impacts from the construction phase of one project may combine in time and space with the operational impacts of another project (e.g., the combination of temporary construction noise with a new permanent noise source), and so the consideration of project timing is not limited by project phase.

4.4 Potential Related Projects

Past, present, and reasonably foreseeable future projects that may have the potential to combine with the impacts of the Dry Creek Project are described in **Table 4-1**. As discussed above, this analysis uses the “list” approach for identifying and evaluating potential cumulative impacts. The following criteria were used to determine whether a past, present, or foreseeable future project would be included in this cumulative impact analysis. Potential related projects are: (a) located within the vicinity of the proposed project construction sites (i.e., Dry Creek or Dry Creek Valley) and may affect the same environmental resources as the proposed project; (b) associated with the proposed project through the Russian River Instream Flow and Restoration (RRIFR) Program (described below) and therefore intended to beneficially affect the same resources; and/or (c) have the potential to significantly affect the Dry Creek ecosystem.

The identified potential related projects are in various stages of planning and development and include projects that have been constructed, are currently being constructed, have been recently approved, or are pending approval as of the publication of this Draft EIR.

Projects 1 through 6 in **Table 4-1**, along with the proposed project, are components of the RRIFR Program, a program of the Sonoma County Water Agency (Water Agency) to address fisheries issues in the Russian River watershed. Two salmonid species inhabiting the Russian River watershed, Chinook salmon and steelhead, have been listed as threatened under the federal Endangered Species Act (ESA), and one species, coho salmon, has been listed as endangered under both the federal ESA and California ESA.

Because the Water Agency’s water supply facilities and operations have the potential to adversely affect the three listed species, the Water Agency entered into a Memorandum of Understanding (MOU) in December 1997 to participate in a consultation under Section 7 of the federal ESA. The other signatories of the MOU include the United States Army Corps of Engineers (USACE), National Marine Fisheries Service (NMFS), and Mendocino County Flood Control and Water Conservation Improvement Project. In September 2008, NMFS issued a Biological Opinion (Biological Opinion) evaluating the impact of the Water Agency’s and the USACE’s operations on the listed species and identifying Reasonable and Prudent Alternatives (RPAs) and Recommended and Prudent Measures (RPMs) to be implemented by the Water Agency and USACE to address impacts and potential impacts on listed salmonids. The Biological Opinion concluded that some elements of the USACE and Water Agency’s activities in the Russian River watershed could result in an adverse modification of critical habitat and jeopardize the continued existence of coho salmon and steelhead in this evolutionary significant unit.

The Biological Opinion involves both immediate and long-term actions to improve habitat and fish populations that will guide operations to protect threatened or endangered salmonids in the Russian River watershed through the year 2023. The Water Agency has developed RRIFR Program to implement the mandates under the Biological Opinion. In addition to the proposed project, the following actions are mandated by the Biological Opinion:

- Continue support of the Coho Broodstock Program;
- Water Diversion Infrastructure improvements: including replacement of the Mirabel fish screens and decommissioning the Wohler infiltration ponds;
- Flood Control: Stream Maintenance Program;
- Russian River Estuary Management Project; and
- Fish Habitat Flows and Water Rights Project.

Table 4-1. Potential Related Projects in Cumulative Scenario

ID #	Project Name and Description	Location	Jurisdiction/Developer	Status/Timing
1	<p>Water Agency Dry Creek Habitat Enhancement Demonstration Project (Demonstration Project). This project includes four backwater channels, two bank stabilization sites, three instream constructed riffles, two boulder fields, and five boulder clusters constructed along a one-mile stretch of Dry creek centered around Lambert Bridge. Construction began in September 2012 and continued during the summer of 2013 and 2014.</p>	Dry Creek Reach 7	Water Agency	Completed in 2014
2	<p>Russian River Coho Salmon Captive Broodstock Program (Coho Broodstock Program). Under this program, wild coho salmon are captured, reared, and spawned at the Don Clausen Warm Springs Hatchery, located at Warms Springs Dam, Lake Sonoma. The offspring are then stocked as juveniles into tributaries within their historic range. University of California Cooperative Extension and California Sea Grant scientists are responsible for monitoring juvenile and adult salmon in the wild, following their release, to document whether released program fish return to their streams of release as adults and successfully complete their life cycles. The goal of the program is to recover the self-sustaining wild population. A newly constructed building at the hatchery location facilitates broodstock rearing.</p>	Russian River tributaries	California Department of Fish and Wildlife (CDFW), NMFS, USACE	<p>Construction of new building completed in 2012</p> <p>Stocking began in 2001, will continue annually through 2020.</p>
3	<p>Mirabel Fish Ladder and Fish Screen Replacement Project. Project consists of demolishing the existing fish screen/intake and fish ladder structures on the western bank of the Russian River, and constructing the new fish screen/intake and fish ladder structures. The new facilities would extend approximately 40 feet farther upstream and approximately 100 feet farther downstream than the existing facilities. (Water Agency, 2012)</p>	At the existing Mirabel Dam along the Russian River approximately 2,600 feet downstream of the Wohler Bridge.	Water Agency	Construction will be completed in Fall 2015.

Table 4-1. Potential Related Projects in Cumulative Scenario

ID #	Project Name and Description	Location	Jurisdiction/Developer	Status/Timing
4	<p>Wohler Infiltration Ponds 1 and 2 Decommissioning Project. The purpose of the project is to decommission two infiltration ponds adjacent to the Russian River to prevent the entrapment of salmonids and reduce aquatic species entrapment in the ponds after flood events. The project consists of decommissioning the ponds by removing two manual valves and re-grading the channels and ponds at a slope of one percent toward the Russian River. Re-grading the channels includes the removal of portions of the roads between the channel and ponds. A one percent slope will allow the ponds to fill with water during flood events, but will allow them to drain at the same rate as the receding Russian River. The project includes placement of approximately 11,600 cubic yards of fill material into ponds 1 and 2. Previously removed sediment from the infiltration ponds will be used for the fill material. The ponds and channels will be graded and the fill material will be placed to create a one percent slope. (North Coast RWQCB, 2010)</p>	Wohler facilities north of Forestville	Water Agency	Construction was Completed in 2011.
5	<p>Flood Control: Stream Maintenance Program. The purpose of the Stream Maintenance Program is to define the overall maintenance program and present key programs features such as management activities, natural resources in the program area, and methods to avoid or minimize impacts to environmental resources. Stream maintenance activities include sediment removal, bank stabilization, vegetation management, access road maintenance, culvert repair and installation, trash and debris removal, fence maintenance, and graffiti removal. (Water Agency, 2010a)</p>	Flood control channels and streams throughout Sonoma County	Water Agency	Ongoing
6	<p>Russian River Estuary Management Project. The Russian River Biological Opinion's RPA 2, Alterations to Estuary Management, requires the Water Agency to collaborate with NMFS and to modify estuary water level management in</p>	Six to Seven miles of Russian River	Water Agency	Approved in 2011

Table 4-1. Potential Related Projects in Cumulative Scenario

ID #	Project Name and Description	Location	Jurisdiction/Developer	Status/Timing
	order to reduce marine influence (high salinity and tidal inflow) and promote a higher water surface elevation in the estuary for purposes of enhancing the quality of rearing habitat for steelhead from May 15 to October 15. During this “lagoon management period,” the Water Agency discontinues artificial breaching of the barrier beach, allowing a fresh or brackish lagoon to form, and adaptively manages a lagoon outlet channel to achieve an average daily water surface elevation of at least seven feet. (Water Agency, 2010b)	from Jenner to Austin Creek		
7	Fish Habitat Flows and Water Rights Project. The objective of the Fish Habitat Flows project is to manage Russian River Project releases to provide instream flows in the Russian River and Dry Creek that improve habitat for threatened and endangered fish, while updating the Water Agency’s existing water rights to reflect current conditions. (Water Agency, 2010c)	Russian River watershed in Mendocino County and Sonoma County	Water Agency	Draft EIR is currently being prepared.
8	USACE Dry Creek Reach 15 Restoration Project (Reach 15 Project). Habitat restoration project along 1,600 feet of Dry Creek just downstream from the outlet works of Warm Springs Dam. Consists of new secondary channel running parallel to Dry Creek to provide low flow for salmon to rest, feed, and spawn during summer and winter months when there is high release flow from the dam. The excavated channel was filled with two to four inches of cobblestone for armoring purposes and to form a habitat for fish spawning. Large woody material was placed along the creek bed using excavated trees and boulders, and willow spikes were planted every 10 to 15 feet along the channel to provide shade for fish (USACE, 2013).	Dry Creek Reach 15	USACE	Completed in 2013
9	Lake Sonoma Solar Project. Up to ten megawatts of solar photovoltaic power. The first five-megawatt phase would be constructed on a 42-acre site that previously was cut to	Lake Sonoma	USACE/Dry Creek Band of Pomo Indians	Memorandum of Understanding

Table 4-1. Potential Related Projects in Cumulative Scenario

ID #	Project Name and Description	Location	Jurisdiction/Developer	Status/Timing
	provide earthen fill for construction of the Warm Springs Dam. The second phase would be built within the remaining 200-acre plateau above Lake Sonoma. Power would serve the Dry Creek tribe's needs and the USACE's hatchery facilities at Lake Sonoma, with potential excess returned to the grid as offsets for other USACE facilities.			signed November 2014
10	Hale Winery and Tasting Room. Winery and public tasting room (single building approx. 17,000 square feet) and conversion of the existing barn (approx. 3,200 square feet) to barrel storage with a 25,000 case maximum annual production capacity, to include public tasting, retail sales, 12 agricultural promotional events per year with 80 guests, two charitable benefit dinners with 100 guests, and participation in industry-wide events totaling eight four days with 100 guests on the site at a time with a maximum capacity of 300 guests on 40 acres. The project site is under a Prime Land Conservation Contract (Williamson Act Contract). (County of Sonoma Permit and Resource Management Department, 2012, 2015).	4304 Dry Creek Road, Healdsburg	Sonoma County/Private Applicant	Use Permit approved April 2015

4.5 Approach to Cumulative Analysis

The analysis of cumulative impacts focuses on the impacts of the implementation of the Dry Creek Project by resource category along with the other past, present, and reasonably foreseeable future projects (related projects) identified in **Table 4-1** that may contribute to a cumulative impact in combination with the impacts of the proposed project.

4.5.1 Standards of Significance

The standards of significance and methodology used to determine cumulative impacts under each resource category are based on the standards of significance and methodology outlined in each sub-chapter of Chapter 3, "Environmental Setting, Impacts, and Mitigation Measures." Please refer to these subchapters for more comprehensive information regarding the methodologies and standards of significance used to analyze impacts to particular resource categories.

For each Dry Creek potential project-level impact and mitigation measure, the cumulative impact analysis addresses whether a significant cumulative impact would occur (using the standards of significance from Chapter 3), and whether the proposed project's contribution to a cumulative impact would be cumulatively considerable. As defined in CEQA Guidelines Section 15065(a)(3), "cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (identified in **Table 4-1**).

CEQA Guidelines Section 15130(a)(3) indicate that a project's contribution is less than cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact.

4.5.2 Geographic and Temporal Scope

CEQA Guidelines Section 15130(b)(3) indicate that lead agencies should define the geographic scope of the area affected by the cumulative effect and provide a reasonable explanation for the geographic limitation used. The geographic scope of the cumulative impacts analysis varies depending on the environmental resource. For example, the geographic area associated with criteria air pollutants is the entire North Coast Air Basin (NCAB), because project-related air pollutant emissions may affect ambient air quality within this air basin. However, because the proposed project could only contribute to effects on recreational resources with Dry Creek itself, the geographic scope of potential cumulative impacts on recreational resources is limited to Dry Creek. The geographic scope for each resource category is described in Section 4.6, Cumulative Impacts and Mitigation Measures below.

In addition to geographic scope, cumulative impacts are determined by timing of the other projects relative to the proposed project. Schedule is important for many construction-related impacts; for a group of projects to generate cumulative impacts from activities with short durations (e.g., temporary and/or intermittent noise), they must occur close together in time as well as location. Potential related projects described in **Table 4-1** may or may not occur simultaneously with the proposed project, depending on the schedule of each individual project. Although the timing of construction of the foreseeable future projects is currently unknown, this analysis assumes that these projects could be constructed concurrently with construction of all or portions of the proposed project. The temporal scope for each resource category also is described in Section 4.6, Cumulative Impacts and Mitigation Measures below.

4.6 Cumulative Impacts and Mitigation Measures

The analysis is organized by resource categories, as presented in Chapter 3, Environmental Setting, Impacts, and Mitigation Measures. Where appropriate, additional measures are identified to mitigate potentially significant cumulative impacts.

4.6.1 Aesthetics

Impacts of the Dry Creek Project

As explained in **Chapter 3.1, Aesthetics**, direct impacts could occur where the proposed project would be visible from Dry Creek Road, West Dry Creek Road, Westside Road Bridge, Yoakim Bridge Road, the Martorana Family Winery, and the Truett-Hurst Winery, in addition to privately owned sites adjacent to Dry Creek.

Aesthetic impacts would be primarily limited to the construction-related activities associated with construction and equipment, including ground disturbance, grading, equipment and materials staging, and increased vehicle and truck traffic on local scenic roads. An aesthetic impact could occur for a period of time following construction-related activities when vegetation is becoming reestablished in disturbed areas and before sediment has been deposited from upstream to blend constructed features with existing creek features. Intermittent operation-activity impacts would occur as a result of periodic maintenance activities, and would be similar to construction-related activity impacts. There are no permanent aesthetic impacts associated with the proposed project.

As described in **Chapter 3.1**, the proposed project would result in no impact with respect to creating a new source of light or glare. Therefore, it could not contribute to a cumulative impact related to this criterion, and it is not discussed further. The proposed project could result in: 1) a temporary less-than-significant impact related to a substantial adverse effect on scenic vistas from construction and maintenance activities;

2) a less-than-significant impact related to substantially damaging scenic resources associated with operational activities, after implementation of **Mitigation Measures 3.3.1a** from **Chapter 3.3**, Biological Resources and **Mitigation Measure 3.6.3** from **Chapter 3.6**, Geology, Soils, and Mineral Resources regarding revegetation as well as **Mitigation Measure 3.1.2**; 3) a less-than-significant impact related to an adverse impact on scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway associated with construction, operation and/or maintenance activities, after implementation of **Mitigation Measure 3.3.1a** from **Chapter 3.3**, Biological Resources and **Mitigation Measure 3.6.3** from **Chapter 3.6**, Geology, Soils, and Mineral Resources regarding revegetation as well as **Mitigation Measure 3.1.2**; and 4) a less-than-significant impact related to the existing visual character or quality of the site and its surroundings associated with construction, operation, and/or maintenance activities, after implementation of **Mitigation Measure 3.3.1a** from **Chapter 3.3**, Biological Resources and **Mitigation Measure 3.6.3** from **Chapter 3.6**, Geology, Soils, and Mineral Resources regarding revegetation as well as **Mitigation Measure 3.1.2**.

Impacts of Identified Related Projects

Construction of the Demonstration Project, Reach 15 and Coho Broodstock Program projects have been completed, therefore there are no construction-related aesthetic cumulative impacts on Dry Creek Road associated with the implementation of the Dry Creek Project and these related projects.

Although no environmental analyses were available to review for the Lake Sonoma Solar Project and Hale Winery and Tasting Room Project, this analysis assumes that these related projects would involve typical construction-related activities and equipment, including ground disturbance, grading, equipment and materials staging, and increased vehicle and truck traffic on local scenic roads. The construction schedule is currently unknown for the Lake Sonoma Solar and Hale Winery and Tasting Room projects; therefore, these projects could result in construction-related aesthetic cumulative impacts on Dry Creek Road associated with the implementation of the Dry Creek Project and these related projects.

Relationship of the Dry Creek Project to Identified Related Projects

Geographic and Temporal Scope

The geographic scope of potential cumulative impacts on aesthetics includes the area within which the proposed project could cause a direct or indirect impact. As explained in Chapter 3.1, direct impacts could occur where the proposed project would be visible from Dry Creek Road, West Dry Creek Road, Westside Road Bridge, Yoakim Bridge Road, the Martorana Family Winery, and the Truett-Hurst Winery, in addition to privately owned sites adjacent to Dry Creek. Due to the temporary nature of project construction

impacts and the localized nature of all project activities, no indirect impacts on aesthetics have been identified. Therefore, the geographic scope includes those areas visible from the locations listed.

Cumulative aesthetic impacts primarily would be limited to the construction-related activities associated with construction and equipment, including ground disturbance, grading, equipment and materials staging, and increased vehicle and truck traffic on local scenic roads from the implementation of the proposed project and the identified related projects. Intermittent cumulative operation-activity impacts would occur as a result of periodic maintenance activities, and would be similar to construction-related activity impacts from the implementation of the proposed project and identified related projects. Because the project's aesthetic impacts would be limited to temporary construction- and maintenance-related activities, the temporal scope does not include permanent or long-term aesthetic impacts.

Cumulative Impact Analysis

Existing conditions reflect the impacts of past projects and are described in Chapter 3, Section 3.1.2. The standards of significance for impacts on aesthetics are described in Chapter 3, Section 3.1.4 under "Methodology." These standards also apply to the significance of cumulative impacts on aesthetics.

Aesthetic impacts would be primarily limited to the construction-related activities associated with construction and equipment, including ground disturbance, grading, equipment and materials staging, and increased vehicle and truck traffic on local scenic roads of the proposed project. An aesthetic impact could occur for a period of time following construction-related activities when vegetation is becoming reestablished in disturbed areas and before sediment has been deposited from upstream to blend constructed features with existing creek features. Intermittent operation-activity impacts would occur as a result of periodic maintenance activities, and would be similar to construction-related activity impacts.

There are no permanent physical aesthetic impacts associated with the proposed project. Construction of the Demonstration Project, Coho Broodstock Program facilities, and Reach 15 projects has been completed. The permanent facilities and physical changes associated with these projects would not be visible from the same scenic roads and vista points as the temporary physical changes associated with vegetation reestablishment from construction-related impacts of the proposed project. Therefore, there are no potential aesthetic cumulative impacts associated with permanent facilities and physical changes from the same scenic roads and vista points from the implementation of the Dry Creek Project and Demonstration Project, Coho Broodstock Program facilities, and Reach 15 projects.

Due to the topography of the area and intervening vegetation, none of the identified related projects would be visible from the Westside Road Bridge, Martorana Family Winery or the Truett-Hurst Winery. Therefore, there are no aesthetic cumulative impacts on these locations associated with the implementation of the Dry Creek Project along with the identified related projects.

The only identified related project with the potential to be visible from West Dry Creek Road is the Demonstration Project, for which construction has been completed. The aesthetic impacts of the Demonstration Project would be substantially similar to those of the proposed project, though occurring along a different reach of Dry Creek. Therefore, no aesthetic cumulative impact on West Dry Creek Road associated with the implementation of the Dry Creek Project and the Demonstration Project would occur.

Some portions of the Lake Sonoma Solar Project may be visible from Yoakim Bridge Road, though not from the same locations on the road that the proposed project activities could be visible (the bridge over Dry Creek). Therefore, there is no aesthetic cumulative impact on Yoakim Bridge Road associated with the implementation of the Dry Creek Project and the Lake Sonoma Solar Project.

