CHAPTER 5.0
Cumulative Analysis

5.1 CEQA Analysis Requirements

The CEQA Guidelines require that EIRs discuss the cumulative impacts of a project when the project's incremental effect is "cumulatively considerable," meaning that the project's incremental effects are considerable when viewed in combination with the effects of past, current, and probable future projects.[1] The purpose of this analysis is to disclose significant cumulative impacts resulting from the Russian River Estuary Management Project (Estuary Management 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)). The CEQA Guidelines indicate that the discussion of cumulative impacts should include:

(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; and,

(4) Reasonable, feasible options for mitigating or avoiding the project's contribution to any significant cumulative effects.

The analysis of cumulative impacts in this chapter focuses on the impacts of implementation of the Estuary Management Project concurrent with past, present, and probable future projects producing related impacts. The projects include pending and/or approved projects as part of the Sonoma County Water Agency's (Water Agency) Russian River Instream Flow and Restoration (RRIFR) Program (see also **Chapter 2.0, Project Description** for details on the RRIFR Program elements) and other types of projects in the project area. This analysis will rely on a list of projects that have the potential to contribute to potential cumulative impacts in the project area. The Impacts and Mitigation Measures section defines significance criteria used for the impact assessment and presents a discussion of potential project-related impacts.

[1] CEQA Guidelines Section 15130, 15065, as amended January 1, 2010. As defined in Section 15355, a cumulative impact is an impact that 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 the project evaluated in the EIR.

5.2 Related Projects

5.2.1 Geographic Scope

The potential for project-generated impacts to contribute to a significant cumulative impact would arise if they are located within the same geographic area. This geographic area may vary, depending upon the issue area discussed and the geographic extent of the potential impact. For example the geographic area associated with noise impacts would be limited to areas directly affected by noise, whereas the geographic area that could be affected by hydrologic or water quality conditions may include a larger area. Thus, when considered cumulatively with other projects that may occur in the same geographic vicinity, the scope of analysis is defined by the physical boundaries for each issue. Impacts associated with lagoon outlet channel creation and maintenance activities, such as aesthetics, noise, traffic, erosion, and access limitations tend to be localized and could be exacerbated if other projects are occurring within the immediate vicinity of proposed activities. Impacts associated with long-term implementation of the Estuary Management Project may encompass a different geographic scope that extends to the greater watershed. For example, cumulative impacts to hydrology and water quality would occur within the watershed. For this cumulative analysis, the two primary geographic boundaries that capture the majority of these impacts are the six-mile reach of the Estuary (lower Russian River) and the greater Russian River Watershed. Air quality impacts will be considered in the context of conditions in the North Coast Air Basin. Where appropriate, other jurisdictional boundaries are applied for individual issue area analysis.

5.2.2 Project Timing

In addition to the geographic scope, cumulative impacts are determined by timing of the other projects relative to the proposed project. Schedule is particularly important for construction-related impacts; for example, for a group of projects to generate cumulative construction impacts, they must be temporally as well as spatially proximate. The schedules for the projects described in **Section 5.2.4** are likely to fluctuate; therefore this analysis assumes that the projects would be implemented concurrently with implementation of the Estuary Management Project.

5.2.3 Future Conditions – Climate Change and Sea Level Rise

Due to the Estuary's connectivity with the Pacific Ocean, the potential for climate change, and subsequent sea level rise, this is considered as a future conditions scenario. In recent years, the scientific community has generally reached consensus that climate change and sea level rise are likely to occur. California's position on climate change was formalized in Assembly Bill (AB 32), the California Global Warming Solutions Act of 2006, which states that: "Global warming poses a potential threat to the economic well-being, public health, natural resources, and the environment of California."While scientists agree that sea level rise is likely to occur in the future, the rate of sea level rise is uncertain. Several different estimates have been proposed for planning purposes. For example, the CALFED Independent Science Panel used empirical models

based on historic sea level rise to estimate a sea level rise ranging from 20 to 55 inches by 2100 (CALFED Independent Science Board, 2007). The San Francisco Bay Conservation and Development Commission (BCDC) is in the process of developing a strategy to address sea level rise in the future (San Francisco BCDC, 2008).