Related projects that would or may be visible from Dry Creek Road include the Demonstration Project, Reach 15, Coho Broodstock Program, Lake Sonoma Solar, and Hale Winery and tasting room projects. Construction of the Demonstration Project, Coho Broodstock Program facilities, and Reach 15 projects has been completed; therefore, there are no aesthetic cumulative impact on Dry Creek Road associated with the implementation of the Dry Creek Project and these related projects. However, the construction schedule is currently unknown for the Lake Sonoma Solar and Hale Winery and Tasting Room projects; therefore, there could be potential temporary construction-related (ground disturbance, grading, equipment and materials staging, and revegetation establishment) cumulative aesthetic impacts on Dry Creek Road from the implementation of the Dry Creek Project and the Lake Sonoma Solar and Hale Winery and Tasting Room projects.

In addition, all scenic roadways in the geographic scope may experience increased levels of construction-related traffic as a result of the related projects (Lake Sonoma Solar and Hale Winery and Tasting Room projects) that would be under construction in the Dry Creek Valley. Therefore, there could be potential construction-related traffic aesthetic cumulative impacts on local scenic roadways associated with the implementation of the Dry Creek Project and Lake Sonoma Solar and Hale Winery and Tasting Room projects.

Cumulatively, these impacts would be temporary – lasting only the duration of construction for each project – and like the proposed project, would be visible only from

portions of the Dry Creek Road and other local roadways offering scenic views. As a result of the temporary and intermittent nature of potential combined or synergistic views of these project sites, and measures to reestablish vegetation, cumulative impacts would be less than significant.

Finally, while construction and maintenance activities would be visible from private residences or wineries directly adjacent to habitat enhancement sites, most properties that would be adjacent to habitat enhancement sites are actively participating in the proposed project because landowners and business owners have volunteered to take part. Non-participating adjacent properties would typically be shielded from most views of construction activities by the often dense and tall riparian vegetation that provides a visual barrier between properties and from one side of the creek to the other. Therefore, the potential visibility of other related projects from privately owned sites is limited due to screening effects of vegetation, and actively participating landowners and business owners. Because most landowners and business owners with potential views of the proposed project sites have volunteered to participate, potential temporary cumulative aesthetic impacts on privately owned lands would not be significant.

Cumulative Impact Summary

Impact 4.6.1.1: The cumulative aesthetic impacts on scenic views from Dry Creek Road resulting from temporary construction-related activities (ground disturbance, grading, equipment and materials staging, and vegetation reestablishment), during construction and maintenance activities of the Dry Creek Project, in combination with Lake Sonoma Solar and Hale Winery and Tasting Room projects, would be less than significant. (Cumulatively Less than Significant)

Mitigation Measure: None required. The cumulative impact would be less than significant.

Impact 4.6.1.2: The cumulative aesthetic impacts on scenic views from local roadways resulting from temporary construction-related activities associated with increased vehicle and truck traffic during construction and operation/maintenance activities from the implementation of the Dry Creek Project and Lake Sonoma Solar and Hale Winery and Tasting Room projects would be less than significant. (Cumulatively Less than Significant)

Mitigation Measure: None required. The cumulative impact would be less than significant.

4.6.2 Air Quality, Greenhouse Gas Emissions, Energy, and Sustainability

Impacts of the Dry Creek Project

As described in **Chapter 3.2, Air Quality, Greenhouse Gases, Energy, and Sustainability**, the following criteria included in Appendix F and Appendix G of the CEQA Guidelines do not apply to the proposed project analysis: conflict with or obstructing implementation of an applicable air quality plan; result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under a federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors); or result in impacts on energy conservation.

Therefore, the proposed project could not contribute to a cumulative impact related to these criteria, and they are not discussed further.

Construction, operation, and/or maintenance activities associated with the proposed project could result in: 1) a less-than-significant impact related to violating an air quality standard, after implementation of **Mitigation Measures 3.2.1a** and **3.2.1b**; 2) a less-than-significant impact related to exposing sensitive receptors to substantial pollutant concentrations standards; 3) a less-than-significant impact from creating objectionable odors affecting a substantial number of people; 4) a less-than-significant impact from generating greenhouse gas emissions that may have a significant impact on the environment; and 5) a less-than-significant impact related to conflicting with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Impacts of Identified Related Projects

All of the identified related projects in **Table 4-1** are within the NCAB and have produced or would produce air pollutant and GHG emissions as a result of construction activities, transportation of personnel and materials, periodic maintenance activities, and operational activities, as applicable. The Reach 15 Project and Demonstration Project could produce TACs and objectionable diesel odors during periodic maintenance activities, similar to those of the proposed project's periodic maintenance emissions.

Relationship of the Dry Creek Project to Identified Related Projects

Geographic and Temporal Scope

The geographic extent of cumulative effects of a project with respect to air quality varies, depending on the type of pollutant considered. Ozone is generally not directly emitted to the atmosphere but is formed under favorable photochemical conditions from precursor compounds (ROG and NOx) and is therefore considered a regional pollutant.

Under the CAA, California is divided into air basins and the project is located within the NCAB, which is in attainment or unclassified for all of the State and federal standards. For criteria air pollutants, the NCAB represents the geographic extent of impact assessment. All of the identified related projects are within the NCAB. This analysis focuses on the portion of the NCAB in the Dry Creek project area, as characterized in **Table 3.2-2 in Chapter 3.2.**

The NSCAPCD has not established a quantitative methodology for assessing cumulative impacts related to TACs. However, the BAAQMD has generally established a perimeter of 1,000 feet as the geographic extent for assessing impact related to TACs, and this extent is consistent with recommended distances between receptors and TAC emission sources in the California Air Pollution Control Officers Association's (CAPCOA) Health Risk Assessments for Proposed Land Use Projects (CAPCOA, 2009). Therefore, for TACs (i.e., DPM), the geographic scope includes areas within approximately 1,000 feet of those sensitive receptors within 1,000 feet of proposed project work sites. The Hale Winery and Tasting Room project would not have work sites within 1,000 feet of any receptors located within 1,000 feet of the proposed project's work sites. The Reach 15 Project and Demonstration Project may be within this geographic scope. The geographic scope for impacts related to objectionable diesel odors is the same as that for DPM-related effects because the same receptors would be sensitive to odors, and the cause of both effects is the same – diesel exhaust.

GHG emissions are inherently a cumulative concern because it is the accumulation of GHG emissions in the atmosphere around the earth that results in global climate change. As described in **Chapter 3.2, Section 3.2.3, Regulatory Framework**, within the State of California, regulatory efforts to address GHG emissions have acknowledged both the global effect and California's role in contributing to and mitigating climate change. The resulting plans and policies to address greenhouse gas emissions at the state level, and local and regional plans to implement these statewide policies (including the BAAQMD's operational significance threshold and the Sonoma County Community Climate Plan), are intended to be protective of cumulative by implementing state and local fair-share reductions. Therefore, Sonoma County is an appropriate geographic scope for cumulative impacts related to GHG emissions and climate change.

Impacts primarily would be restricted to construction-related activities and to periodic maintenance activities as needed during operation, which would be similar to construction-phase activities. Therefore, the temporal scope of cumulative impacts on air quality, greenhouse gas emissions, energy, and sustainability is limited to construction and to intermittent periods of maintenance during operation.

Cumulative Impact Analysis

Existing conditions reflect the impacts of past projects and are described in **Chapter 3.2, Section 3.2.2**. The standards of significance for impacts on air quality, greenhouse gas, energy, and sustainability are described in **Chapter 3.2, Section 3.2.4** under “Approach to Analysis.” These standards also apply to the significance of cumulative impacts. Since the northern Sonoma County portion of the NCAB is in attainment status for all criteria pollutants, the North Sonoma County APCD is not required to have an air pollution reduction plan; however, it has defined thresholds for significant new sources of pollution for specific criteria air pollutant emissions, which are designed to be protective of cumulative air pollution conditions (NSCAPCD, 1985). Similarly, the BAAQMD thresholds used in **Chapter 3.2** have been established to address the inherently cumulative issue of greenhouse gas emissions and climate change.

Construction emissions from the proposed project would not exceed NSCAPCD significance thresholds for criteria pollutants. The area is in attainment of all State and federal standards. As shown in **Table 3.2-2** in **Chapter 3.2**, the existing average ambient air quality for the project area is well within the State and national standards. Therefore, the emissions of identified local related projects, which primarily would be short-term, construction-related emissions like those of the proposed project, would not be cumulatively significant enough to raise local average concentrations above State and federal standards.

It is anticipated that construction of the proposed project and occasional maintenance activities involving heavy duty diesel equipment would emit DPM. However, since health risks associated with DPM are generally associated with chronic exposure (70-year exposure), it can be assumed that the Dry Creek Project-related emissions would result in a negligible net increase in health risk. Similarly, periodic maintenance activities associated with the Reach 15 and Demonstration projects would involve equipment likely to emit DPM. However, like the proposed project’s emissions, these would be short-term and intermittent. Therefore, even if construction and maintenance activities were to overlap in time and geography to cause a cumulative increase in DPM concentrations at the location of a sensitive receptor, this would result in a negligible net increase in health risk. The cumulative impact would be less than significant.

In addition to particulate matter, diesel exhaust can create objectionable odors. For the same reasons described above for DPM, the cumulative impact related to objectionable odors caused by diesel exhaust emissions would be less than significant.

The proposed project would result in minor short-term GHG emissions during construction that would be below CEQA thresholds developed by BAAQMD and used in the analysis in **Chapter 3.2**, and negligible long-term GHG emissions during operation

and maintenance. The proposed project would not conflict with or interfere with implementation of the Sonoma County Community Climate Action Plan, AB 32, or CARB's Climate Scoping Plan. All of the related projects could contribute to global warming due to the generation of short-term and/or long-term GHG emissions. However, the proposed project's contribution in combination with the related projects would not be cumulatively considerable, and is therefore less than significant.

Cumulative Impact Summary

Impact 4.6.2.1: The cumulative impacts related to concentrations of criteria pollutants, pollutants affecting sensitive receptors, objectionable odors, and greenhouse gas emissions associated with construction operation/and or maintenance activities resulting from the implementation of the Dry Creek Habitat Enhancement Project Miles 2-6, in combination with identified related projects would be less than significant. (Cumulatively Less than Significant)

Mitigation Measure: None required. The cumulative impact would be less than significant.

4.6.3 Biological Resources

Impacts of the Dry Creek Project

As described in **Chapter 3.3, Biological Resources**, the proposed project would result in no impact with respect to conflicting with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved plan; or to conflicting with local policies or ordinances protecting biological resources. Therefore, it could not contribute to a cumulative impact related to these criteria, and they are not discussed further.

As described in **Chapter 3.3**, construction, operation and maintenance activities associated with the proposed project could result in: 1) less-than-significant impacts, either directly or through habitat modifications, on special-status plants, special-status animals, and nesting birds after the implementation of **Mitigation Measures 3.3.1a, 3.3.1b, 3.3.1c, and 3.3.1d**; 2) a less-than-significant impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the CDFW or USFWS that are located along Dry Creek with the implementation of **Mitigation Measures 3.3.1a, 3.3.1b, 3.3.1c, and 3.3.1d**; 3) less-than-significant impacts on federally protected wetlands as defined by Section 404 of the Clean Water Act through direct removal, filling, hydrological interruption, or other means after the implementation of **Mitigation Measures 3.8.1a through 3.8.1d** from **Chapter 3.8, Hydrology and Water Quality** as well as **Mitigation Measure 3.6.8a** from **Chapter 3.6, Geology, Soils, and Mineral Resources** are anticipated to reduce any construction-related impacts to a less-than-significant level; 4) a less-than-

significant temporary impact on the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites; and 5) a less-than-significant temporary impact during construction and/or maintenance activities on the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or substantially reduce the number or restrict the range of an endangered, rare, or threatened species after the implementation of **Mitigation Measures 3.3.1a through 3.3.1d** and **Mitigation Measure 3.5.1** described in **Chapter 3.5, Fisheries Resources** would reduce these impacts to less than significant level; and 6) a beneficial impact from the operation of the proposed project on the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or substantially reduce the number or restrict the range of an endangered, rare, or threatened species.

Impacts of Identified Related Projects

The related projects are the Coho Broodstock Program, Reach 15 Project, Demonstration Project, Fish Habitat Flows Project, and Hale Winery and Tasting Room Project, which are located within the Dry Creek Valley. The Fish Habitat Flows project would affect stream flows in Dry Creek and therefore may have an impact on habitat for aquatic wildlife species such as western pond turtle. The Coho Broodstock, Reach 15, and Demonstration projects have been constructed, and so the potential adverse construction-related impacts of these projects are not within the temporal scope of this analysis. However, periodic maintenance of the Reach 15 and Demonstration projects may occur concurrently with construction and/or maintenance of the proposed project, and would be similar in nature to the proposed project.

Relationship of the Dry Creek Project to Identified Related Projects

Geographic and Temporal Scope

The geographic scope of potential cumulative impacts on biological resources includes the area within which the proposed project could cause an adverse direct or indirect effect. As explained in **Chapter 3.3**, impacts could occur at the locations of enhancements in Miles 2-3 and within the as-yet-unidentified locations of enhancements within Mile 4-6 of Dry Creek from Warm Springs Dam to the Russian River, including the creek banks and adjacent staging and work areas. Thus, the geographic scope includes the local ranges of potentially affected species and habitat types within and adjacent to Dry Creek (the Dry Creek Valley, generally). The related projects located within the geographic scope are the Coho Broodstock Program, Reach 15 Project, Demonstration Project, and Hale Winery and Tasting Room Project, Fish Habitat Flows Project which are located within the Dry Creek Valley. Impacts primarily

would be restricted to the construction phase and to periodic maintenance activities as needed during operation, which would be similar to construction-phase activities. No permanent adverse impacts on habitat would occur. Therefore, the temporal scope of cumulative effects on biological resources is limited to construction and to intermittent periods of maintenance during operation.

Cumulative Impact Analysis

Existing conditions reflect the impacts of past projects and are described in Chapter 3.3, Section 3.3.2. The standards of significance for impacts on biological resources are described in **Chapter 3.5, Section 3.5.4** under “Approach to Analysis.” These standards also apply to the significance of cumulative impacts on biological resources.

The Reach 15 and Demonstration projects could have intermittent, temporary impacts on special-status plants, special-status animals, and nesting birds, as well as on riparian habitat and associated wetlands (including federally protected wetlands) during periodic maintenance activities similar to the construction phase-related impacts of the proposed project. The Hale Winery and Tasting Room project may have similar impacts during construction, particularly with respect to nesting birds that may be present in trees near the proposed construction area. If two or more of these projects would result in impacts on the same special-status plants or animals or their habitats, or on nesting birds, the combined impact could be significant. However, the residual impacts of the proposed project would be minimal because most impacts would be avoided and revegetation of disturbed areas would occur soon after disturbance. Further, because the work would occur in relatively isolated increments along Dry Creek, there would be ample available habitat of the same types nearby. Therefore, the implementation of the proposed project in combination with the Hale Winery and Tasting Room project would not have a cumulative impact on special-status plants or animals or their habitats, or on nesting birds.

During construction of the Hale Winery and Tasting Room project, and during periodic maintenance of the Reach 15 and Demonstration projects, terrestrial wildlife movement may be temporarily restricted through active construction and maintenance sites, similar to the impact described for the proposed project. However, as described for the proposed project, alternative corridors would be available during construction and maintenance activities. Additionally, due to the site-specific nature of these potential impacts and the fact that even if work were to occur at two sites within the Dry Creek Valley simultaneously, they would be geographically isolated from one another with available wildlife corridors in between, these impacts would not be additive. Therefore, the implementation of the proposed project in combination with the Hale Winery and Tasting Room, and Reach 15 and Demonstration projects would not cause a significant cumulative impact on terrestrial wildlife movement.

Cumulative Impact Summary

Impact 4.6.3.1: The cumulative biological resource impacts on special-status plants, special-status animals, nesting birds, riparian habitat and associated wetlands (including federally protected wetlands), and terrestrial wildlife movement resulting from construction, operation and maintenance activities associated with the implementation of the Dry Creek Habitat Enhancement Project, Miles 2-6, in combination with identified related projects would be less than significant. (Cumulatively Less than Significant)

Mitigation Measure: None required. The cumulative impact would be less than significant.

4.6.4 Cultural Resources

Impacts of the Dry Creek Habitat Enhancement Project, Miles 2-6

As described in **Chapter 3.4, Cultural Resources**, the following criteria included in Appendix G of the CEQA Guidelines does not apply to the proposed project analysis: disturbance or destruction of a unique paleontological resource or site or unique geologic feature. Therefore, the proposed project could not contribute to a cumulative impact on paleontological resources, and these resources are not discussed further. Construction and maintenance activities associated with the proposed project could result in: 1) a less-than-significant impact related to a substantial adverse change in the significance of a historical and/or unique archaeological resources after the implementation of **Mitigation Measures 3.4.1a** through **3.4.1c**; 2) a less-than-significant impact related to disturbing human remains, including those interred outside of formal cemeteries after implementation of **Mitigation Measure 3.4.2**; and 3) a less-than-significant impact on the distribution of culturally significant plants along Dry Creek after implementation of **Mitigation Measures 3.4.3a** and **3.4.3b**.

Impacts of Identified Related Projects

The impacts of the Coho Broodstock Program facilities and the Reach 15 and Demonstration projects are reflected in baseline conditions, as these related projects have been completed. The Lake Sonoma Solar and Hale Winery and Tasting Room projects have not been constructed and are located within the same archaeological district as the proposed project as described in **Chapter 3.4, Section 3.4.2**. No cultural resource evaluations are currently available for the Lake Sonoma Solar and Hale Winery and Tasting Room projects. The potential cultural impacts of these related projects could occur during ground disturbance activities.

Relationship of the Dry Creek Project to Identified Related Projects

Geographic and Temporal Scope

The geographic scope of potential cumulative impacts on cultural resources includes the area within which the proposed project could cause a direct or indirect effect. As explained in **Chapter 3.4**, for direct impacts from potential disturbance of known or previously unknown culturally significant materials and/or for human remains interred outside of formal cemeteries, this includes the area of ground disturbance associated with the proposed project. Indirect effects also could occur within the recognized archaeological district described in **Chapter 3.4, Section 3.4.2** as a result of the disturbance or destruction of resources that contribute to this district. The potential impacts of the proposed project associated with ground disturbance would occur only during its construction period; however, if destruction of a culturally significant resource were to occur, the effects of this impact would be permanent, and therefore could overlap in time with any future cumulative impacts. The impacts of the Coho Broodstock Program facilities and the Reach 15 and Demonstration projects are reflected in baseline conditions, as these projects have been completed. The Lake Sonoma Solar and Hale Winery and Tasting Room projects are located within this district and therefore could contribute to cumulative impacts during ground-disturbing activities.

For impacts associated with the distribution of culturally significant plants along Dry Creek, the geographic scope includes the ethnobotanical preserve downstream of Warm Springs Dam and the local ranges of the plants listed in **Table 3.4-7** in **Chapter 3.4**.

Cumulative Impact Analysis

Existing conditions reflect the impacts of past projects and are described in **Chapter 3.4, Section 3.4.2**. The standards of significance for impacts on cultural resources are described in Section 3.4.4 under “Approach to Analysis.” These standards also apply to the significance of cumulative impacts on cultural resources.