Because of its location at the ocean's edge, the proposed project is likely to be affected by future sea level rise. A recent study (Largier, 2010) prepared by a joint working group of the Gulf of the Farrallones and Cordell Bank National Marine Sanctuary Advisory Councils identifies and synthesizes potential climate change impacts to habitats and biological communities along the north-central California Coast, located 10 miles south of the project site. The report presents scientific observations and expectations to identify potential issues related to changing climate. Surface ocean temperatures have increased in the North Pacific, offshore of the north-central California continental shelf. This increase in temperature has significant effects on water column structure (i.e., stratification), sea level rise, and ocean circulation patterns. While sea temperature also appears to have increased in shallow bays, estuaries and sheltered nearshore locations, waters over the north-central California continental shelf have cooled over the last 30 years (by as much as 1°C in some locations) due to stronger and/or more persistent upwelling winds during spring, summer and fall (Largier, 2010).

According to the report, estuary habitats in the study region may be most affected by changes in the timing and persistence of seasonal mouth closure and the intensity and timing of seasonal runoff, as well as the continued rise in sea level. Sediment delivery and availability are projected to strongly influence the ability of estuary morphology to adjust to rising sea level and maintain intertidal estuarine habitat. Also, water properties such as temperature, salinity, dissolved oxygen, and pH can be expected to change significantly, as well as patterns of primary production (Largier, 2010). While it is unlikely to predict future states of a system as complex as the coastal ecosystem within the study region, the report recommends developing an action plan for the study region, which includes monitoring and adaptive management approaches that can be implemented as the environment continues to change, seeking to maximize benefits of change while mitigating the negative impacts (Largier, 2010).

In response to concerns about climate change and sea level rise, the University of Arizona Department of Geosciences conducted research on factors that determine the degree to which a coastal area is susceptible to sea level rise. This analysis assumes a one meter rise in sea level by 2100 as the worst-case-scenario, and identifies potential impacts to the future projects. The Estuary Management Project location was included in the sea level rise inundation maps. Some portions of the Estuary Management Plan could be impacted in the future, which could reduce the functionality and effectiveness of the proposed outlet channel and lagoon management strategy. Implementation of the Estuary Management Plan within the context of this potential future condition is further discussed in **Impact 5.2.4** at the end of this section.

5.2.4 Type of Projects Considered

As described in **Chapter 4.0, Environmental Setting, Impacts, and Mitigation Measures**, of this EIR, impacts associated with implementation of the proposed Estuary Management Project include short-term impacts related to lagoon outlet channel creation, as well as potential significant long-term impacts associated with increased duration and higher frequency of increased water levels in the Estuary. Therefore, cumulative effects would be the Estuary Management Project's impacts combined with the impacts of other projects in the Russian River watershed within Sonoma County. For this analysis, other past, present, and reasonably-foreseeable future construction projects in the area have been identified (see **Table 5-1**).

A brief overview of relevant projects, specifically water and/or flood control projects, habitat enhancement projects, and some large capital improvement projects, planned by public agencies is provided below. In addition to these specific projects, it is recognized that additional development could occur within the project area and may contribute to cumulative impacts. Such planned and approved projects, as listed in **Table 5-1**, are in accordance with the General Plan for Sonoma County.

Russian River Instream Flow and Restoration Program (RRIFR)

Over the last 15 years, the Water Agency has been working with regulatory agencies, primarily the National Marine Fisheries Service (NMFS) 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 the federal ESA and California ESA.[2]

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 ESA. The other signatories of the MOU include the U.S. Army Corps of Engineers (USACE), NMFS, and Mendocino County Flood Control and Water Conservation Improvement Project. In September 2008, NMFS issued a Biological Opinion (Russian River 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 Russian River Biological Opinion concluded that some elements of the USACE and Water Agency 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 (NMFS, 2008).

[2] Protective regulations of the ESA prohibit the "take" of these species. "Take" is broadly defined in the ESA and its implementing regulations; it includes not only intentionally killing a protected species, but also actions that unintentionally result in actual harm to an individual of a protected species, including adverse modification of habitat.