The proposed project’s potential residual impacts on recorded or previously unknown historic or archaeological resources, and on human remains, would be site-specific, as would the potential impacts of projects in the cumulative scenario. Therefore, impacts would not combine to create a cumulative impact with respect to individual sites. However, impacts on resources contributing to the archaeological district could contribute to a cumulative impact on that district. No cultural resource evaluations are currently available for the Lake Sonoma Solar and Hale Winery and Tasting Room projects. However, like the proposed project, all future projects would be required to adhere to the body of laws and regulations pertaining to the protection of cultural resources, including the NHPA and CEQA (see **Chapter 3.4, Section 3.4.3**, Regulatory Framework). For example, the Hale Winery and Tasting Room Project would be

required to adhere to a condition of approval requiring measures to avoid impacts to archaeological and/or historic resources (County of Sonoma Permit and Resource Management Department, 2015). Therefore, no significant cumulative effect on the archaeological district is expected to occur.

Construction of Warm Springs Dam significantly impacted ethnobotanical and other cultural resources in the Dry Creek area. To mitigate the loss of these resources, an ethnobotanical preserve was created by transplanting plants of ethnobotanical value, and this area is now protected. The ongoing cumulative impact of past projects on the distribution of culturally important plants is significant, though mitigated in part by the establishment of the ethnobotanical preserve. If current and/or future projects were to adversely affect the distribution of these plants, the significant cumulative effect would be exacerbated. Maintenance of the Reach 15 and Demonstration projects may have minimal effects on culturally significant plants, but would include replanting of disturbed planted areas. Because **Mitigation Measure 3.4.3a** requires replanting of basket sedge at a 1:1 ratio and **Mitigation Measure 3.4.3b** requires the inclusion of high-priority plant species of important to local tribal interests in revegetation plans, the proposed project's contribution to the ongoing significant cumulative effect would not be cumulatively considerable.

Cumulative Impact Summary

Impact 4.6.4.1: The cumulative impacts on cultural resources associated with construction and maintenance activities from the implementation of the Dry Creek Habitat Enhancement Project, Miles 2-6 in combination with the identified related projects would be less than significant. (Cumulatively Less than Significant)

Mitigation Measure: None required. The cumulative impact would be less than significant.

4.6.5 Fisheries Resources

Impacts of the Dry Creek Project

As described in **Chapter 3.5, Fisheries**, the proposed project would result in no impacts with respect to affecting water temperature for CCC coho salmon, CC Chinook salmon, or CCC steelhead juveniles; or affecting local policies protecting biological resources or conflict with the provisions of an adopted HCP, Natural Communities Conservation Plan (NCCP) or other approved local, regional or state habitat conservation plan. Therefore, the proposed project could not contribute to a cumulative impact related to these criteria, and it is not discussed further. Operational impacts on fisheries resources would be beneficial and therefore would not combine with the effects of related projects to cause an adverse cumulative impact. The construction and maintenance activities associated with the proposed project could result in: 1) a less-than-significant impact on

movement of adult or juvenile CCC coho salmon, CC Chinook salmon, or CCC after the implementation of **Mitigation Measure 3.5.1**; 2) less-than-significant impacts, on CCC coho salmon, CC Chinook salmon, and CCC steelhead spawning habitat usage and quality after implementation of **Mitigation Measure 3.5.1**; and 3) a less-than-significant impact on CCC coho salmon, CC Chinook salmon, and CCC steelhead rearing habitat usage after implementation of **Mitigation Measure 3.5.1**.

Impacts of Identified Related Projects

Several related projects are located within the Dry Creek watershed and have the potential to directly affect fisheries within Dry Creek. The Lake Sonoma Solar and Hale Winery and Tasting Room projects are located within the Dry Creek watershed, however no instream enhancement components requiring isolation of Dry Creek are included in their project descriptions; therefore they are not anticipated to have similar potential impacts to fisheries as the proposed project and are not discussed further.

The Fish Habitat Flows project would be located within Dry Creek and would affect stream flows. The Coho Salmon Captive Broodstock Program facilities, Reach 15 and Demonstration projects each are located within Dry Creek between Warm Springs Dam and the Russian River. Construction for each of these projects has been completed. However, periodic maintenance of the Reach 15 and Demonstration projects may occur which may result in temporary impacts on restricting movement of adult or juvenile CCC coho salmon, CC Chinook salmon, and CCC steelhead into the project site; on upstream migration of adult salmonids; and on spawning habitat usage and the quality of habitat for CCC coho salmon, CC Chinook salmon and CCC steelhead.

Relationship of the Dry Creek Project to Identified Related Projects

Geographic and Temporal Scope

The geographic scope of potential cumulative impacts on fisheries includes the area within which the proposed project could cause an adverse direct or indirect effect on fisheries as a result of isolating portions of Dry Creek. As explained in **Chapter 3.5**, impacts could occur at the locations of enhancements in Miles 2-3 and within the as-yet-undefined locations of enhancements within Mile 4-6 of Dry Creek from Warm Springs Dam to the Russian River. The Reach 15 and Demonstration projects each are located within Dry Creek between Warm Springs Dam and the Russian River and have the potential to directly affect fisheries within Dry Creek. The Fish Habitat Flows project would affect stream flows in Dry Creek.

Permanent, ongoing impacts to fisheries in Dry Creek would be beneficial as a result of enhancements to spawning, rearing, and migration habitat, and would not have the potential to combine adversely with impacts of future related projects. Potential fisheries impacts primarily would be limited to the construction phases of the proposed project

and to periodic maintenance activities as needed during operation, which would be similar to construction-phase activities. Therefore, the temporal scope of cumulative fisheries effects is limited to construction and to intermittent periods of maintenance during operation. Construction of the Demonstration Project, Coho Salmon Captive Broodstock Program facilities, and Reach 15 projects has been completed. The permanent facilities and physical changes associated with these projects would not contribute to construction- or maintenance-related cumulative impacts. However, periodic maintenance of the Reach 15 and Demonstration projects may occur concurrently with construction and/or maintenance of the proposed project.

Cumulative Impact Analysis

Existing conditions reflect the impacts of past projects and are described in **Chapter 3.5, Section 3.5.2**. The standards of significance for impacts on fisheries are described in **Chapter 3.5, Section 3.5.4** under “Methodology.” These standards also apply to the significance of cumulative impacts on fisheries.

As described in **Chapter 3.5**, instream enhancement could require isolation of Dry Creek and the use of bypass pumping during construction and maintenance activities that could have less-than-significant temporary impacts on restricting movement of adult or juvenile CCC coho salmon, CC Chinook salmon and CCC steelhead into the project site; on upstream migration of adult salmonids; and on spawning habitat usage and quality and rearing habitat for CCC coho salmon, CC Chinook salmon and CCC steelhead with the implementation of **Mitigation Measure 3.5.1**.

Bypassing flows would result in a section of the Dry Creek being dewatered during construction and remain unavailable to fish for the duration of construction. Any portions of the creek isolated during construction would require rescue of fish from the work area. The following mitigation measure is incorporated into the project to minimize impacts to special-status fish species as a result of temporary loss of habitat availability during construction activities through the removal of fish species to appropriate habitat outside of the project site. This temporary impact is considered less than significant because the restriction is temporary, would not likely occur during a critical life stage for passage, would occur in a relatively small portion of the entire creek during any one construction season, and the fish habitat in the project area is anticipated to improve as a result of the project. If maintenance activities require in-stream construction activities, the same potential impact and mitigation of those activities as described above for construction would occur. The potential construction and maintenance-related impact to movement would be reduced to less than significant with implementation of **Mitigation Measures 3.5.1**.

With implementation of **Mitigation Measure 3.5.1**, during dewatering activities, fish located near the isolated area would be removed and relocated to appropriate habitat

downstream of the project site by qualified fisheries biologists, using methods approved by the National Marine Fisheries Service and California Department of Fish and Wildlife, would perform the fish rescue and relocation, as applicable. Similar prevention measures would be implemented as needed for periodic maintenance of the Reach 15 and Demonstration projects.

Implementation of the projects and actions mandated by the Biological Opinion, including the RRIFR Program projects (listed and described in section 4.3 above) and the Reach 15 Project and Demonstration Project would have individually and cumulatively beneficial effects on CCC coho salmon, CC Chinook salmon, and CCC steelhead and their habitat when implemented. In particular, the proposed project, Reach 15 Project, and Demonstration Project would create low velocity areas for juvenile coho and steelhead as their primary benefit, and would result in other incidental fisheries benefits as described in **Chapter 3.5**. The Fish Habitat Flows and Water Rights Project would affect flows in Dry Creek to the benefit of salmonids as identified in the Biological Opinion. Overall, the cumulative permanent, ongoing impacts of these projects on fisheries would be beneficial.

Cumulative Impact Summary

Impact 4.6.5.1: The temporary cumulative fisheries impacts on restricting movement of adult or juvenile CCC coho salmon, CC Chinook salmon and CCC steelhead, upstream migration of adult salmonids, and on spawning habitat usage and quality and rearing habitat for CCC coho salmon, CC Chinook salmon and CCC steelhead in Dry Creek resulting from isolation of the creek and the use of bypass pumping during construction and maintenance activities associated with the implementation of the Dry Creek Project in combination with the identified related projects would be less than significant. (Cumulatively Less than Significant)

Mitigation Measure: None required. The cumulative impact would be less than significant.

Impact 4.6.5.2: The cumulative fisheries impacts on CCC coho salmon, CC Chinook salmon, and CCC steelhead and their habitat in Dry Creek resulting from the creation of low velocity areas in Dry Creek associated with the implementation of the Dry Creek Habitat Enhancement Project, Miles 2-6 in combination with the Reach 15 and Demonstration projects would be Beneficial. (Cumulatively Beneficial)

Mitigation Measure: None required. The cumulative impact would be beneficial.

4.6.6 Geology, Soils, and Mineral Resources

Impacts of the Dry Creek Project

As described in **Chapter 3.6**, Geology, Soils, and Mineral Resources, the proposed project would result in no impact on the following criteria: expose people or structures to adverse effects associated with fault rupture, seismic shaking, and liquefaction during operation; the availability of gravel as a mineral resource;. Therefore, it could not contribute to a cumulative impact on mineral resources, and these resources are not discussed further. Similarly, the proposed project would have no impact, and no contribution to a cumulative impact, associated with soils incapable of adequately supporting septic tanks, because no septic tank is proposed. The construction, operation and maintenance activities associated with the proposed project could result in: 1) less than significant impact on people and structures associated with fault rupture, seismic shaking, and liquefaction during construction and maintenance activities after the implementation of **Mitigation Measure 3.6.1**; 2) a less-than-significant impact related to the exposure of people or structures to adverse effects associated with landslides during construction operation and maintenance activities; 3) a less-than-significant impact related to erosion and the loss of topsoil during construction operation and maintenance activities after the implementation of **Mitigation Measures 3.3.1c** in **Chapter 3.3, Biological Resources** and **3.6.8a** and **3.6.8b**; 4) a less-than-significant impact associated with unstable geologic units or soils and potentially result in on- or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse during construction operation and maintenance activities after the implementation of **Mitigation Measures 3.6.1, 3.6.8a, and 3.6.8b**; and 5) a less-than-significant impact associated with expansive soils as defined in Table 18-1-B of the Uniform Building Code (1994 or more current edition), creating substantial risks to life or property during construction operation and maintenance activities.

Impacts of Identified Related Projects

The Reach 15, Demonstration, and Hale Winery and Tasting Room projects are located within the Dry Creek Valley and would involve ground disturbance during maintenance (of the projects within Dry Creek) and construction activities (of the winery project) that could have potential erosion and loss of topsoil impacts.

Relationship of the Dry Creek Project to Identified Related Projects

Geographic and Temporal Scope

Impacts related to geologic and seismic hazards are generally site-specific and depend on the localized geology and soil conditions. As a result, they are not typically additive or cumulative in nature. For the less-than-significant residual impacts associated with potential hazards to construction and/or maintenance workers or to structures (i.e., due to fault rupture, ground shaking, liquefaction, unstable geologic units or soils, landslides,

or expansive soils), the area of potential impact is limited to the site on which construction and/or maintenance activities would occur. Thus, such site-specific impacts would not combine with impacts of projects in other locations to create cumulatively greater impacts, and are not discussed further.

For impacts associated with erosion and loss of topsoil, the geographic scope includes the Dry Creek Valley, where soils of similar types are located and could be susceptible to a cumulative loss of topsoil due to erosion. The Reach 15, Demonstration, and Hale Winery and Tasting Room projects are located within the Dry Creek Valley.

Cumulative Impact Analysis

Existing conditions reflect the impacts of past projects and are described in Chapter 3.6, Section 3.6.2. The standards of significance for impacts on geology and soils are described in Chapter 3.6, Section 3.6.4 under “Methodology.” These standards also apply to the significance of cumulative impacts on geology and soils.

Like the proposed project, the Reach 15 and Demonstration projects have a goal of preventing or minimizing creek bank erosion, and would therefore involve streambank stabilization measures, minimizing the potential to contribute to cumulative erosion impacts. The Hale Winery and Tasting Room would disturb less than 0.5 acre and is subject to a condition of approval requiring the implementation of an erosion prevention/sediment control plan, and therefore would not have a substantial effect on the loss of topsoil in the Dry Creek Valley due to erosion (County of Sonoma Permit and Resource Management Department, 2015). Therefore, the cumulative impact would be less than significant.

Cumulative Impact Summary

Impact 4.6.6.1: The cumulative impact related to geology, soils, and mineral resources materials associated with the construction, operation and maintenance activities from the implementation of Dry Creek Habitat Enhancement Project, Miles 2-6 in combination with the identified related projects would be less than significant. (Cumulatively Less than Significant)

Mitigation Measure: None required. The cumulative impact would be less than significant.

4.6.7 Hazards and Hazardous Materials

Impacts of the Dry Creek Project

As described in **Chapter 3.7**, Hazards and Hazardous Materials, the following criteria included in Appendix G of the CEQA Guidelines do not apply to the proposed project analysis: emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed

school; result in a safety hazard for people residing or working within an airport land use plan or within two miles of a public airport or public use airport; result in a safety hazard for people residing or working within the vicinity of a private airstrip; impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; and expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands. Therefore, the proposed project could not contribute to a cumulative impact related to these criteria, and they are not discussed further. Construction and maintenance activities associated with the proposed project could result in: 1) a less-than-significant impact from creating a hazard to the public or environment through the routine transport, use, or disposal of hazardous materials; 2) a less-than-significant impact from creating a hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Although this impact is considered less than significant, **Mitigation Measure 3.7.2** is included to reduce the impact further; and 3) a less-than-significant impact related to being located on a site included on a list of hazardous materials sites. Although this impact is considered less than significant, **Mitigation Measure 3.7.2** is included to reduce the impact further.

Impacts of the Identified Related Projects

The Reach 15, Demonstration, and Lake Sonoma Solar and Hale Winery and Tasting Room projects are within Dry Creek Valley. The Reach 15 and Demonstration projects' construction have been completed. Potential impacts associated with the construction and maintenance activities associated with the Lake Sonoma Solar and Hale Winery and Tasting Room projects could be accidental release of hazardous materials.

Relationship of the Dry Creek Project to Identified Related Projects

Geographic and Temporal Scope

The risks associated with hazardous materials are largely site-specific, and limited to the immediate area surrounding the proposed project construction sites and, with respect to the transport of hazardous materials, the roads in the project vicinity (described in **Chapter 3.13**, Traffic and Transportation). However, due to the potential for transport of hazardous materials in stream flows if encountered or inadvertently released, the geographic scope for the analysis of cumulative hazards and hazardous materials impacts includes all of Dry Creek. Due to the nature of the equipment and the small amount and low toxicity of oil and fuel that would be used for the proposed project, any potential effects of accident or upset conditions would be limited such that the evaluation of a larger geographic scope is not warranted. The temporal scope includes the construction phase as well as periodic maintenance during the operational phase. The Reach 15 and Demonstration projects are located within Dry Creek, and

construction has been completed for both projects. The Lake Sonoma Solar Project and Hale Winery and Tasting Room would use the same local roads as the proposed project during construction (e.g., Dry Creek Road).

Cumulative Impact Analysis

Existing conditions reflect the impacts of past projects and are described in **Chapter 3.7, Section 3.7.2**. The standards of significance for impacts on hazards and hazardous materials are described in **Chapter 3.7, Section 3.7.4** under “Methodology.” These standards also apply to the significance of cumulative impacts on hazards and hazardous materials.

Potential impacts associated with the accidental release of hazardous materials caused by the Lake Sonoma Solar and Hale Winery and Tasting Room projects, combined with the proposed project, would not result in a significant cumulative impact even if all of the projects were to be constructed simultaneously because the proposed project and all future projects in the cumulative scenario would be required to adhere to the robust body of regulations that govern hazardous materials storage and handling, water quality best management practices, construction work, and fire prevention and management. Together, these measures would ensure that impacts related to exposure to hazardous materials would be minimized and/or avoided. Therefore, the proposed project’s incremental contribution to any hazards and hazardous material-related cumulative impact would not be cumulatively considerable.

As stated in **Chapter 3.7**, construction activities anywhere within Dry Creek have the potential to encounter historic erosion control debris placed along the channel banks. Based on the condition, environment, and location, any hazardous materials associated with this debris are not likely to present a significant risk of release beyond what has existed since these materials were placed. Materials encountered during project construction would be removed from the system, which is considered an environmental benefit. Therefore, the proposed project would not contribute to a cumulative impact.

Cumulative Impact Summary

Impact 4.6.7.1: The cumulative impacts related to hazards and hazardous materials from the construction and maintenance activities associated with the implementation of the Dry Creek Habitat Enhancement Project, Miles 2-6 in combination with the identified related projects would be less than significant. (Cumulatively Less than Significant)

Mitigation Measure: None required. The cumulative impact would be less than significant.

4.6.8 Hydrology and Water Quality

Impacts of the Dry Creek Project

As described in **Chapter 3.8**, Hydrology and Water Quality, the proposed project would have no impact with respect to inundation by seiche, tsunami, or mudflow. Therefore, the project could not contribute to a cumulative impact related to this criterion, and it is not discussed further. The proposed project would not consume groundwater, and its impacts on groundwater would be beneficial as it could enhance groundwater resources through encouraging recharge in areas where new pools, alcoves, and backwaters are created. The proposed project would not have the potential to combine adversely with impacts of future related projects on groundwater quality or supply, and this issue is not discussed further.

The proposed project could result in: 1) a less-than-significant impact from altering drainage patterns during construction activities that could result in substantial erosion or sedimentation on- or off-site after the implementation of **Mitigation Measures 3.8-1a** through **3.8-1d**; 2) a less-than-significant impact from altering drainage patterns during operation and maintenance activities that could result in substantial erosion or sedimentation on- or off-site after the implementation; 3) a less-than-significant impact from altering drainage patterns to substantially increase the rate or amount of surface runoff in a manner during construction, operation, and/or maintenance activities which would result in flooding on- or off-site; 4) a less-than-significant impact related to creating or contributing runoff water which would exceed the capacity of existing or planned stormwater drainage systems or providing substantial additional sources of polluted runoff during construction, operation, and/or maintenance activities; 5) a beneficial impact related to the placement of housing within a 100-year flood hazard area during the construction, operation and/or maintenance activities; 6) a less-than-significant impact related to the placement of structures within a 100-year flood hazard area that would impede or redirect flood flows during the construction, operation and/or maintenance activities; 7) a less-than-significant impact related to exposing people or structures to a significant risk of loss, injury, or death involving flooding during construction, operation, and/or maintenance activities; 8) a less-than-significant impact related to violating water quality standards or waste discharge requirements or otherwise degrading water quality during construction, operation and/or maintenance activities; and 9) a less-than-significant impact related to substantially affecting groundwater supplies or recharge resulting in reduced aquifer volume or a lowering of the local groundwater table level from the construction, operation and/or maintenance of channel habitat enhancement.

Impacts of the Identified Related Projects

Several related projects are located within the watershed and/or have the potential to directly affect Dry Creek. The Reach 15 and Demonstration projects each are located within Dry Creek between Warm Springs Dam and the Russian River. The Fish Habitat Flows project would affect stream flows in Dry Creek. The existing Coho Broodstock Program facilities and the proposed Hale Winery and Tasting Room project are located within the Dry Creek watershed.

Relationship of the Dry Creek Project to Identified Related Projects

Geographic and Temporal Scope

The geographic scope of potential cumulative impacts on surface hydrology and water quality includes the area within which the proposed project could cause an adverse direct or indirect effect. As explained in **Chapter 3.8**, impacts on surface water quality could occur within Dry Creek downstream of Warm Springs Dam. Impacts on surface water hydrology primarily would be limited to this portion of Dry Creek and to the 100-year flood hazard areas adjacent to it. Therefore, the geographic scope includes Dry Creek from Warm Springs Dam to the Russian River, and its watershed.

Potential significant impacts on surface water quality primarily would be limited to the construction phases of the proposed project and to periodic maintenance activities as needed during operation, which would be similar to construction-phase activities. However, there is some potential for nuisance sedimentation to occur during normal operation, as described in **Chapter 3.8**. Therefore, the temporal scope of cumulative sedimentation effects includes all project phases, and the temporal scope of other water quality effects is limited to construction and to intermittent maintenance activities. Permanent, ongoing impacts to surface hydrology in Dry Creek would be beneficial as a result of enhancements that would reduce the potential for flooding and excess runoff, and would not have the potential to combine adversely with impacts of future related projects. However, construction and maintenance activities associated with the proposed project may result in surface hydrology impacts. Construction of the Demonstration Project, Coho Broodstock Program facilities, and Reach 15 projects has been completed. The permanent facilities and physical changes associated with these related projects would not contribute to construction- or maintenance-related cumulative impacts. However, periodic maintenance of the Reach 15 and Demonstration projects may occur concurrently with construction and/or maintenance of the proposed project, and construction of the Hale Winery and Tasting Room Project may coincide with construction and/or periodic maintenance of the proposed project.

Cumulative Impact Analysis

Existing conditions reflect the impacts of past projects and are described in **Chapter 3.8, Section 3.8.2**. The standards of significance for impacts on hydrology and water

quality are described in **Chapter 3.8, Section 3.8.4** under “Methodology.” These standards also apply to the significance of cumulative impacts on hydrology and water quality.

Although no environmental analysis was available to review for the Hale Winery and Tasting Room Project, this analysis assumes that this related project would involve typical construction activities and equipment, including ground disturbance, grading, and equipment and materials staging. This small project (less than 0.5 acre) would not be required to obtain coverage under the Phase II NPDES program, but is subject to a condition of approval requiring the implementation of an erosion prevention/sediment control plan (County of Sonoma Permit and Resource Management Department, 2015). Additionally, periodic maintenance of the Reach 15 and Demonstration projects would result in ground-disturbing effects similar to the proposed project. The effects of these construction activities could combine with the less than significant residual effects of the proposed project to result in a cumulative increase of suspended and settleable materials reaching the main channel. Periodic maintenance associated with the Reach 15 and Demonstration projects, like the proposed project, would be implemented for the purpose of maintaining these projects’ beneficial long-term impact on erosion and sedimentation within Dry Creek. Long-term operation of the proposed project and Project may be subject to nuisance sedimentation. The Reach 15 Project is within the Upper Segment of Dry Creek which does not receive sediment or hydrologic inputs from tributaries, and has the lowest risk of constructed habitat being compromised by nuisance sediment deposition. Like the proposed project, the Demonstration Project implemented a monitoring and adaptive management plan to address nuisance sedimentation. The Water Agency will continue to monitor and make changes as needed to minimize nuisance sedimentation within all enhanced areas of Dry Creek under its jurisdiction. Therefore, the cumulative impact on surface water quality would be less than significant.

With respect to surface hydrology effects during proposed project construction and maintenance activities, as described in **Chapter 3.8**, preparation of work areas would follow appropriate Best Management Practices (BMPs) that reduce runoff from exposed, non-vegetated surfaces, including placement of geotextile fabric and bio-logs to increase infiltration and impede runoff. Additionally, construction would occur only during the dry period, when the potential for runoff is minimal. Except as needed for emergencies, maintenance of the proposed project and the Reach 15 and Demonstration projects also would occur during the dry period. None of these related projects would create new impervious surfaces or place new structures or housing within a 100-year flood hazard zone. The Hale Winery and Tasting Room Project would not be located within a 100-year flood hazard zone, and although it would create new impervious surface, this would be limited to 0.5 acre, and the site is surrounded by

pervious surfaces. Therefore, the cumulative effects related to runoff, including on stormwater drainage systems and on- and off-site flooding, would be minimal and therefore less than significant.

Implementation of the related projects and actions mandated by the Biological Opinion, including the RRIFR Program projects (listed and described in section 4.3 above) and the Reach 15 and Demonstration projects would have individually and cumulatively beneficial effects on long-term surface hydrology. In particular, the proposed project, Reach 15 and Demonstration projects would create low-velocity areas resulting in incidental hydrology and water quality benefits (e.g., reduced erosion of streambanks) as described in **Chapter 3.8**. Overall, the cumulative permanent, ongoing impacts of these related projects on hydrology and water quality would be beneficial.

Cumulative Impact Summary

Impact 4.6.8.1: The cumulative impacts on surface water quality, surface water hydrology, and groundwater supplies associated with the construction, operation and maintenance activities from the implementation of the Dry Creek Habitat Enhancement Project, Miles 2-6 in combination with the identified related projects would be less than significant. (Cumulatively Less than Significant)

Mitigation Measure: None required. The cumulative impact would be less than significant.

4.6.9 Land Use, Planning, and Agricultural Resources

Impacts of the Dry Creek Project

As described in **Chapter 3.9**, Land Use, Planning, and Agricultural Resources, the following criteria included in Appendix G of the CEQA Guidelines do not apply to the proposed project analysis: conflict with existing zoning for or cause rezoning of forest land, timberland, or timberland zoned Timberland Production; or result in the loss of forest land or conversion of forest land to non-forest use. The proposed project also would result in no impact with respect to physically dividing an established community. Therefore, the proposed project could not contribute to a cumulative impact related to these criteria, and they are not discussed further. Construction and/or maintenance activities associated with the proposed project could result in: 1) a less-than-significant impact related to conflicting with an applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect; 2) a beneficial impact related to an applicable habitat conservation plan/natural community conservation plan; 3) a less-than-significant impact from converting Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use; 4) a less-than-significant impact from conflicting with existing zoning for agricultural use or a Williamson Act contract after implementation of

Mitigation Measures 3.9.5a, 3.9.5b, and 3.9.5c; and 5) a less-than-significant impact related to changes in the existing environment which could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use. This impact, while less than significant, would be further reduced by the implementation of **Mitigation Measures 3.1.1 and 3.1.2 in Chapter 3.1 Aesthetics** as well as **Mitigation Measure 3.9.5a, b, and c.**

The cumulative beneficial impacts of the proposed project and the other projects related to the Biological Opinion is described in section 4.6.5 above, and fully addresses the beneficial cumulative impact associated with compliance with an applicable habitat conservation plan or natural community conservation plan.

Impacts of the Identified Related Projects

The Coho Broodstock Program, Reach 15, Demonstration, and Hale Winery and Tasting Room projects are located within the Dry Creek Valley. Construction of the Coho Broodstock Program, Reach 15, and Demonstration projects has been completed, and so the extent to which these projects have permanently converted agricultural or other rural land to riparian or related uses is reflected in the existing conditions described in **Chapter 3.9**. Periodic maintenance of the Reach 15 and Demonstration projects may occur concurrently with construction and/or maintenance activities associated with the proposed project, and would be similar in nature to the proposed project. The construction period for the Hale Winery and Tasting Room Project is not yet known, but could overlap with proposed project construction and/or maintenance activities.

Relationship of the Dry Creek Project to Identified Related Projects

Geographic and Temporal Scope

The geographic scope of potential adverse cumulative impacts on land use, planning, and agricultural resources includes the area within which the proposed project could cause an adverse direct or indirect effect. As explained in **Chapter 3.9**, impacts could occur at the locations of enhancements in Miles 2-3 and within the as-yet-unidentified locations of enhancements within Mile 4-6 of Dry Creek from Warm Springs Dam to the Russian River, including the creek banks and adjacent staging and work areas. However, the extent of land use changes would be limited to lands immediately adjacent to Dry Creek. Thus, the geographic scope includes types of land uses that may be affected within the Dry Creek Valley, which are primarily land intensive agriculture and resources and rural development. The temporary effects of the proposed project on agricultural operations as a result of dust, noise, and traffic impacts would be restricted to the construction and periodic maintenance of the proposed project. Impacts from permanent conversion of lands adjacent to Dry Creek to riparian habitat would continue indefinitely.

The related projects located within the geographic scope are the Coho Broodstock Program, Reach 15, Demonstration, and Hale Winery and Tasting Room projects, which are located within the Dry Creek Valley.

Cumulative Impact Analysis

Existing conditions reflect the impacts of past projects and are described in **Chapter 3.9, Section 3.9.2**. The standards of significance for impacts on land use, planning, and agriculture are described in **Chapter 3.9, Section 3.9.4** under “Methodology.” These standards also apply to the significance of cumulative impacts on land use, planning, and agriculture.

With implementation of **Mitigation Measures 3.9.5a, 3.9.5b, and 3.9.5c**, the proposed project would have a minimal conflict with agricultural operations as a result of construction and maintenance-related dust, noise, and traffic. Maintenance of the Reach 15 and Demonstration projects could affect agricultural operations in a similar manner, and may overlap with proposed project construction and/or maintenance activities, resulting in a greater cumulative impact on agricultural operations throughout the Dry Creek Valley. However, due to the locations of these related projects along Dry Creek, it is unlikely that one landowner would be affected by more than one project. Therefore, the cumulative impact would be less than significant.

The Hale Winery and Tasting Room Project would be located on land designated land intensive agriculture and zoned for agricultural use (LIA B6 20 Z), and would remove less than 0.5 acre of currently planted vineyards of the 36 acres present on the site from agricultural use (County of Sonoma Permit and Resource Management Department, 2012). While this related project would have permanent effects on farmland and agriculturally zoned land, the proposed project would have a negligible and in some cases slightly beneficial effect on long-term farmland and agricultural zoning in locations where streambank stabilization would occur, protecting adjacent lands from future erosion. Therefore, the proposed project would not contribute to a significant long-term cumulative effect.

Cumulative Impact Summary

Impact 4.6.9.1: The cumulative impacts related to land use, planning, and agricultural resources associated with the construction and maintenance activities from the implementation of the Dry Creek Habitat Enhancement Project, Miles 2-6 in combination with the identified related projects would be less than significant. (Cumulatively Less than Significant)

Mitigation Measure: None required. The cumulative impact would be less than significant.

4.6.10 Noise

Impacts of the Dry Creek Habitat Enhancement Project, Miles 2-6

As described in **Chapter 3.10, Noise**, three of the following criteria included in Appendix G of the CEQA Guidelines do not apply to the proposed project analysis: expose persons to or generating noise levels in excess of standards established in the Sonoma County General Plan 2020; expose people residing or working within the vicinity of an airport or private airstrip to excessive noise levels; or result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project. Therefore, the proposed project could not contribute to a cumulative impact related to these criteria, and they are not discussed further. Construction and maintenance activities associated with the proposed project could result in: 1) a significant and unavoidable impact related to a substantial temporary or periodic increase in ambient noise levels, even with implementation of **Mitigation Measures 3.10.1a** through **3.10.1c**; and 2) a less-than-significant impact related to ground-borne vibration.

Impacts of the Identified Related Projects

The related projects that may have the potential to impact the same noise- and vibration-sensitive receptors as the proposed project and to overlap in time with proposed project construction and maintenance are the Reach 15, Demonstration, and Lake Sonoma Solar and Hale Winery and Tasting Room projects.

Construction of the Reach 15 and Demonstration projects has been completed, but periodic maintenance of these related projects may occur concurrently with construction and/or maintenance of the proposed project, and would be similar in nature to the proposed project's maintenance. The construction periods for the Lake Sonoma Solar and Hale Winery and Tasting Room projects are not yet known, but could overlap with proposed project construction and/or maintenance. While the Hale Winery and Tasting Room project's construction activities may affect the same noise-sensitive receptors as the proposed project, only the increase in truck traffic associated with the Lake Sonoma Solar Project would have the potential to combine with the noise and vibration effects of the proposed project, due to the distance between the proposed project work sites and the Lake Sonoma Solar Project site.

Relationship of the Dry Creek Project to Identified Related Projects

Geographic and Temporal Scope

The geographic scope of the cumulative noise and vibration analysis includes surrounding sensitive receptors. Noise and vibration impacts tend to be localized due to attenuation over distance; therefore, the area near the proposed project work sites would be most affected. Impacts would be restricted to the construction phase and to

periodic maintenance activities as needed during operation, which would be similar to construction-phase activities. Therefore, the temporal scope of cumulative impacts on noise and vibration is limited to construction and to intermittent periods of maintenance during operation. The related projects that may have the potential to impact the same noise- and vibration-sensitive receptors as the proposed project and to overlap in time with proposed project construction and maintenance are the Reach 15, Demonstration, and Hale Winery and Tasting Room projects. In addition, the Lake Sonoma Solar Project would be accessed via the same roads used for the proposed project, in particular, U.S. 101 and Dry Creek Road.

Cumulative Impact Analysis

Existing conditions reflect the ongoing impacts of past projects and are described in **Chapter 3.10, Section 3.10.2**. The standards of significance for impacts on noise and vibration are described in **Chapter 3.10, Section 3.10.4** under “Methodology.” These standards also apply to the significance of cumulative impacts.

As described in **Chapter 3.10**, when using the highest noise level generated from construction equipment (vibratory pile driver) for construction of the proposed project, the resulting noise level at the nearest sensitive receptor would be just over 80 dBA. Due to the nature of foreseeable maintenance activities for the Reach 15 and Demonstration projects and construction activities for the Hale Winery and Tasting Room Project, the use of vibratory pile driving is unlikely, and in particular, unlikely to occur concurrently with pile driving for the proposed project. Therefore, sources of noise from these related projects would generate lower noise levels (see Table 3.10-4). Additionally, the only source of noise from the Lake Sonoma Solar Project that could combine with noise from the proposed project would be construction traffic along Dry Creek Road, which also would generate lower noise levels than potential pile driving activities. Nonetheless, because the proposed project’s construction noise impacts are considered to be significant and unavoidable, any contribution of noise from another project would result in a significant cumulative impact. Because **Mitigation Measures 3.10.1a** through **3.10.1c** represent the extent of feasible mitigation to reduce the proposed project’s noise impacts, no additional mitigation is available to further reduce the cumulative impact. Therefore, the cumulative impact would be significant and unavoidable, and the proposed project’s contribution would be cumulatively considerable.

Cumulative vibration impacts would occur if two vibration-generating activities are within a relatively close distance from one another. Projected vibration levels from the proposed project at nearby sensitive receptor would be below the threshold of perception, with the possible exception of pile driving. Maintenance activities associated with the Reach 15 and Demonstration projects and construction of the Hale Winery and Tasting Room and Lake Sonoma Solar projects would not generate vibration levels

great enough to combine with those of the proposed project to cause vibration exceeding the thresholds in **Tables 3.10-7** and **3.10-8** in **Chapter 3.10** at the nearest vibration-sensitive receptors. Therefore, the cumulative impact would be less than significant.

Cumulative Impact Summary

Impact 4.6.10.1: The cumulative impacts related to construction noise associated with construction and maintenance activities from the implementation of the Dry Creek Habitat Enhancement Project, Miles 2-6 in combination with the identified related projects would be significant and unavoidable. (Cumulatively Significant and Unavoidable)

Mitigation Measure: None feasible. Even with implementation of Mitigation Measures 3.10.1a through 3.10.1e, the cumulative impact would be significant and unavoidable.

Impact 4.6.10.2: The cumulative impacts related to construction vibration associated with construction and maintenance activities from the implementation of the Dry Creek Habitat Enhancement Project, Miles 2-6 in combination with the identified related projects would be less than significant. (Cumulatively Less than Significant)

Mitigation Measure: None required. The cumulative impact would be less than significant.

4.6.11 Public Services, Utilities and Service Systems

As described in **Chapter 3.11**, Public Services, Utilities and Service Systems, the following criteria included in Appendix G of the CEQA Guidelines do not apply to the proposed project analysis: result in substantial adverse physical impacts associated with the provision of or need for new or physically altered governmental facilities; alterations to existing public services; disruption in the delivery or availability of existing public services; exceedance of wastewater treatment requirements; require or result in the construction of new water or wastewater treatment or stormwater drainage facilities or expansion of existing facilities; inadequate wastewater treatment capacity to serve the project's projected demand in addition to the provider's existing commitments; insufficient permitted landfill capacity to accommodate the project's solid waste disposal needs; and compliance with federal, state, and local statutes and regulations related to solid waste. Therefore, the proposed project could not contribute to a cumulative impact related to these criteria, and they are not discussed further. The proposed project would result in no impact with respect to a having insufficient water supplies available to serve the project from existing entitlements and resources. The project would require a temporary source of water during construction for dust control and after construction to irrigate plantings for two to three dry seasons following installation until the plants

become established. Therefore, the proposed project could not contribute to a cumulative impact related to public services, utilities and service systems.

4.6.12 Recreation

Impacts of the Dry Creek Habitat Enhancement Project, Miles 2-6

As described in **Chapter 3.12**, Recreation, two of the following criteria included in Appendix G of the CEQA Guidelines do not apply to the proposed project analysis: increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; or to include recreational facilities or requiring the construction or expansion of recreational facilities, which might have adverse physical effects on the environment. Therefore, the proposed project could not contribute to a cumulative impact related to these criteria, and they are not discussed further. The proposed project could result in: 1) a less-than-significant impact related to temporarily altering the ability for people to operate canoes, kayaks, and rafts in Dry Creek during construction and/or maintenance activities; 2) a less-than-significant impact on altering the stream channel in Dry Creek which could affect the ability for people to operate canoes, kayaks and rafts during operation of habitat enhancement features; 3) a less-than-significant impact related to blocking access to some swimming sites during construction and maintenance activities; 4) a less-than-significant impact related to the loss of beaches used by private landowners from the construction of the proposed project; and 5) a less-than-significant impact related to the relocation or loss of winery picnic areas from the construction of the proposed project.

Impacts of the Identified Related Projects

The Reach 15 and Demonstration projects are the only related projects within the geographic scope. Both have been constructed, and would be subject to ongoing periodic maintenance activities similar to that described for the proposed project. Like the proposed project, periodic maintenance activities associated with the Reach 15 and Demonstration projects would temporarily alter the ability for people to operate canoes, kayaks, and rafts in Dry Creek, and would temporarily block access to swimming sites.

The Reach 15 and Demonstration projects consist of similar enhancement features, and therefore would have the same types of effects on recreational boating as the proposed project. As indicated for project-related enhancements, the permanent presence of new backwaters, side channels, log placements, pool enhancements, and stream bank stabilization measures are likely to improve boating conditions on Dry Creek. The permanent presence of new boulder gardens, boulder clusters, logs, and riffles would not substantially alter the boating environment in Dry Creek, as the type of skilled boaters frequenting Dry Creek would be accustomed to navigating around such obstacles in the stream channel.