TABLE 5-1
PLANNED AND APPROVED PROJECTS IN THE ESTUARY MANAGEMENT PROJECT AREA AND VICINITY

Jurisdiction	Project	Area Affected	Status
CURRENT AND ONGOING PROJECTS			
Sonoma County Water Agency	Dry Creek Tributary Restoration Projects (i.e. Grape Creek Habitat Improvement Project)[1]	Various tributaries; Russian River Watershed	2008-2011 (Grape Creek Completed September 2010)
Jenner Community Club	Bridge Replacement Project	Jenner Creek at Jenner Community Club, 10432 Highway 1, Jenner	Ongoing 2010
North Coast Integrated Regional Water Management Plan Projects			
Sotoyome Resource Conservation District	Arundo Removal and Habitat Restoration Project	Russian River and tributaries	2000 - Ongoing
RECENTLY COMPLETED PROJECTS[2]			
Sonoma County Water Agency	Stream Maintenance Program[1]	Russian River, Sonoma County	2009
	Temporary Urgency Change Petition[1]	Russian River, Sonoma County	2009 and 2010
	Upper Austin Creek Restoration Project	Tyrell Property adjacent to Austin Creek, north of Cazadero	1998 through 2008
North Coast Integrated Regional Water Management Plan			
California Land Stewardship, Sonoma and Mendocino Counties	Sediment Reduction and Habitat Improvements	Russian River tributaries	n/a
Laguna de Santa Rosa Foundation	Riparian Restoration	Laguna de Santa Rosa (5 miles)	Completed September 2009
Sonoma County Permit and Resource Management Department (PRMD)	Recycling and Habitat Preservation Program	City of Santa Rosa	Completed July 2010
FORESEEABLE FUTURE PROJECTS			
Russian River Instream Flow and Restoration Program (RRIFR)			
Sonoma County Water Agency	Modification of D1610[1]	Upper, Middle, and Lower Reaches, Russian River, Sonoma County	Environmental Review; Completion Anticipated 2016
	Willow Creek Fish Passage Enhancement Project (partnership with Stewards and State Parks and Trout Unlimited)	Willow Creek, tributary to Russian River (7.3 mile portion and 4.7 mile portion)	Pending Approval
	Fish Passage Projects	Grape, Mill, and Wallace Creeks	Awaiting final CDFG permit; Feasibility Study and Engineering Designs complete: Construction to begin summer and fall 2011
	Dry Creek Demonstration Project[1]	1 mile of Dry Creek	2013-2015
	Dry Creek Enhancements (Phase 1)[1]	2 additional miles of Dry Creek	2015-2017
	Dry Creek Enhancements (Phase 2)[1]	Enhance additional 3 miles of Dry Creek	2018-2020
	Coho Broodstock Program (US Army Corps of Engineers)1	Russian River, Sonoma County tributaries	Continue through 2020

TABLE 5-1
PLANNED AND APPROVED PROJECTS IN THE ESTUARY MANAGEMENT PROJECT AREA AND VICINITY

Jurisdiction	Project	Area Affected	Status
FORESEEABLE FUTURE PROJECTS (cont.)			
Russian River Instream Flow and Restoration Program (RRIFR) (cont.)			
	Water Diversion Infrastructure[1]	Decommission Infiltration Ponds at Wohler Fish screen replacement at Mirabel	2011 and 2015
	2011 Urban Water Management Plan	Russian River Watershed	Under Development
RELEVANT PLANS AND POLICIES[3]			
North Coast Regional Water Quality Control Board Basin Plan/303(d) List			
Sonoma County General Plan			
Sonoma County Local Coastal Program			
Sonoma County Aggregate and Mining Resources Plan			
Assembly Bill 2121			

1 Element of the Sonoma County Water Agency Russian River Instream Flow and Restoration (RRIFR) Program.
2 Consideration of the proposed project's incremental contribution to effects associated with past projects must be analyzed under CEQA, in accordance with CEQA Guidelines Section 15064 (h)(1). The purpose of this type of analysis is to determine whether impacts associated with the proposed project, when considered with recently incurred impacts, would occur above the significance threshold.
3 CEQA Statutory Section 21100(e) provides for use of previously approved land use documents, including but not limited to general plans and local coastal plans in a cumulative impact analysis,

SOURCE: Compiled by ESA, 2010 via Sonoma County PRMD, 2010; Sonoma County Transportation and Public Works, 2010; SCWA, 2009; SCWA, 2010; NMFS, 2008.