Relationship of the Dry Creek Project to Identified Related Projects

Geographic and Temporal Scope

The geographic scope of potential cumulative impacts on recreational resources is limited to Dry Creek. Temporary impacts would be limited to the construction phases of the proposed project and to periodic maintenance during operation. Permanent impacts would continue indefinitely. The Reach 15 and Demonstration projects are the only related projects within the geographic scope. Both have been constructed, and would be subject to ongoing periodic maintenance similar to that described for the proposed project. The permanent effects of these projects are reflected in the existing conditions for recreational access and amenities along Dry Creek.

Cumulative Impact Analysis

Existing conditions reflect the impacts of past projects and are described in **Chapter 3.12, Section 3.12.2**. The standards of significance for impacts on recreational resources are described in **Chapter 3.12, Section 3.12.4** under “Methodology.” These standards also apply to the significance of cumulative impacts on recreational resources.

Like the proposed project, periodic maintenance activities associated with the Reach 15 and Demonstration projects would temporarily alter the ability for people to operate canoes, kayaks, and rafts in Dry Creek, and would temporarily block access to swimming sites. These impacts could combine with those of the proposed project to cause a cumulative increase in the number of sites at which such alterations or blockages occurred, and/or the duration of time over which they occurred. However, these effects would be temporary. Additionally, because the amount of use of Dry Creek for canoeing, kayaking, rafting, and swimming is low, temporary effects on the ability to use the creek for these activities would affect few users. Therefore, like the project-specific impacts on canoeing, kayaking, rafting, and swimming, the cumulative impact would be less than significant.

As discussed in **Chapter 3.12**, the habitat enhancement features of the proposed project have the potential to interact with recreational boating. The Reach 15 and Demonstration projects consist of similar enhancement features, and therefore would have the same types of effects on recreational boating as the proposed project. As indicated for project-related enhancements, the permanent presence of new backwaters, side channels, log placements, pool enhancements, and stream bank stabilization measures are likely to improve boating conditions on Dry Creek. The permanent presence of new boulder gardens, boulder clusters, logs, and riffles would not substantially alter the boating environment in Dry Creek, as the type of skilled boaters frequenting Dry Creek would be accustomed to navigating around such obstacles in the stream channel. The cumulative impact of the additional enhancements in Dry Creek would be largely beneficial for boaters, and would be less than significant.

With respect to the loss of beaches used by private landowners and to the relocation or loss of winery picnic areas, neither of these resources exists or existed in the Reach 15 project area. As noted in **Chapter 3.12**, participation in the Water Agency's Dry Creek enhancements program (including the Demonstration Project) is voluntary and landowners can choose to take an active role during site selection and design of the project. If a landowner feels that the project could eliminate a valuable recreational resource, he or she can provide input into site selection and project design. If the landowner feels that, even after providing input, the project design still impacts a valuable recreational resource he or she can choose to not participate in the project. Therefore, it is assumed that to the extent that the Demonstration Project would have affected beaches and/or winery picnic areas, such design issues have been resolved to the satisfaction of participating landowners. Similarly, these issues would be resolved for the proposed project through the process described above. Because these impacts could be avoided by modifying off-channel habitat designs to avoid beaches and winery picnic areas, or reduced by relocating winery picnic areas that overlap a project site to locations adjacent to a project site in project design, the cumulative impact would be less than significant.

Cumulative Impact Summary

Impact 4.6.12.1: The cumulative impacts on recreational resources, including boating, swimming, beach access, and winery picnic areas associated with construction and/or maintenance from the implementation of the Dry Creek Project in combination with the identified related projects (Reach 15 and the Demonstration project), would be less than significant. (Cumulatively Less than Significant)

Mitigation Measure: None required. The cumulative impact would be less than significant.

4.6.13 Traffic and Transportation

Impacts of the Dry Creek Project

As described in **Chapter 3.13**, Traffic and Transportation, four of the following criteria included in Appendix G of the CEQA Guidelines do not apply to the proposed project analysis: conflict with an applicable congestion management program and exceedance of LOS standards established by the county congestion management agency; result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks; substantially increase hazards due to a design feature or incompatible uses; or conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities. Therefore, the proposed project could not contribute to a cumulative impact related to these criteria, and they are not discussed further. Construction and/or maintenance activities associated with the proposed project

could result in: 1) a less-than-significant impact related to conflicting with an applicable plan, ordinance or policy establishing measures for the performance of the circulation system after implementation of **Mitigation Measure 3.13.1**; 2) a less-than-significant impact related to impeding access to local streets or adjacent uses, including access for emergency vehicles, after implementation of **Mitigation Measure 3.13.1**; 3) a less-than-significant impact related to traffic safety hazards due to increased traffic volumes after implementation of **Mitigation Measure 3.13.1**; and 4) a less-than-significant impact from causing substantial damage or wear of roadways by increased movement of heavy vehicles after implementation of **Mitigation Measure 3.13.4**.

Impacts of the Identified Related Projects

The related projects that could contribute to traffic on the roads within the geographic scope are the Coho Broodstock Program, Reach 15, Demonstration, Lake Sonoma Solar, and Hale Winery and Tasting Room projects, which would be accessed via the same roads used for the proposed project, in particular, U.S. 101 and Dry Creek Road. Construction of the Coho Broodstock, Reach 15, and Demonstration projects has been completed. The long-term effect on traffic from staff at the Don Clausen Warm Springs Hatchery is reflected in the baseline conditions. Periodic maintenance of the Reach 15 and Demonstration projects may occur concurrently with construction and/or maintenance of the proposed project, and would be similar in nature to the proposed project's low-intensity maintenance-related traffic. The construction periods for the Lake Sonoma Solar and Hale Winery and Tasting Room project are not yet known, but could overlap with proposed project construction and/or maintenance.

Relationship of the Dry Creek Project to Identified Related Projects

Geographic and Temporal Scope

The geographic scope of potential cumulative traffic and transportation impacts includes U.S. 101 in the project vicinity, Dry Creek Road, West Dry Creek Road, Canyon Road, and adjacent rural roads. Impacts primarily would be restricted to the construction phase and to periodic maintenance activities as needed during operation, which would be similar to construction-phase activities, but with less traffic generated due to the lower intensity of work and lower potential for simultaneous work at different sites.

The related projects that could contribute to traffic on the roads within the geographic scope are the Coho Broodstock Program, Reach 15, Demonstration, Lake Sonoma Solar, and Hale Winery and Tasting Room projects.

Cumulative Impact Analysis

Existing conditions reflect the impacts of past projects and are described in **Chapter 3.13, Section 3.13.2**. The standards of significance for impacts on transportation and traffic are

described in Section 3.13.4 under “Methodology.” These standards also apply to the significance of cumulative impacts on transportation and traffic.

As described in **Chapter 3.13**, under an accelerated construction schedule for Miles 2-6, 276 additional daily vehicle trips could be added to surrounding roadways during construction of the proposed project. These trips would be spread over several simultaneous construction locations along Dry Creek, but nearly all likely would access Dry Creek Road from U.S. 101. Maintenance-related traffic would be periodic and would not result in significant increases in traffic volumes on roadways in the project area. Therefore, to address the maximum potential contribution to local traffic, this analysis uses the construction period trip estimate.

Maintenance of the Reach 15 and Demonstration projects would contribute some trips to local roadways, estimated to be fewer than the 45 daily trips created by Mile 1 construction, as noted in **Chapter 3.13**. The Hale Winery and Tasting Room Project’s construction traffic is not currently known, though this project may have greater operational traffic than construction-related traffic. The winery would have a small permanent staff, and anticipates attracting an average of 25 visitor vehicles per day. In addition, the winery would host several events per year, with up to 46 vehicles accessing the site per event, including visitor and event staff vehicles (County of Sonoma Permit and Resource Management Department, 2015). The traffic impact of the Lake Sonoma Solar Project’s construction is not currently known, but is estimated to be similar to that of the proposed project.

In the unlikely event that proposed project construction were to overlap with the maximum traffic from each of these projects, the total additional traffic on Dry Creek Road could be approximately 675 round trips. Most of this traffic would access Dry Creek Road north of Lambert Bridge Road, and this total would represent approximately 46 percent of the total average daily traffic on this portion of Dry Creek Road as reported in **Table 3.13-3** in **Chapter 3.13**. Winery events are likely to be on weekends and/or weekday nights, whereas most construction and maintenance activities associated with the other projects would occur during the weekday.

A more likely scenario is that construction of the proposed project would occur concurrently with construction of the Lake Sonoma Solar Project, resulting in approximately 500 round trips per day. At 33 percent of total weekday traffic on Dry Creek road north of Lambert Bridge Road, this could still represent a significant cumulative increase in traffic on Dry Creek Road. Even with implementation of **Mitigation Measure 3.13.1**, the residual transportation impacts could still contribute substantially to cumulative local and regional traffic and roadway capacity disruptions, a cumulatively significant impact. **Mitigation Measure 4.6.13.1**, presented below, is designed to further reduce the proposed project’s incremental contribution such that it

no longer would be cumulatively considerable. However, there is no guarantee that the agencies responsible for non-Water Agency projects would participate in such coordination efforts. Therefore, even though this mitigation measure could reduce the proposed project's cumulative contribution to a less than significant level, the conclusion remains that the proposed project's incremental contribution to potential significant cumulative effects could be cumulatively considerable during construction (significant and unavoidable with implementation of mitigation). During operation, the proposed project's maintenance-related traffic would not be cumulatively considerable, and no mitigation would be required.

Although other projects in the cumulative scenario may contribute to wear and tear on local roads, because the proposed project would return such roads to their previous condition per landowner agreements following completion of project-related activities at the site (**Mitigation Measure 3.13.4**), the proposed project would not have a cumulatively considerable contribution to such an impact (less than significant).

Cumulative Impact Summary

Impact 4.6.13.1: The cumulative impacts related to construction-period traffic and transportation, including conflicting with circulation system performance measures, impeding access to local streets or adjacent uses, including access to emergency vehicles and increased traffic safety hazards due to increased traffic volumes from the implementation of the Dry Creek Project in combination with the identified related projects would be significant and unavoidable. (Cumulatively Significant and Unavoidable with Mitigation)

Mitigation Measure 4.6.13.1: The Water Agency shall coordinate with the appropriate planning agencies for projects implemented simultaneously within the Dry Creek Valley (e.g., Sonoma County, the U.S. Army Corps of Engineers) to develop and implement a Construction Traffic Coordination Plan. The purpose of the plan shall be to lessen the cumulative effects of the project and other local development project traffic delays and congestion. The plan shall address construction-, maintenance-, and operation-related traffic associated with all project sites in the vicinity of Dry Creek Habitat Enhancement Project, Miles 2-6 components (i.e., within one mile or would use the same roads) and whose construction, maintenance, or special event schedules overlap that of the project. However, the construction traffic coordination plan shall, at a minimum, include the following components:

- Identification of all projects located in the vicinity of Dry Creek Habitat Enhancement Project, Miles 2-6 components (within one mile or would use the same roads) and whose construction, maintenance, or special event schedules overlap that of the project.
- Consideration for the types of vehicles and corresponding numbers and timing of trips associated with each said project.

- An evaluation of roadways affected by construction activities and measures to minimize roadway and traffic disturbances (e.g., lane closures and detours).
- Phasing of construction activities, as feasible and necessary to prevent degradation of levels of service on affected roadways.
- A program that provides for continual coordination with the affected agencies to allow for adjustments and refinements to the plan once project construction is underway.

The construction traffic plan may be modeled after the Traffic Control Plan described in **Mitigation Measure 3.13.1**.

Impact 4.6.13.2: The cumulative traffic and transportation impact on wear and tear of local roads associated with the construction phase of the Dry Creek Project in combination with the identified related projects would be less than significant. (Cumulatively Less than Significant)

Mitigation Measure: None required. The cumulative impact would be less than significant.

4.7 References

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CHAPTER 5 Other Topics Required by CEQA

5.1 Introduction

This chapter contains other required CEQA statutory sections that evaluate the potential growth-inducing impacts and significant irreversible and irretrievable impacts of the proposed project.

5.2 Growth-Inducing Impacts and Secondary Effects of Growth

The California Environmental Quality Act (CEQA) Guidelines [Section 15126.2(d)] require that an Environmental Impact Report (EIR) evaluate the growth inducing impacts of a proposed project. The EIR should:

Discuss the ways in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a wastewater treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also discuss the characteristic of some projects which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

A project can have direct and/or indirect growth inducement potential. Direct growth would result if a project involved construction of new housing. A project can have indirect growth inducement if it would establish substantial new permanent employment opportunities (e.g., commercial, industrial or governmental enterprises) or if it would involve a substantial construction effort with substantial short-term employment opportunities and indirectly stimulate the need for additional housing and services to support the new employment demand. A project would also have an indirect growth inducement effect if it would remove an obstacle to additional growth and development, such as removing a constraint on a required public service.

The Dry Creek Habitat Enhancement Project, Miles 2 – 6 (Dry Creek Project) activities are located in the Dry Creek channel in unincorporated areas of Sonoma County. As described in **Chapters 1.0, Introduction**, and **2.0, Project Description**, the Water Agency is following the mandates in the Russian River Biological Opinion to implement a series of actions to modify existing water supply and flood control activities to mitigate or remove the effects of ongoing Water Agency and USACE operations on endangered coho salmon and threatened steelhead in the region.

The Dry Creek Project is one of these actions to enhance habitat in Dry Creek to provide up to six miles of high quality salmonid habitat within the 14-mile section of Dry Creek from Warm Springs Dam down to Dry Creek's confluence with the Russian River. The Russian River Biological Opinion specifies that these habitat enhancements are not to be concentrated in a contiguous six miles of stream, but rather they are to be distributed across eight or more sites including sites in the upper, middle, and lower portions of Dry Creek. The habitat enhancements are to create both winter and summer rearing habitats for juvenile steelhead and coho salmon, with an emphasis on improving habitats for the survival of juvenile coho salmon.

The Dry Creek Project would not involve an increase in population or employment, or construction of new housing in the project area. Short-term project activities would involve workers for the course of construction activities along Dry Creek. Construction activities would consist of a crew of approximately 10-15 workers per mile per construction season to implement. Long-term activities under the Dry Creek Project would involve habitat monitoring and as-needed maintenance activities by Water Agency staff to implement habitat restoration objectives of the Russian River Biological Opinion (see **Chapter 1, Introduction** and **Chapter 2.0, Project Description**). No substantial change in the existing activities of the Water Agency as a result of the project is anticipated that would increase housing, population, or employment. The proposed project would not result in a direct increase in population or employment or new housing.

The proposed project would not directly or indirectly support economic expansion, population growth, or residential construction in the Dry Creek Project area. The purpose of the Dry Creek Project is to create both winter and summer rearing habitats for juvenile steelhead and coho salmon, with an emphasis on improving habitats for the survival of juvenile coho salmon. Improving habitat for coho salmon and steelhead in Dry Creek does not remove any obstacle to human growth in the region. The proposed project would not increase the population-serving capacity of the Water Agency, and is therefore not considered growth-inducing.

5.3 Irreversible Environmental Changes and Irretrievable Commitments

Section 15126.2 of the CEQA Guidelines states that an EIR should discuss significant irreversible environmental changes from the project or any irreversible damage from any environmental accidents associated with the project. The EIR should also evaluate any irretrievable commitments of resources, which are those that cause either direct or indirect use of natural resources such that the resources cannot be restored or returned to their original condition. For example, the extirpation of a species from an area is an irreversible commitment.

Types of resources generally considered in an irretrievable or irreversible commitment of resources analysis includes resources like fossil fuels, natural gas, minerals, or timber. As described in **Chapter 2.0, Project Description**, the Dry Creek Project would involve the construction of habitat features along five miles of the Dry Creek riparian corridor. The habitat features would require importing numerous large logs as materials used in the habitat features. Although designs change based upon the habitat features that are suitable at each site, the Water Agency's Dry Creek Habitat Enhancement Demonstration Project (Mile 1) required approximately 1,500 large logs for habitat feature construction.

For the logs used, assuming a length of 30-feet per log and a diameter of 20-inches, the number of logs used for the Demonstration Project was approximately 720,000 board-feet of material. In 2014, approximately 13,400 million board feet of timber was harvested in Sonoma County (CSBE 2014). The 720,000 board-feet utilized in the Demonstration Project represents approximately 0.005% of the 2014 Sonoma County timber harvest; therefore, proposed habitat enhancement projects for the Dry Creek Project would not represent a significant irretrievable and irreversible commitment of timber resources.

On the contrary, the proposed habitat features are directly intended to provide habitat for endangered coho salmon and threatened steelhead. Without habitat efforts, as well as other ongoing efforts in the region to support these species, the region could see a continued decline or loss entirely of these species from the region. As noted above, the loss or extirpation of a species from an area is an irreversible commitment of a resource.

5.4 References

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CHAPTER 6 Alternatives Analysis

6.1 Introduction

The California Environmental Quality Act (CEQA) requires that an Environmental Impact Report (EIR) describe and evaluate a range of reasonable alternatives to a project or to the location of a project, which would feasibly attain most of the basic project objectives (see **Chapter 1, Introduction**) and avoid or substantially lessen significant project impacts. The basic objective of the Dry Creek Habitat Enhancement Project, Miles 2–6 (Dry Creek Project or proposed project) is to provide habitat in Dry Creek for threatened and endangered fish in order to comply with National Marine Fisheries Service’s (NMFS) Russina River Biological Opinion (Biological Opinion) while allowing the Water Agency to maintain its ability to deliver water to its customers.

This chapter describes the development of the Dry Creek Project project alternatives, presents the project alternatives, evaluates the alternatives for consistency with stated project objectives, and summarizes and compares the environmental impacts and economic feasibility of the alternatives, in order to make recommendations on the environmentally superior alternative.

The CEQA Guidelines set forth the following criteria for selecting alternatives:

1. “. . . [T]he discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly.” §15126.6(b)
2. “The range of potential alternatives shall include those that could feasibly accomplish most of the basic purposes of the project and could avoid or substantially lessen one or more of the significant effects.” §15126.6(c)
3. “The specific alternative of ‘no project’ shall also be evaluated along with its impacts.” §15126.6(e)(1)
4. “The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project. Of those alternatives, the EIR need examine in detail only the ones that the lead agency determines could meet most of the basic objectives of the project. The range of feasible alternatives shall be selected and discussed in a manner to foster meaningful public participation and informed decision making.” §15126.6(f)

In general, there are two types of alternatives that may be reviewed in an EIR: (1) alternatives *to* the project that are other projects entirely, or other approaches to achieving the project objectives rather than the project or modified project; and (2)

alternatives of the project that include modified project components, such as alternative project sites or processes and/or modified facilities, layout, size, and scale. This chapter evaluates both types of alternatives in order to develop a reasonable range of alternatives for evaluation in this EIR and describes the alternatives of the project that were carried forward for further analysis. This chapter also describes alternatives to the project that were not discussed further and the reasons for which they were not carried forward for analysis.

6.2 National Marine Fisheries Service's Russian River Biological Opinion

The NMFS Biological Opinion (described in detail in **Chapter 1.0, Introduction**) mandates the Sonoma County Water Agency (Water Agency) and United States Army Corps of Engineers (USACE) to implement a series of actions [identified as Reasonable and Prudent Alternatives (RPAs)] to modify existing water supply and flood control activities to mitigate or remove the effects of ongoing Water Agency and USACE operations on endangered coho salmon and threatened steelhead in the region.