The Russian River 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 the Russian River Instream Flow and Restoration (RRFIR) Program to implement the mandates under the BO. In addition to Estuary Management, the following actions are mandated by the BO:

1. Permanent Modifications to the State Water Resources Control Board's (SWRCB) Decision 1610 to reduce instream flow requirements in the mainstem Russian River and Dry Creek and Temporary Modifications to the SWRCB's Decision 1610 instream flow requirements in the mainstem Russian River;

2. Continue support of the Coho Broodstock Program[3];

3. Water Diversion Infrastructure improvements: including replacement of the Mirabel fish screens and decommissioning the Wohler infiltration ponds;

4. Flood Control: Stream Maintenance Program; and

5. Dry Creek Habitat Enhancement.

[3] Note that the Water Agency assists with funding of this program; however it is administered and implemented by the U.S. Army Corps of Engineers.

Relationship to Estuary Management Project

As presented in **Chapter 1.0, Introduction**, the RRIFR Program has been developed pursuant to the Russian River Biological Opinion. Many of the actions mandated by the Biological Opinion require additional review under CEQA, as well as compliance with other state and federal regulations. The Russian River Biological Opinion and the corresponding RRIFR Program include a series of actions to be taken by the Water Agency, in coordination with NMFS and CDFG, to provide benefit to listed salmonids. The Estuary Management Project is one of a series of actions to be undertaken by the Water Agency to meet the requirements of the Russian River Biological Opinion. The effects of the Estuary Management Project must be considered in conjunction with impacts associated with other RRIFR Program elements in a cumulative analysis. The RRIFR Program elements are described in more detail below.

The objectives of the Estuary Management Project are identified in **Chapter 2.0, Project Description**. The Estuary Management Project would enhance freshwater lagoon conditions from May 15 to October 15 to enhance rearing habitat for juvenile salmonids, particularly steelhead, while minimizing the potential for flooding low-lying properties. The Estuary Management Project project provides independent utility (i.e. must be implemented to achieve a purpose irrespective of other RRIFR elements) in achieving these goals and necessitates implementation separately from other RRIFR Program elements in order to meet the objectives and schedule in the Russian River Biological Opinion. The lagoon outlet channel will be designed to increase the extent of freshwater retention in the Estuary under the range of inflow conditions that have been historically recorded. As identified in the Russian River Biological Opinion, the Water Agency is preparing a separate CEQA analysis of proposed modifications to D1610 and potential enhancements to Dry Creek. The Estuary Management Project will function under a range of flow conditions, irrespective of the other elements identified in the Russian River Biological Opinion, and is federally mandated to be implemented as the first in a series of actions. The Estuary Management Project's potential contribution to these cumulative impacts is further discussed in **Section 5.3** below.

Modification of Decision 1610 – Fish Habitat Flows and Water Rights Project

The Water Agency is preparing an Environmental Impact Report (EIR) for the proposed *Fish Habitat Flows and Water Rights Project* (Fish Flow Project). The Water Agency released the Notice of Preparation in September 2010. The Water Agency holds water-right permits[4] issued by the SWRCB that authorize the Water Agency to divert[5] Russian River and Dry Creek flows and to re-divert[6] water stored and released from Lake Mendocino and Lake Sonoma. The Water Agency releases water from storage in these lakes for delivery to municipalities, where the water is used primarily for residential, governmental, commercial, and industrial purposes. The primary points of diversion include the Water Agency's facilities at Wohler and Mirabel Park (near Forestville). The Water Agency also releases water to satisfy the needs of other water users and to contribute to the maintenance of minimum instream flow requirements in the Russian River and

4 SWRCB water-right permits 12947A, 12949, 12950 and 16596.

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.