One of these RPAs requires six miles of Dry Creek habitat enhancements downstream of Warm Springs Dam to create both winter and summer rearing habitats for juvenile steelhead and coho salmon, with an emphasis on improving habitats for the survival of juvenile coho salmon while reducing the velocities of flows. The six miles of enhancements are to be distributed over the 14 miles, implemented at a minimum of eight locations on Dry Creek (NMFS 2008).

The six miles of habitat enhancements will emphasize natural stream characteristics, or geomorphology, which refers to the manner in which water and sediment combine to create habitat features friendly to fish. By using enhancement practices that emulate natural geomorphic conditions, the benefits provided to young coho salmon and steelhead and their longevity are optimized. Enhancement techniques such as streambank stabilization, backwater channels, alcoves and ponds, side channels, log jams, pool enhancement, riffle construction, and riparian vegetation management, are critical components in producing high quality coho salmon and steelhead habitat. Success of these enhancement practices are determined through monitoring activities such as fish surveys, stream profile and cross-section measurements, vegetation surveys, wildlife surveys, and photo documentation of structures.

The Biological Opinion requires the Water Agency to enhance salmonid rearing habitat in Dry Creek using a phased approach to construction to allow for evaluation of the effectiveness of the enhancements as the effort progresses. The five phased approach includes:

1. Two years of conceptual project design and planning (2009-2010);
2. Two years for project review, permitting, and pre-monitoring (2011-2012);
3. Two years of initial construction of at least one mile of modified stream channel (2013-2014).
4. Two years of construction (years 8 and 9 covered by the Russian River Biological Opinion) of an additional two miles of modified stream channel (2016-2017).
5. Two years of construction (years 11 and 12 covered by the Russian River Biological Opinion) of an additional three miles of modified stream channel (2019-2020).

The Water Agency began construction in of the Dry Creek Habitat Enhancement Demonstration Project (Demonstration Project, Item 3 above) in 2012. Construction activities continued in 2013 and were completed in November 2014. In 2013, the USACE completed construction of a Dry Creek Habitat Enhancement Project (Reach 15) in Reach 15 of Dry Creek immediately below Warm Springs Dam. Together, the Water Agency's Demonstration Project and the USACE's Reach 15 Project comprise just over the first mile of modified stream channel work to improve habitat for listed salmonid species in Dry Creek.

Miles 2-6 of habitat enhancement in Dry Creek consist of construction of two additional miles of habitat enhancements by 2017 (Item 4 above) and three additional miles of habitat enhancements by 2020 (Item 5 above). These are the subject of the Dry Creek Project evaluated in this document. The potential impacts of Miles 2 and 3 habitat components, which are to be constructed by the end of 2017, are evaluated on a project-specific basis in this EIR because specific locations of potential sites for habitat projects that make up the work for these miles have been identified. The potential impacts of Miles 4-6, which do not yet have specific potential site locations narrowed down, are evaluated on a programmatic basis in this EIR.

The completed Demonstration Project and Reach 15 projects appear to be successfully functioning as high quality habitat. However, future designs for habitat enhancements may be modified as effectiveness monitoring provides information regarding the quality of habitat provided during previous phases of the project. This refinement of project designs, referred to as adaptive management, will direct future Water Agency design efforts. Once Mile 2 and 3 are constructed, the success at providing high quality habitat for coho salmon and steelhead would be evaluated by the Water Agency, NMFS and California Department of Fish and Wildlife. If the habitat construction is determined to have successfully created high quality coho salmon and steelhead habitat, then Miles 4-6 of habitat enhancement projects would be constructed (for a total of six miles of habitat).

The Biological Opinion identifies an alternative stipulation following construction of a total of three miles of habitat enhancement along Dry Creek. If monitoring shows that the habitat enhancement projects have not resulted in the creation of the expected features necessary for high quality coho salmon and steelhead habitat, then the Water Agency is to proceed with implementing a bypass pipeline between Warm Springs Dam and the Russian River to alleviate the need for high flows in Dry Creek for water supply purposes. In the event that habitat enhancement in Dry Creek does not provide the necessary high quality salmonid habitat, the Water Agency would be required to prepare additional environmental documentation before approving and constructing a Dry Creek bypass pipeline. This EIR will consider the Dry Creek bypass pipeline as a future alternative identified but not considered further because the Biological Opinion requires that Miles 2 and 3 of habitat enhancement be constructed before a decision is made regarding a bypass pipeline.

6.3 Alternatives Development

6.3.1 Russian River Biological Opinion

The Biological Opinion offers specific criteria with respect to desired main channel rearing habitat characteristics and stresses the availability of off-channel habitats in low velocity areas with substantial cover. Enhancement techniques should consider log or rock weirs, deflectors, log jams, constructed alcoves, side channels, backwaters, and dam pools that have successfully increased the quantity and quality of summer and winter rearing habitat for coho salmon and steelhead (NMFS 2008).

Because of the Biological Opinion's habitat enhancement criteria, alternatives to the proposed project are exclusively limited to locations within Dry Creek below Warm Springs Dam. Alternative locations, such as tributaries to Dry Creek or the Russian River, would not meet the requirements of the Biological Opinion.

As mentioned above, the Biological Opinion identifies an alternative stipulation following construction of a total of three miles of habitat enhancement along Dry Creek. If monitoring shows that the habitat enhancement projects have not resulted in the creation of the expected features necessary for high quality coho salmon and steelhead habitat, then the Water Agency is to proceed with implementing a bypass pipeline between Warm Springs Dam and the Russian River to alleviate the need for high flows in Dry Creek for water supply purposes. In this scenario, the Water Agency would be required to prepare additional environmental documentation before approving and constructing a Dry Creek bypass pipeline.

6.3.2 Dry Creek Habitat Enhancement Design Process

As part of the Dry Creek habitat enhancement design process, studies were completed to identify existing habitat conditions in Dry Creek, evaluate potential habitat enhancement opportunities, and conceptual habitat designs. Three reports were prepared: a current conditions inventory, a feasibility study, and a conceptual design report.

The Dry Creek Current Conditions Inventory Report (Current Conditions Inventory) (Inter-Fluve 2010) identifies existing habitats and areas with potential for habitat restoration within the 14 miles of Dry Creek between its confluence with the Russian River and Warm Springs Dam. Numerous areas for potential habitat enhancement were identified for a range of habitat enhancement techniques, including bank stabilization, creation of alcoves/ponds/backwaters, installation of large woody debris, enhancing pools, and creating riffles.

The Dry Creek Fish Habitat Enhancement Feasibility Study (Feasibility Study) (Inter-Fluve 2012) was conducted on the entire 14 miles of Dry Creek from its confluence with the Russian River to Warm Springs Dam. This study, determined which areas of Dry Creek are candidates for habitat enhancement and evaluated the feasibility of designing projects that provide habitat enhancement while also evaluating construction feasibility considerations.

The Dry Creek Fish Habitat Enhancement Conceptual Design Report (Conceptual Design Report) (Inter-Fluve 2012) was used to identify potential habitat enhancement locations along 25 enhancement subreaches within the entire 14 miles of Dry Creek. These sites were ranked in the Conceptual Design Report by their potential for providing a habitat benefit for coho salmon. In order to summarize potential habitat benefits to assist with site ranking, three evaluation metrics were assessed for each of the enhancement subreaches. These metrics are based on 1) potential summer coho salmon rearing habitat, 2) incremental winter rearing and refugia habitat, and 3) total potential enhanced habitat. Following application of the metrics, the enhancement subreaches were further organized into Tier 1 and Tier 2 within each study reach segment (lower, middle and upper), the Tier 1 sites being those that have a higher potential habitat benefit than the Tier 2 areas. Over the three study reach segments, the ranking phase resulted in a total of 16 Tier 1 enhancement subreaches (out of 25 total).

6.3.3 Selection of Habitat Enhancement Site Locations

The process of alternative habitat enhancement site selection began with evaluating all potential areas within Dry Creek through the Conceptual Design Report. Water Agency staff began outreach to property owner's of sites that were identified as Tier 1 sites with high potential for habitat benefits. Those sites that were listed as Tier 1 and had landowners that were willing to allow access for further evaluation were selected as

potential Mile 2-3 sites. Eventual site selection is an ongoing process that will continue over the next several years as the Water Agency and its partners identify opportunities to implement habitat enhancement to meet the requirements of the Biological Opinion. A similar site selection process will continue as the project moves into the Mile 4-6 phase. As part of the site selection process, the results of the ranking phase from the Conceptual Design Report is evaluated alongside other critical factors such as access, cost, and overall distribution along Dry Creek.

Provided below are summary descriptions of the feasible alternatives which meet the basic project objectives and were carried forward for further analysis. **Section 6.4, Alternatives Identified but Not Considered Further**, provides information related to other alternatives considered and the rationale for eliminating them from further consideration.

6.4 Alternatives Identified but Not Considered Further

According to CEQA Section 15126.6(f)(3), an EIR need not consider alternatives for which the effects cannot be reasonably determined and for which implementation is remote and speculative. This section describes three projects that are potential alternatives to the proposed project. However, these potential alternatives either would not achieve the project objectives, or could incur new or more severe impacts than those associated with the proposed project. Therefore, these alternatives are not considered further.

Dry Creek Bypass Pipeline

The Biological Opinion includes a requirement after construction of a total of three miles of habitat enhancement along Dry Creek, that if monitoring shows that the habitat enhancement projects have not resulted in the creation of the expected features necessary for high quality coho salmon and steelhead habitat, then the Water Agency is to proceed with implementing a Dry Creek bypass pipeline to alleviate the need for high flows in Dry Creek for water supply purposes. Because the Biological Opinion requires the first three miles of habitat enhancements be implemented before a decision is made regarding a bypass pipeline, the bypass pipeline itself is not considered a direct alternative to habitat enhancement work. While this alternative would be able to meet a portion of the purpose of the proposed project of reducing velocities of flows in Dry Creek, it does not achieve the objectives of the proposed project to provide habitat enhancements that would create additional winter and summer rearing habitats for juvenile steelhead and coho salmon. If, after three miles of habitat enhancements are completed, it is determined that a bypass pipeline is needed, additional environmental impact analysis of constructing, operating, and maintaining a bypass pipeline would be

conducted at that time. A bypass pipeline alternative would likely result in new or more severe impacts than those associated with the proposed habitat enhancement project.

Reduced Minimum Instream Flows In Dry Creek

Reducing summertime minimum instream flows in Dry Creek to reduce velocities is similar to the Dry Creek Bypass Pipeline alternative as it may be able to meet a portion of the proposed project objective by reducing velocities in Dry Creek in order to improve juvenile salmonid rearing habitat. Reducing minimum instream flows could improve habitat conditions, but would not enhance or create new winter and summer rearing habitats; therefore it would not meet the basic objective of the proposed project. In addition, just reducing minimum instream flows to alleviate velocities in Dry Creek would be infeasible because this reduction in summertime releases from Warm Springs Dam would conflict with and impair the Water Agency's ability to maintain delivering water supply to its customers. Reducing instream minimum flows in Dry Creek to a level where velocities are low enough to provide suitable coho salmon rearing habitat would not allow for enough volume of water flowing down Dry Creek for the Water Agency to maintain water supply delivery to its customers.

Reduced Project Alternative

A "reduced project" alternative is a commonly analyzed type of project alternative that is intended to achieve project objectives while simultaneously avoiding or incrementally reducing the severity of significant impacts associated with a proposed project. For the Dry Creek Project, a reduced project alternative could either be decreasing the five miles of habitat enhancements or eliminating one or more of the specific techniques used for habitat enhancements. While a reduced project alternative that decreases the number of miles of habitat enhancement would create habitat and reduce velocities to some extent, it does not comply with the Biological Opinion nor achieve the proposed project objectives of creating five miles of winter and summer rearing habitats for juvenile steelhead and coho salmon.

6.5 Alternatives of the Project Analyzed in the EIR

The discussion of alternatives does not need to be exhaustive. The key issue is whether a reasonable range of alternatives is considered that could feasibly accomplish the basic objectives of the project and could avoid or substantially reduce its significant environmental impacts. Thus, the EIR provides decision-makers and the public with the mitigation measures and the feasible alternatives available to reduce or avoid those substantial adverse effects that would result from the proposed project. Based upon

their ability to meet the project objectives, the alternatives that were carried forward and analyzed in this EIR are described below.

No Project Alternative

The No Project Alternative assumes that the proposed project would not be constructed, which would result in the continued potential for the Water Agency's existing water supply operations to jeopardize the continued existence of and critical habitat for coho salmon and steelhead in Dry Creek. If the Dry Creek Project is not built, and the Water Agency continues its existing water supply operations, velocities in Dry Creek would remain too high for juvenile salmon in Dry Creek due to simplified habitats that do not provide velocity breaks or refugia. As such, the No Project Alternative would not meet the proposed project objective of enhancing winter and summer rearing habitats for juvenile steelhead and coho salmon while allowing the Water Agency to maintain its existing water supply functions. The No Project Alternative would also result in the Water Agency being out of compliance with the California and federal Endangered Species Acts by continuing to potentially jeopardize coho salmon and steelhead by not implementing the RPA for habitat enhancement in Dry Creek as identified in the Biological Opinion. Such non-compliance could result in the loss of the incidental take authority granted to the Water Agency by the Biological Opinion, potentially exposing the Water Agency to liability in the event its activities resulted in a "take" of listed species.

Dry Creek Habitat Enhancement Location Alternatives

In order to meet the objectives of the Biological Opinion, the habitat enhancement sites need to be located along Dry Creek between its confluence with the Russian River and Warm Springs Dam. Numerous interest areas for habitat enhancement were identified along the 14 miles of Dry Creek below Warm Springs Dam that would provide habitat potential and a range of different habitat enhancement techniques. These interest areas include the proposed locations for Miles 2 and 3 (evaluated on a project level) and locations for Miles 4 through 6 (evaluated on a programmatic level), and future alternative locations. All of the interest areas have similar environmental impacts as the proposed project sites.

Project locations for Miles 2 and 3 were selected based on habitat potential and if access to the properties was granted by landowners for site evaluation and design development as described above in **Section 6.3** of this chapter. For Miles 4 through 6, a similar selection process will be conducted from the remaining interest areas that have not been enhanced to determine project locations and alternatives.

All of the interest areas have habitat potential and have similar environmental impacts. The only difference between the proposed project sites and project location alternative

sites is that access to the properties was granted by landowners for site evaluation and design development for the proposed project sites.

6.6 Alternatives Analysis

In accordance with the CEQA Guidelines, the alternatives considered in this EIR include those that: 1) could feasibly accomplish most of the basic objectives of the project, and; 2) could avoid or substantially lessen one or more of the significant effects of the project. To provide the appropriate context for this alternatives analysis, the project objectives and key significant effects are summarized below.

Project Purpose and Objectives

The purpose of the Dry Creek Project is to provide habitat in Dry Creek for threatened and endangered coho salmon and steelhead in order to comply with NMFS' Biological Opinion. NMFS concluded in the Biological Opinion that the continued operations of Coyote Valley Dam and Warm Springs Dam by the USACE and the Water Agency in a manner similar to recent historic practices, together with the Water Agency's stream channel maintenance activities and estuary management, are likely to jeopardize and adversely modify critical habitat for endangered coho salmon and threatened steelhead.

The objectives for the Dry Creek Habitat Enhancement Project, Miles 2-6 are to :

- Enhance summer rearing habitat for juvenile coho salmon and steelhead to 'near-ideal' conditions;
- Create refugia from winter high-flow releases for coho salmon and steelhead;
- Enhance habitat, and to the extent feasible, minimize impacts on private property and infrastructure; and
- Enhance habitat without adversely affecting Chinook salmon habitat.
- Enhance habitat without adversely affecting the Water Agency's ability to meet water supply demands.

Significant Effects

Chapter 3.0, Environmental Setting, Impacts, and Mitigation Measures, presents the impact analysis for the Dry Creek Habitat Enhancement Project, Miles 2-6. Based on the analysis presented in Chapter 3.0, implementation of the proposed project would result in the following beneficial and significant, unavoidable impacts:

Beneficial

1. Fish Habitat Enhancements. Dry Creek habitat enhancements would create both winter and summer rearing habitats for juvenile steelhead and coho salmon, with an emphasis on improving habitats for the survival of juvenile coho salmon.

2. Benefits to other aquatic and riparian species. Dry Creek habitat enhancements that increase usable aquatic habitat within the Dry Creek corridor would also benefit other species that utilize these habitats (such as other fish species, turtles, frogs, birds, riparian plants).
3. Benefits to land conservation plans. The Dry Creek habitat enhancements would be consistent with existing coho salmon recovery plans as well as the Russian River Biological Opinion.

Significant and Unavoidable

Based on the analysis presented in **Chapter 3.0**, environmental impacts associated with noise generated during construction of the habitat enhancement features would be significant and unavoidable, even with implementation of feasible mitigation measures.

Implementation of the proposed project could result in potentially significant short-term construction-related impacts associated with construction and maintenance of the habitat enhancement features in the following areas: aesthetics, biological, cultural, fisheries, geology, hydrology, land use, and traffic. These impacts would be reduced to a less-than-significant level by mitigation measures listed in **Chapter 3.0**.

6.7 Summary of Comparison of Project Alternatives

The following analysis examines each of the proposed alternatives (i.e., No Project Alternative and Dry Creek Habitat Enhancement Alternatives) for their ability to meet the stated project objectives and their ability to reduce or avoid potential impacts. A summary of the various advantages and disadvantages associated with each alternative is included below.

No Project Alternative

Under the No Project Alternative, the Water Agency's existing water supply operations would potentially jeopardize the continued existence of coho salmon and steelhead and their critical habitat in Dry Creek. In considering existing conditions under a "no project scenario," this could result in the Water Agency becoming out of compliance with the Biological Opinion. Such non-compliance could result in the loss of the incidental take authority granted to the Water Agency by the Biological Opinion, potentially exposing the Water Agency to liability in the event its activities resulted in a "take" of listed species. The No Project Alternative would not have the significant and unavoidable noise impact of the Proposed Project identified above in **Section 6.6**. However, the No Project Alternative would not have the beneficial impacts of the Proposed Project also identified above in **Section 6.6**.

Ability to Meet Project Objectives

As noted in **Section 6.5** of this chapter, the No Project Alternative would not achieve the project objectives. As such, the No Project Alternative would not meet the proposed project objective of enhancing winter and summer rearing habitats for juvenile steelhead and coho salmon. The No Project Alternative would also result in the Water Agency being out of compliance with the California and Federal Endangered Species Acts by continuing to potentially jeopardize coho salmon and steelhead by not implementing the RPA for habitat enhancement in Dry Creek as identified in the Biological Opinion. Such non-compliance could result in the loss of the incidental take authority granted to the Water Agency by the Biological Opinion, potentially exposing the Water Agency to liability in the event its activities resulted in a “take” of listed species.

Environmental Effects

Short-term Effects

Implementation of the No Project Alternative would avoid short-term construction-related impacts associated with of the creation of habitat enhancements.

Long-Term Effects

Implementation of the No Project Alternative would result in the continuation of current conditions within Dry Creek, which have been found to be detrimental to state and federally listed salmonids, and could result in the Water Agency being out of compliance with the mandates of the Biological Opinion and State consistency determination to implement habitat enhancement in Dry Creek in accordance with the Biological Opinion. Such non-compliance could result in the loss of the incidental take authority granted to the Water Agency by the Biological Opinion, potentially exposing the Water Agency to liability in the event its activities resulted in a “take” of listed species. Implementation of the No Project Alternative would not enhance winter and summer rearing habitats for juvenile steelhead and coho salmon. As such, implementation of the No Project Alternative would not meet project objectives related to the enhancement of winter and summer rearing habitats for juvenile steelhead and coho salmon within Dry Creek.

Dry Creek Habitat Enhancement Location Alternatives

Ability to Meet Project Objectives

As noted in **Sections 6.3** and **6.5** of this chapter, the Dry Creek Habitat Enhancement Location Alternatives would achieve the project objectives like the proposed project, which are directed at improving salmonid habitat to create both winter and summer rearing habitats for juvenile steelhead and coho salmon, with an emphasis on improving habitats for the survival of juvenile coho salmon, while allowing the Water Agency to maintain its ability to deliver water to its customers. The only difference between the proposed project sites and the project location alternative sites is that access to the

properties was not granted by landowners for site evaluation and design development for the location alternative sites. The Dry Creek Habitat Enhancement Location Alternatives would have similar beneficial and significant and unavoidable impacts as described above in Section 6.6 for the proposed Dry Creek Project. The Dry Creek Habitat Enhancement Location Alternatives would have the additional impact of forcing unwilling landowners to be involved with the habitat enhancement efforts.

Environmental Effects

Short-term Effects

Implementation of the Dry Creek Habitat Enhancement Location Alternatives would have similar short-term construction-related impacts associated with the creation of habitat enhancements identified for the proposed project associated with construction and maintenance of the habitat enhancement features in the following areas: aesthetics, biological, cultural, fisheries, geology, hydrology, land use, and traffic. These impacts would be reduced to a less-than-significant level by mitigation measures listed in **Chapter 3.0**.

Long-Term Effects

Dry Creek Habitat Enhancement Location Alternatives would benefit fisheries, aquatic and other riparian species by increasing suitable areas and providing vegetative cover and winter and summer rearing areas. The Dry Creek Habitat Enhancement Location Alternatives would also be consistent with existing coho salmon recovery plans as well as the Russian River Biological Opinion.

6.8 Environmentally Superior Project Alternative

The lead agency is not required by CEQA to adopt an environmentally superior alternative that will not feasibly attain project objectives or reduce environmental effects. In the process of selecting the environmentally superior alternative, CEQA requires that a lead agency demonstrate why a project or an alternative is selected.

The Dry Creek Project was selected as the environmentally superior alternative because it achieves the project objectives of enhancing habitat to create winter and summer rearing habitats for juvenile steelhead and coho salmon, with an emphasis on improving habitats for the survival of juvenile coho salmon while allowing the Water Agency to maintain its ability to deliver water to its customers.

In determining the environmentally superior project alternative, the Water Agency compared the environmental impacts of each alternative. Given the uniform nature of the riparian corridor along Dry Creek, the physical location of the habitat sites do not result in significantly different impacts to construct, operate, or maintain; however, as

noted for the Conceptual Design Report, different sites have different potential habitat benefits. In addition, a critical component of the selected Water Agency's habitat sites are that they are only on properties with willing landowners where the habitat enhancements mesh well with the landowners vision for the use of their land. Therefore, the proposed project is the environmentally superior project because it best meets the project objectives and the enhancement sites are only proposed on properties with willing landowners.

The Dry Creek Habitat Enhancement Location Alternatives would achieve the project objectives of enhancing five miles of habitat to create winter and summer rearing habitats for juvenile steelhead and coho salmon, with an emphasis on improving habitats for the survival of juvenile coho salmon while allowing the Water Agency to maintain its ability to deliver water to its customers. In addition, the Dry Creek Habitat Enhancement Location Alternatives would comply with the Biological Opinion. However the Dry Creek Habitat Enhancement Location Alternatives would not reduce environmental effects as impacts of construction, operation, and maintenance are similar to the proposed project, but they are at locations where no permission to access the properties was granted by landowners for site evaluation and design development. Therefore, the Dry Creek Habitat Enhancement Location Alternatives is not considered the environmentally superior project alternative.

A No Project Alternative would not achieve the objectives of enhancing five miles of habitat to create winter and summer rearing habitats for juvenile steelhead and coho salmon. In addition, the Reduced Project Alternative would not would not comply with the Biological Opinion. Therefore, a No Project Alternative is not considered environmentally superior.

6.9 References

Inter-Fluve 2010. Final Current Conditions Report, Dry Creek from Warm Springs Dam to the Confluence with the Russian River. Prepared for the Sonoma County Water Agency. December.

Inter-Fluve 2012. Final Habitat Enhancement Feasibility Study Report, Dry Creek from Warm Springs Dam to the Confluence with the Russian River. Prepared for the Sonoma County Water Agency. July.

Inter-Fluve 2012. Final Dry Creek Fish Habitat Enhancement: Conceptual Design Report: Dry Creek: Warm Springs Dam to the Russian River Sonoma County, CA. Prepared for the Sonoma County Water Agency. July.

NMFS 2008. Biological Opinion for Water Supply, Flood Control Operations, and Channel Maintenance conducted by the U.S. Army Corps Of Engineers, the Sonoma County Water Agency, and the Mendocino County Russian River Flood Control and Water Conservation Improvement District in the Russian River watershed. Southwest Region. September 24.

Chapter 7 Glossary and Acronyms

DEFINITION OF TERMS

Adjudicate – to study and settle a dispute or conflict by judicial procedure.

Adobe – a brick or building material comprised of dried mud and straw.

Aesthetic – a sense of perception that may be visually pleasing.

Agency – Sonoma County Water Agency

Aggregate – clean, broken rock used for preparation of concrete and as base materials for structures.

Algae – aquatic, non-vascular plants, such as seaweed or pond scum.

Alluvial fan deposits – a geologic composition, of the Holocene age (10,500 years ago) and the Pleistocene age (10,500 years to 2 million years ago), blanketing the northern and central Sonoma Valley, composed of interbedded sand, silt, clay, and gravel.

Alluvium – relating to, composed of, or found in clay, silt, sand or gravel that has been deposited by running water.

Anadromous – relating to any species of fish that lives in the ocean as an adult, and returns to freshwater in order to spawn, or lay eggs, such as Chinook and Coho salmon.

Andesitic lava flow – lava flow composed of fine-grained igneous rock often associated with mountain-building processes.

Anode – an electrode through which conventional current flows into a polarized electrical device. Typically, the positive terminal of an electrolytic cell.

Anoxic – without oxygen; anoxic water is water that contains no dissolved oxygen.

Anthropogenic – effects derived from human activities.

Appurtenance – referring to an accessory of something else.

Aquifer – a water-bearing layer of permeable rock, sand, or gravel.

Auger – a tool used to dig holes and tunnels in soil.

Awl – a tool used for digging; Native American tool for digging made out of bone or stone.

Backfill – the process of filling trenches after the pipeline has been placed within it.

Basaltic lava flow – lava flow composed of fine-grained igneous rock dominated by dark-colored minerals.

Basin Plan – Water Quality Control Plan for the North Coast.

Bathtub ring – as a reservoir's water level drops, an unvegetated band of soil is exposed around the perimeter of the lake.

Bedding planes – a collective term used to signify layers or beds of sedimentary rock.

Bedload – particles of sand, gravel, or soil carried by the natural flow of a stream on or immediately above its bed.

Berm – a mound or wall of earth.

Biogenic – greenhouse gasses from biogenic sources are those that result from biological activity.

Biotic – caused or produced by living beings.

Board – Sonoma County Board of Supervisors.

Booster pump station – necessary to increase water pressure and/or move water to areas of higher elevation.

Breaching – the act of creating an opening in a barrier, such as a levee or sand bar, that allows a river to flow freely.

Buildout – the complete development of an area's adopted land use designation.

Caisson – a watertight well casing used in Ranney collectors.

Caltrans – California Department of Transportation

Capability class – used to describe soils. Roman numerals ranging from I – VIII indicate progressively limited uses for agriculture.

Catalytic oxidizer – oxidizes (burns) carbon monoxide and hydrocarbons thereby reducing toxic tailpipe emissions.

Cathodic protection – a series of metal anodes attached to a pipeline at intervals along the transmission system to prevent corrosion of the pipe.

Caustic soda – sodium hydroxide (NaOH) is used to raise pH in treated water to reduce corrosion in pipes.

Cementation – one of the processes that turns sediment into sedimentary rock.

Chaparral – an ecological community comprised of shrubby plants and bushes.

Check-dam – a small dam designed to retard the flow of water and sediment in a channel, used especially for controlling soil erosion.

Chinook – *Oncorhynchus tshawytscha*, Chinook salmon. Listed as threatened under the federal Endangered Species Act.

Claystone – sedimentary rock composed primarily of clay-sized particles.

Coho – *Oncorhynchus kisutch*, California Coho salmon. Listed as endangered under federal and California Endangered Species Acts.

Coliform – relating to the colon bacillus bacteria; used as an indicator of sewage contamination in water.

Confluence – the flowing together of two or more streams to form a larger stream or river.

Conservation easement – permanent recorded deed restriction transferring certain development rights from a willing landowner to an easement holder for the intention of resource protection.

Correction capacitor – a device that regulates electrical current making the flow of electricity steady as opposed to fluctuating.

Cover – vegetation along streambeds, or in lakes, that protects fish from predators.

Culvert – a drain or sewer that crosses under a road or embankment, often utilizing a large corrugated pipe.

Cumulative Scenario 1 – Assumes that current Decision 1610 flows, and current Potter Valley Project flows, remain in effect.

Cumulative Scenario 2 – Assumes that Decision 1610 has been modified to reflect the reduced flows proposed in the Flow Proposal submitted to National Marine Fisheries Service as part of the Endangered Species Act Section 7: consultation Biological Assessment, and that current Potter Valley Project flows remain in effect.

Decibel – a unit measurement for expressing relative intensity of sound.

Decision 1610 – State Water Resources Control Board’s 1986 decision establishing minimum instream flow requirements for Dry Creek and the Russian River.

Denil fishway – a short, relatively steep fish ladder with baffles placed at an angle less than 90 degrees in relation to the slope of flow down the ladder. The baffle dissipates energy and provides a solid column of water in which the fish can migrate upstream.

Desalination – the separation of water from dissolved impurities whereby nearly pure water is recovered from source water such as seawater, brackish water or wastewater.

Disorientation – losing a sense of direction and causing an interruption in the migration of fish upstream or downstream.

Dissolved Oxygen – oxygen present in water.

Diverse Ag – land use designation given to agricultural lands where small parcels and part-time farming are predominant.

Drainage – the geographical area that a river and its tributaries drain.

Drop structure – any erosion control device or structure that prevents erosion of the streambed upstream and downstream of the drop structure.

Ecotone – the zone of transition between two ecological systems.

Effluent – outflow from a wastewater treatment plant after completion of the treatment process.

Elasticity – refers to the extent to which a material recovers from a deforming force.

Embayment – bay or bay-like formation.

Embryonic – referring to the early stage of development.

Environmental impact – beneficial or negative change in the environment as a result of an organizations activities. See also “Significance criteria”.

Ephemeral creek or stream – flows only during, and for short periods following, precipitation.

Erosion – the process of removal of material, such as soil or rock, by water, wind, or ice.

Estuary – the area at the mouth of a river, where it meets the sea, and salt and fresh water mix to form brackish water.

Ethnobotanical – referring to the plant lore of a race or people.

Evapotranspiration – the loss of water from the soil by both evaporation and the transpiration of plants.

Fallow – cultivated land that is allowed to lie idle during the growing season.

Feral – referring to being wild, and not domesticated or cultivated.

Fish ladder – a passageway which allows fish to navigate around barriers, such as dams.

Fledgling – a young bird.

Flip bucket – an area of a dam over which released water flows in order to oxygenate the water before it enters a stream.

Fluvial deposits – river-produced deposits.

Fly ash – finely divided residue created as a by-product of coal-fired electric generating plants.

Forbs – small broadleaf herbaceous plants.

Frequency – the number of sound waves per second produced by a sounding body.

Friable – refers to the ease of crumbling of soils.

Fugitive dust – dust generated from open sources such as unpaved roads and heavy construction.

General Plan – an adopted city or county-wide set of policies designed to guide growth, development, and conservation of resources.

General Vallejo – General Mariano Guadalupe Vallejo. 1808–1890. Instrumental in the colonization of Alta California.

Geologic formation – a large mass of rock with distinct characteristics.

Geomorphology – the study of landforms and the processes that shape them.

Geotextile fabric – a synthetic fabric often used to stabilize slopes and prevent erosion.

Glide – a slowly flowing reach of a stream, usually broad and even in depth, with little surface agitation. May appear to be a flooded riffle. Substrate is usually covered by water.

Grade control structures, weirs and sills – constructed of rock, concrete or other materials placed in the bed of a waterway to prevent the streambed from downgrading.

Gravel transport – the act of gravel washing downstream by the force of river currents.

Greenhouse gases – primarily carbon dioxide and methane, allow sunlight to enter the atmosphere freely. When sunlight strikes the Earth's surface, some of it is reflected back towards space as infrared radiation (heat), but greenhouse gases absorb this infrared radiation and trap the heat in the atmosphere.

Greenstone – basaltic rock that was once solid deep-sea lava.

Greywacke – also called lithic sandstone. A variety of sandstone containing quartz, feldspar, and small rock fragments set in a matrix of clay-sized particles.

Grid – a network of conductors for distribution of electric power.

Groundwater – non-saline and saline water beneath the natural surface of the ground, may or may not flow through known and definite channels.

Groundwater Recharge – refers to the replenishing of underground water resources.

Grouted riprap – riprap, usually rock, with concrete grout placed in the spaces between rocks. Grouted riprap provides more rigid protection than loose rock, and is usually used in areas with higher water velocities.

Habitat – a site where a plant or animal lives and grows.

Hatchery – a facility for artificially spawning and rearing fish.

Headwaters – the source of a river, where it river originates.

Hertz – a unit of frequency equal to one cycle per second.

Heterogeneous – consisting of dissimilar ingredients.

Horsepower – a unit of power in the United States of America equal to 746 watts and nearly equivalent to the English gravitational unit of the same name that equals 550 foot-pounds of work per second.

Hummock – rounded or conical mounds within volcanic landslides or avalanche debris deposits.

Hydraulic – pertaining to water in motion.

Hydrocarbons – chemical compounds containing hydrogen and carbon. Most motor vehicles are powered by hydrocarbon based fuels.

Hydroelectric – pertaining to the production of electricity by waterpower.

Hydrogeologic – pertaining to the occurrence, distribution, character, and movement of subsurface water.

Hydrologic – pertaining to the properties and circulation of water.

Hydrology – the study of water in all its forms and from all its origins to all its destinations on earth.

Hydrophytic – pertaining to a plant that grows in a moist environment and requires large amounts of water for growth.

Hydroseeding – a method of seeding which involves spraying a layer of seeds and mulch mixed with water over a large area.

Igneous – crystalline or glassy rocks formed from the cooling and crystallizing of molten rock.

Impermeable – not permitting the passage of a fluid; non-porous.

Incubation – the period of time for the development of a fish within an egg before hatching.

Indurated – a very strongly cemented soil horizon.

In-fill – the development of vacant or underutilized urban parcels.

Infiltration ponds – ponds receiving diverted water from the river, for the purpose of augmenting recharge of the underground aquifer, improving radial collector well production.

Infrastructure – the basic framework of a system or organization.

Inorganic – being composed of matter other than that of plants or animals.

Invertebrate – any animal without a spine, such as insects.

Kilovolt – a unit of electrical potential equal to one thousand volts.

Kilowatt-hours – a unit of electrical energy equal to one thousand watts per hour.

Land extensive Ag – land use designation given to low yield agricultural lands meant to remain in agriculture permanently.

Leachate – refers to liquid waste which can spread into adjacent soil and water from landfills unless controlled.

Lead Agency – the California government agency that has the principal responsibility for carrying out or approving a project.

Liquefaction – takes place when loosely packed, water-logged sediments at or near the ground surface lose their strength in response to strong ground shaking (earthquakes).

Lithic scatter – a concentration of stone tools and flakes of stone left over from tool-making activity.

Macroinvertebrate – animals without a spine that live on rocks, logs, sediment, debris and aquatic plants during some period of their life. Includes crustaceans, mollusks, aquatic worms, and immature forms of aquatic insects.

Mainstem, of the Russian River – the entire river, excluding tributaries.

Mean – a measurement which is an average between the extremes.

Megawatt-hours – a unit of electrical energy equal to one million watts per hour.

Metabolism – the chemical process in living cells by which energy is provided for vital processes.

Metagraywacke – late proterozoic – 750 million years old. A metamorphosed medium- to coarse-grained, poorly-sorted gray sandstone.

Metamorphic rock – a pre-existing rock that has been altered since its formation by temperature, pressure or the chemical environment.

Micro-climate – the local, rather uniform climate of a specific place or habitat, compared with the climate of the entire area of which it is a part.

Midden site – a localized concentration of shells and other artifacts left behind by Native American inhabitants.

Middle reach, of the Russian River – between Fitch Mountain in Healdsburg and the Wohler Bridge in Forestville.

- Migration, of fish** – movement up or downstream as part of their natural life cycle.
- Minor collector** – a road which carries local traffic to the main traffic thoroughfare.
- Mitigation** – measures to rectify impacts by repairing, rehabilitating, or restoring the affected environment. Imposed as a condition of approval by the Lead Agency.
- Morphology** – the study of structure or form.
- Mouth of the river** – the area where the river ends and flows into the ocean.
- Mudflow** – a downhill movement of a mass of wet earth.
- Negative Declaration** – a written statement that briefly describes the reasons why a proposed project will *not* have a significant effect on the environment and, therefore, does not require an EIR.
- Nephelometric Turbidity Unit** – a measurement used to describe the turbidity of a liquid.
- Nongame** – referring to fish that are not economically important, or caught for sport.
- Null Zone** – an area in-stream where fresh and saline waters mix.
- 100 year flood plain** – an area of land that has a 1 percent chance in any given year of being inundated by a flood or is expected to be inundated once every 100 years.
- Ophiolite** – rock derived from oceanic crust and upper mantle material that has been pushed up onto continents.
- Organic** – of, or pertaining to being composed of plant or animal matter.
- Organism** – anything that is alive, such as an animal or plant.
- Outmigration** – the movement of juvenile fish downstream on their way to the ocean.
- Ozone** – O₃, an unstable blue gas with a pungent odor used as an oxidant, bleach, and water purifier, and to treat industrial wastes.
- Ozone precursors** – pollutants that react in the presence of sunlight to form ozone.
- Paleontological** – referring to the study of life during past geological periods.
- Particulate** – fine solid particles which remain individually dispersed in gases.
- Perennial** – pertaining to being present during all seasons of the year.
- Permeable** – a porous formation through which gases or liquids can flow.

Petroglyphs – images carved or engraved in rock. Usually associated with prehistoric peoples.

Photochemical – interactions between atoms, small molecules, and light.

Plate tectonics – global tectonics based on a model of the earth characterized by a small number of semi-rigid plates that float on the viscous underlayer in the mantle.

Plutonic rock – intrusive, formerly molten, rock masses crystallized from magma below the surface of the earth.

Point discharge – a specific identifiable site or source from which wastewater is discharged into a body of water.

Portaging – referring to the carrying of boats from one body of water to another or around obstacles.

Potable – being suitable for drinking.

Precipitation – any or all of the forms of water particles, whether liquid or solid, that fall from the atmosphere and reach the ground.

Primary arterial – a road which carries large traffic volumes over long distances.

Program level – exact locations or types of facilities are conceptual, and based on assumptions that may change, as environmental, engineering, and alternatives analyses proceed.

Project-level – detail is provided for activities or facilities that need to be implemented or constructed early on in a project. Some site-specific or "project level" impacts of construction will be included.