Dry Creek established in 1986 by the SWRCB's Decision 1610 (D1610). These minimum instream flow requirements vary based on defined hydrologic conditions (normal, dry, and critical) that are based on cumulative inflows into Lake Pillsbury in the Eel River watershed.

During the rainy season (October through May), natural streamflow, rather than reservoir releases, accounts for most of the flow in the Russian River. From June through September, some of the flow in the Russian River is composed of water released from storage in Lake Mendocino (which includes water imported from the Eel River via PG&E's Potter Valley Project) and Lake Sonoma.

D1610 was adopted before the listings of three salmonid species under the federal Endangered Species Act, and did not specifically address the importance of fall storage in Lake Mendocino to the Chinook salmon migration. Although D1610 assumed that higher instream flows were better for fishery resources, information developed in the last decade indicates this may not be so for salmonid species in Dry Creek, the Russian River, and the Russian River estuary. D1610 expressly recognized that later fishery studies might identify a need to change the minimum flow requirements. Decision 1610 also expressly contemplated that such changes might be needed if PG&E's Potter Valley Project imports changed, as they did in 2006.

Russian River Biological Opinion concludes that reducing D1610 minimum instream flow requirements will enable alternative flow management scenarios that will increase available rearing habitat in Dry Creek and the upper Russian River, and provide a lower, closer-to-natural inflow to the estuary between late spring and early fall. According to NMFS, enhancing the potential for maintaining a seasonal freshwater lagoon that would likely support increased production of juvenile steelhead and salmon can and must occur irrespective of D1610 (NMFS, 2008).

As required by Russian River Biological Opinion, in September 2009 the Water Agency filed a petition with the SWRCB to permanently change the D1610 minimum instream flow requirements, in order to improve habitat for endangered Central California Coast coho salmon and threatened Central California Coast steelhead. This petition presently is pending before the SWRCB. The SWRCB will act on this petition after the EIR for the Fish Flow Project is completed.

Until the SWRCB issues an order on this petition, the minimum instream flow requirements specified in D1610 (with the resulting adverse impacts to listed salmonids) will remain in effect, unless temporary changes to these requirements are made by the SWRCB. Russian River Biological Opinion requires that the Water Agency petition the SWRCB for temporary changes to the D1610 minimum instream flow requirements each year until the SWRCB issues an order on the Water Agency's petition for the permanent changes to these requirements. Russian River Biological Opinion only requires petitions for temporary changes to minimum streamflow requirements for the mainstem Russian River, and not to the requirements for Dry Creek. The Water Agency petitioned the SWRCB for the Biological Opinion-specified temporary changes for the first time in 2010, and the SWRCB made a temporary urgency change in its Order WR 2010-0018-DWR.[7]

[7] The Water Agency has also petitioned the SWRCB for temporary changes in mainstem Russian River minimum flow requirements in earlier years because weather conditions warranted such changes to preserve water storage in Lake Mendocino. The SWRCB approved such temporary changes in prior years.

On April 6, 2010, the Water Agency filed a petition with the SWRCB requesting approval of a Temporary Urgency Change (TUC) to the Water Agency's water rights permits pursuant to California Water Code Section 1435. The petition requested the following temporary modifications to the Russian River instream flow requirements as mandated by the Russian River Biological Opinion: 1) from May 1 through August 31, 2010, instream flow requirements for the upper Russian River (from its confluence with the East Fork of the Russian River to its confluence with Dry Creek) were reduced from 185 cubic feet per second (cfs) to 125 cfs and from September 1st to October 15 instream flow requirements for the upper Russian River were reduced from 150 cubic feet per second (cfs) to 125 cfs; and 2) from May 1 through October 15, 2010, instream flow requirements for the lower Russian River (downstream of its confluence with Dry Creek) be reduced from 125 cfs to 70 cfs, with the understanding that the Water Agency will maintain approximately 85 cfs at the Hacienda gage as practicably feasible. On May 25, 2010, the SWRCB approved its Order Approving Temporary Urgency Change.