Public Works – Sonoma County Department of Transportation and Public Works.

Radial collector well – concrete caisson well with a 13–18ft. inside diameter, extending 80–100ft deep, with perforated horizontal intake pipes 6–18in. in diameter extending radially for 70–350ft.

Radiolarian chert – when the glasslike silica skeletons of microscopic ocean animals called radiolarians are deposited on the ocean floor, they create hard resistant layers of rock called chert.

Raptor – referring to a bird of prey.

Reaches – sections of a river or stream.

Reactive organic gases – organic compounds that lead to ozone formation.

Rearing – the development and growth of a juvenile into an adult.

Recycled water – municipal, industrial, or agricultural wastewater that goes to a wastewater treatment facility where advanced treatment processes are used to remove bacteria and pollutants. It can be reused for beneficial uses and to offset demands for potable water supplies.

Redd – a nest created in the streambed gravel where salmonids lay eggs.

Refugia – small isolated areas that have escaped extreme environmental changes undergone by the surrounding areas.

Responsible Agency – an agency, other than the Lead Agency, that also has a legal responsibility to carry out or approve a project.

Restoration plan – a plan to return the environment to its former condition.

Rhyolite – fine grained igneous rock composed of granite.

Riffles – a shallow area across a streambed over which water flows swiftly causing ripples to occur. Substrate is often partially exposed.

Riparian – pertaining to the banks of a stream, lake, reservoir, or other body of fresh water.

Riparian vegetation – plants which grow along the streambank.

Riprap – a layer of large, durable materials (usually rock) used to protect a streambank from erosion. May also refer to the materials themselves.

Riverine – living or situated on the banks of a river.

Roiling – to make a river or creek cloudy by stirring up sediment.

Ruderal – plant communities that occur in disturbed areas, such as along roadsides, trails, parking lots, etc.

Run – a swiftly flowing reach of a stream with little surface agitation. May appear to be a flooded riffle. Substrate is usually covered by water.

Rural residential – land use designation given to land where low density residential development takes precedence over agriculture.

Russian River Project – The Russian River Project includes storage of water at Lake Mendocino on the East Fork Russian River in Mendocino County and at Lake

Sonoma on Dry Creek in Sonoma County, diversion and rediversion facilities at Wohler and Mirabel Park in Sonoma County, and an aqueduct system to convey water from the Russian River to the service areas in southern Sonoma County and in Marin County.

Salmonid – any species of soft-rayed fish belonging to the salmon family, including trout and salmon.

Sandstone – a type of sedimentary rock formed by the cementation of sand-sized individual grains.

Savanna – a treeless plain composed mostly of grasses.

Schist – metamorphic rock generally created from fine-grained sedimentary rock. Different types of schist contain visible amounts of different minerals such as mica.

Seasonal wetland – areas that contain wetland species and are inundated with water during the rainy season but not during the dry season.

Sedentism – archaeological term indicating the transition of a society from a nomadic existence to permanent settlements.

Sedimentation – the settling out of suspended materials from the water column.

Seep – where fissures or breaks in the soil profile allow groundwater to seep toward the surface.

Seiche – a wave that oscillates in a bay, lake, or gulf as a result of seismic or atmospheric disturbance.

Seismic – the phenomena of earth movement, such as an earthquake.

Self-sustaining – being able to maintain the population of a species by natural reproduction, and in the case of fish, not by hatchery plantings.

Sensitive receptors – those people, or facilities, more easily impacted by adverse environmental changes, such as noise or air pollution, due to their nature, or the types of activities involved.

Sensitive species – biological resources for which protection is necessary because they are especially sensitive to change and the adverse effects of activities.

Seral or sere – a series of successional plant communities leading from bare ground to the climax community.

Serpentine – a metamorphic rock which is the alteration product of several types of ultrabasic rocks.

Shale – a fine–grained sedimentary rock made of silt– and clay–sized particles.

Shrink–swell – refers to the property of many clays to swell when wetted and shrink when dried.

Significance criteria – criteria used by the Lead Agency to determine at what level or “threshold” an impact would be considered significant. Includes factual or scientific information; regulatory standards of local, state, and federal agencies and /or guiding and implementing goals and policies identified in local plans.

- ***Less than Significant Level:*** level below which an impact would cause no substantial change in the environment (no mitigation required).
- ***Potentially Significant Impact:*** may cause a substantial change in the environment; however, it is not certain that effects would exceed specified significance criteria. For CEQA purposes, a potentially significant impact is treated as if it were a significant impact. Mitigation measures and/or project alternatives are identified to reduce project effects to the environment.
- ***Significant Impact:*** would cause a substantial adverse change in the physical conditions of the environment. Significant impacts are identified by the evaluation of effects using specified significance criteria. Mitigation measures and /or project alternatives are identified to reduce project effects to the environment.
- ***Significant and Unavoidable Impact:*** would result in a substantial change in the environment that cannot be avoided or mitigated to a less–than–significant level if the project is implemented.
- ***Cumulative Significant Impact:*** would result in a substantial change in the environment from effects of the project as well as surrounding projects and reasonable foreseeable development in the surrounding area. To be considered significant a project’s impact must be a cumulatively considerable contribution to a substantial change in the environment.

Siltation – the depositing of silt transported by water.

Siltstone – a sedimentary rock composed predominantly of silt–sized particles.

Slough – creek in a marsh or tide flat.

Slump – a type of landslide in which an area of rock breaks away along a curved surface and rotates more or less intact downslope.

Slurry – a free-flowing suspension of fine solid material in liquid that can be pumped.

Smolt – a juvenile salmonid which has physiologically adapted to live in seawater and is actively migrating to the ocean.

Soil creep – the slow episodic movement of unconsolidated earth materials.

Sonoma Volcanics – a geologic composition, of Pliocene age (2 to 7 million years ago), which underlies the mountains surrounding the Sonoma Valley, consisting of a thick sequence of lava flows with minor intrusive igneous rocks.

Spawn – the act of fish producing or depositing eggs and sperm.

Species at risk, special-status species, species of special concern – The California Department of Fish and Game has chosen to use its Special Animals List, which it maintains and updates within the California Natural Diversity Database. This list is also referred to as the list of "species at risk" or "special status species." Many of the special status species have been identified as species of special concern due to their low or declining numbers.

Spoils – soil and debris generated during excavation and trenching activities.

Standby – kept ready to serve as a substitute.

Steelhead trout – *Oncorhynchus mykiss*. Listed as threatened under the federal Endangered Species Act.

Step down – to lower the voltage by means of a transformer.

Stocked – a stream or lake that has hatchery-raised fish released into it.

Storie Index Rating – a rating used to measure the suitability of soil type for general intensive farming.

Stormwater – water that accumulates on land, roads, and roofs as a result of storms, as well as runoff from urban areas from washing cars, overwatering lawns, etc. Flows down storm drains directly into streams, rivers and lakes.

Strata – layers of sedimentary rock of one kind lying between beds of other kinds.

Subsidence – the settling of the earth's surface sometimes due to the excessive removal of groundwater.

Substrate – bottom material. In the case of a river, material such as gravel, found in a river bed.

Swale – a linear level-floored open depression excavated by wind or formed by the build-up of two adjacent ridges. A seasonal wetland with an outlet preventing water from ponding.

Tectonics – a branch of geology that deals with regional structural and deformational features of the earth's crust.

Telemetry – transmitting data by radio to a distant location.

Terrestrial – living on the land as opposed to in the water or air.

Thermal stratification in a reservoir – refers to a layer of warm above a layer of cold in a body of water such as a reservoir.

303(d) List – List of Impaired Waterbodies, EPA.

Topography – the natural surface features of a region.

Tributaries – smaller streams that flow into a larger stream, river or lake.

Trihalomethane – synthetic organic compounds that can form when chlorine combines with naturally occurring organic compounds. Trihalomethanes are a source of public health concern.

Tsunami – a tidal wave produced by earth movement on the ocean floor.

Tuff (Tuffaceous) – a rock formed by the compaction of small volcanic fragments (less than 4 mm in diameter).

Turbidity – a measurement of the clarity of water.

Turbine – a rotary engine actuated by the current of fluids.

Unincorporated area – an area of land that is not part of any municipality.

Upland areas – land situated outside wetland and riparian zones which relies solely on precipitation as its source of water.

Value-added – referring to a value (population, employment, water demands, etc.) which would be added in the future.

Vegetated Seep – area where surface water soaks into the ground.

Vegetated Swale – a constructed earthen channel, with vegetation planted inside, which is used to direct and filter storm water runoff.

Velocity – the time rate of the change in direction of a body; speed.

Vernal pool – seasonal wetlands forming in shallow depressions underlain by a shallow, relatively impermeable soil layer that restricts the downward movement of water.

Vested rights – guaranteed rights, such as the ownership of a portion of the river for specific uses.

Viability – capable of living, growing or developing; having life force.

Volcanic tuff – rock consolidated from volcanic ash.

Warmwater fish – fish that inhabit warm water areas, such as bass in reservoirs.

Wastewater – sewage, stormwater and water that has been used for various purposes in homes and businesses.

Water Project – Water Supply, Transmission, and Reliability Project (WSTRP).

Watershed – the entire geographical area which is drained by a river and its tributaries.

Weathering – refers to the decomposition of rocks. Chemical weathering results from a chemical change of the minerals in a rock. Mechanical weathering involves rocks physically breaking into fragments. Mechanical weathering may result from water in cracks expanding as it freezes or the expansion and contraction of minerals throughout the rock due to temperature.

Weir – small overflow type dam used to gradually raise the bed elevation of a river in steps. Often used to create passage for fish.

Well-sorted – refers to sedimentary rock or deposit with grains of about the same size.

Wetlands – land containing much soil moisture, such as tidal flats or swamps.

Wheeling – the process of renting electrical power lines to transfer power from a substation to other facilities.

Xeric – dry habitat.

ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
ABAG	Association of Bay Area Governments
ADFW	average dry weather flow
ADI	Area of Direct Impact
af	acre-feet
AFY	acre-feet per year
ALS	advanced life support
amsl	above mean sea level
APE	Areas of Potential Effect
ASA	Area of Sensitivity Assessment
AST	Above Ground Storage Tank
Basin Plan	North Coast Water Quality Control Plan
BA	Biological Assessment
BAAQMD	Bay Area Air Quality Management District
BEP	Business Emergency Plan
bgs	below ground surface
BLS	basic life support
BMPs	Best Management Practices
BOD	biochemical oxygen demand
CA FID	California Facility Inventory Database
CA WDS	California Waste Discharge System
CAA	Clean Air Act

CAAQS	California Ambient Air Quality Standards
Cal EPA	California Environmental Protection Agency
CAL FIRE	California Department of Forestry and Fire Protection
CalARP	California Accidental Release Prevention Program
California Register	California Register of Historical Resources
CalOSHA	California Occupational Safety and Health Administration
CalRecycle	Formerly Integrated Waste Management Board
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CBC	California Building Code
CC	California Coast
CCC	California Coastal Commission
CCR	California Code of Regulations
CDF	California Department of Forestry
CDFG	California Department of Fish and Game
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGS	California Geological Survey

CH ₄	methane
CHMIRS	California Hazardous Material Incident Report System
CHSC	California Health and Safety Code
CIP	Capital Improvements Program
CMP	Congestion Management Program
CNDDDB	California Natural Diversity Database
CNEL t Level	Community Noise Equivalent
CNPS	California Native Plant Society
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	CO ₂ equivalent
CSC	California Species of Special Concern
CTR	California Toxics Rule
CTS	California tiger salamander
CUPA	Certified Unified Program Agency
CUWCC	California Urban Water Conservation Council
CWA	Clean Water Act
cy	cubic yards
CZMA	Coastal Zone Management Act
dB	decibel
dBA	A-weighted decibels
dbh	diameter at breast height
DEIR	Draft Environmental Impact Report
DO	dissolved oxygen
DTSC	California Department of Toxic Substances Control

DWR	Department of Water Resources
EDR	Environmental Data Resources
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EMI	Emissions Inventory Data
EMS	Emergency Medical Services
EMT	Emergency Medical Technician
EPA	Environmental Protection Agency
ERNS	Emergency Response Notification System
ERP	Emergency Response Plan
ESA	Environmental Science Associates
FCWCD	Flood Control and Water Conservation District
FEMA	United States Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FESA	Federal Endangered Species Act
FHSZ	Fire Hazard Safety Zone
FINDS	Facility Index System
FMMP	Farmland Mapping and Monitoring Program
FMA	Flood Mitigation Assistance
FMP	Fisheries Management Plan
FPD	Fire Protection Department
FPP	Farmland Protection Program
FPPA	Farmland Protection Policy Act
FRHZ	Fault Rupture Hazard Zone
ft	feet

FTA	Federal Transit Administration
g	gravity
GHG	Greenhouse Gases
HazMat	Hazardous Material
HCP	Habitat Conservation Plan
HHW	higher high water
HIST UST	Historic Underground Storage Tank
HMBP	Hazardous Materials Business Plan
Hz	hertz
HWCL	Hazardous Waste Control Law
HWTS	Hazardous Waste Tracking System
IBC	International Building Code
ICBO	International Conference of Building Officials
ICC	International Code Council
IHA	Incidental Harassment Authorization
IPCC	Intergovernmental Panel on Climate Change
IRWMP	Integrated Regional Water Management Plan
km	kilometers
KOP	Key Observation Point
kV	kilovolt
kWh	kilowatt hours
LAFCO	Local Agency Formation Commission
LCP	Local Coast Plan
Ldn	day-night average noise level
Leq	equivalent sound level

Leq	energy-equivalent noise level
LESA	Land Evaluation and Site Assessment
lf	linear feet
Lmax	The instantaneous maximum noise level
Lmax	maximum noise level
LOS	Level of Service
LUST	leaking underground storage tank
M	Richter magnitude
M&I	municipal and industrial
MBTA	Migratory Bird Treaty Act
mg	milligrams
mg/L	milligrams per liter
mgd	million gallons per day
MHHW	mean higher high water
MLLW	mean lower low water
MLPA	Marine Life Protection Act
MMPA	Marine Mammal Protection Act
MMI	Modified Mercalli Intensity
MP	milepost
MPAs	Marine Protected Areas
mph	miles per hour
MPN	most probable number
MRZ	Mineral Resources Zone
MSDS	Material Safety Data Sheet
MSA	Magnuson-Stevens Fishery Conservation and Management Act

MSL	mean sea level
Mw	Moment magnitude
N2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
National Register	National Register of Historic Places
NBBR	Nesting Breeding Birds and Raptors
NCRWQCB	North Coast Regional Water Quality Control Board
NGVD	National Geodetic Vertical Datum of 1929
NHPA	National Historic Preservation Act
NIMS	National Incident Management System
NMFS	National Marine Fisheries Service
NO2	nitrogen dioxide
NOP	Notice of Preparation
NOx	Nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NPLt	National Priority Lis
NPPA	Native Plant Protection Act
NRCS	National Resource Conservation Service
NWIC	Northwest Information of the California Historical Resources Information System
O3	ozone
OEHHA	Office of Environmental Health Hazard Assessment
OES	California Office of Emergency Services
OHP	California Office of Historic Preservation

OHW	Ordinary high water
OPR	Office of Planning and Research
OSHA	Occupational Safety and Health Act
PADS	PCB Activity Database System
PCBs	Polychlorinated Biphenyls
PFMC	Pacific Fishery Management Council
PG&E	Pacific Gas & Electric Company
PGA	Peak ground acceleration
Plan	Sonoma Coast State Park General Plan and EIR
PM 10	Particulate matter < 10 microns
PM 2.5	Particulate matter < 2.5 microns
PM	particulate matter
POD	Pelagic Organism Decline
ppm	parts per million
ppt	parts per thousand
PPV	peak particle velocity
PRC	Public Resources Code
PRMD	Permit Resources Management Department
PSHA	probabilistic seismic hazard assessment
PVP	Potter Valley Project
PWA	Philip Williams & Associates, Ltd.
RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conservation and Recovery Information System
RECs	Recognized Environmental Conditions
RH	Plan Regional Haze Plan

RMP	Risk Management Plan
RMS	root mean square
RPA	Reasonable and Prudent Alternatives
RPM	Reasonable and Prudent Measures
ROG	Reactive organic gases
RRCSCBP	Russian River Coho Salmon Captive Broodstock Program
RRCSD	Russian River County Sanitation District
RRCWD	Russian River County Water District
RRU	Russian River Utility
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act
SB	Senate Bill
SCAPOSP	Sonoma County Agriculture Preservation and Open Space District
SCTA	Sonoma County Transportation Agency
SCWA	Sonoma County Water Agency
SCWMA	Sonoma County Waste Management Agency
SDC	Seismic Design Category
SF6	sulfur hexafluoride
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SLIC	Spills, Leaks, Investigation, and Cleanup
SMARA	Surface Mining and Reclamation Act
SMP	Stream Management Plan
SMR	state marine reserve

SO ₂	sulphur dioxide
SOI	Sphere of Influence
SOP	Standard Operating Procedures
SR	State Route
SRA	State Responsibility Areas
SSWD	Sweetwater Springs Water District
SVFRA	Sonoma Valley Fire and Rescue Authority
SWEEPS	Statewide Environmental Evaluation and Planning System
SWF/LF	Solid Waste Facilities/Landfill Sites
SWMP	Stormwater Management Plan
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	California State Water Resources Control Board
SWRCY	Recycling Facilities in California Database
T&E	Threatened and Endangered
TAC	toxic air contaminants
TDS	total dissolved solids
TMDL	Total Maximum Daily Load
TSCA	Toxic Substances Control Act
UBC	Uniform Building Code
UC	University of California
UGB	Urban Growth Boundary
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USDHS	United States Department of Health Services

USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
UV	Ultraviolet Light
VCP	Voluntary Cleanup Program
VdB	Decibel Notation
Water Agency	Sonoma County Water Agency
WDR	Waste Discharge Requirements
WDS	Waste Discharge System
WMI	Waste Management Incorporated
WMUDS/SWAT	Waste Management Unit Database System
WQCP	Water Quality Control Plans
WQOs	Water Quality Objectives
µg/m ³	Micrograms Per Cubic Meter
µS/cm	Microsiemens Per Centimeter

CHAPTER 8 List of Preparers

This draft EIR was prepared by the Sonoma County Water Agency under the direction of Grant Davis General Manager. The following individuals prepared the document or provided technical assistance or expertise.

Sonoma County Water Agency

Jessica Martini-Lamb, Environmental Resources Manager

David Manning, Environmental Resources Manager

David Cuneo, Principal Environmental Specialist

Neil Lassetre, Principal Environmental Specialist

Anne Crealock, Senior Environmental Specialist

Connie Barton, Senior Environmental Specialist

Jeff Church, Senior Environmental Specialist

Justin Smith, Senior Environmental Specialist

Yvette O'Keefe, Senior Environmental Specialist

Andrea Pecharich, Environmental Specialist

Ann DuBay, Principal Programs Specialist

Barry Dugan, Water Agency Programs Specialist

Carly Cabrera, Water Agency Programs Specialist

Pamela Kuhn, Water Agency Programs Specialist

Rebecca Simonson, Water Agency Engineer III

Heather Kelley, Senior GIS Technician

Sarah Wolf, Natural Resources Program Assistant

Consultants

Environmental Science Associates (ESA)

ESA Subconsultants

Prunuske Chatham, Inc.

Cramer Fish Sciences

A3GEO

Inter-Fluve, Inc

Inter-Fluve Subconsultants

Horizon Water and Environment

CBEC

RGH

Cinquini and Passarino

Tom Origer and Associates