The process for the SWRCB to permanently change D1610 is anticipated to take seven or eight years, including time for CEQA documentation and a public hearing process. During the periods that the temporary changes are in effect, the Water Agency will monitor water quality and fish, and collect and report monitoring information as required by Russian River Biological Opinion.

The objective of the Fish Flow Project is to manage Russian River Project releases to provide instream flows that improve habitat for threatened and endangered fish, while updating the Water Agency's existing water rights to reflect current conditions. The Fish Flow Project would generally be located in the Russian River watershed in Mendocino County and Sonoma County. Environmental impacts of the Fish Flow Project would potentially occur at Lake Mendocino, Lake Sonoma, in and along the Russian River downstream of Lake Mendocino/Coyote Valley Dam to Jenner, and in and along Dry Creek downstream of Lake Sonoma/Warm Springs Dam. The following is a discussion of the key components of the Fish Flow Project.

Minimum Instream Flows for Coho Salmon and Steelhead[8]**:** To comply with the requirements of Russian River Biological Opinion, the Water Agency has filed a petition with the SWRCB that asks the SWRCB to make the following permanent changes in the instream flow requirements that are specified in D1610 and the Water Agency's water-right permits:

1. between June 1 and August 31 of each year the existing minimum instream flow requirement of 185 cfs is proposed to change to 125 cfs for the upper Russian River (upstream of the confluence with Dry Creek and downstream of the confluence of the East and West Forks)

2. between September 1 and October 31 of each year the existing minimum instream flow requirement of 150 cfs is proposed to change to 125 cfs for the upper Russian River (upstream of the confluence with Dry Creek and downstream of the confluence of the East and West Forks)

[8] The proposed changes to the minimum instream flow requirements and the criteria used to determine the hydrologic index, and the proposed requests for water-right permit updates may change as the Fish Flow Project description and alternatives are further developed.

3. between January 1 and December 31 of each year the existing minimum instream flow requirement of 125 cfs is proposed to change to 70 cfs for the lower Russian River (downstream of its confluence with Dry Creek)

4. between May 1 and October 31 of each year the existing minimum instream flow requirement of 80 cfs is proposed to change to 40 cfs for Dry Creek from Warm Springs Dam to the Russian River.

Minimum Instream Flows for Chinook Salmon: Operating water supply releases from Lake Mendocino to preserve or increase the pool of cold water available in Lake Mendocino to support the fall Chinook salmon migration runs is also desirable, and may aid in the conservation and recovery of these threatened species. Although the proposed lower minimum instream flow requirements in Russian River Biological Opinion will help to achieve this goal, the Water Agency may request that the modifications to minimum instream flow requirements be extended beyond the months required by Russian River Biological Opinion for the upper Russian River (upstream of the confluence of Dry Creek and downstream of the confluence of the East and West Forks). These additional months could include those earlier or later in the year, or could be extended to be in effect year-round.

Hydrologic Index: The Water Agency will file another petition with the SWRCB, seeking to change the methodology used to establish the water-year type classifications that determine minimum instream flow requirements for the Russian River, to reflect actual conditions within the Russian River watershed rather than conditions in the Eel River watershed.

Water-Right Permit Updates: The Water Agency will also file petitions as needed to update its water-right permits to reflect current conditions and to resolve the time extension petitions that are pending before the SWRCB. These actions are not required to implement the proposed new minimum instream flow requirements or to change the hydrologic index, but will ask the SWRCB to consolidate the process to modify and update the Water Agency's water-right permits so that the SWRCB may make all necessary changes to the Water Agency's water-right permits at one time. These actions will include the pending petitions to extend time to complete use of water to December 1, 2020, and also may include new petitions to amend the place-of-use maps for the Water Agency's water-right permits, so that they are based on current and expected uses, and to make other updates or clarifications.

Impacts Identified

Environmental documentation for permanent modification of flows under D1610 is pending;[9] however, the types of impacts anticipated to be considered include changes in hydrology, water quality, biological resources, fisheries (beneficial), and recreation. As stated in the Russian River Biological Opinion, the current flow regime results in excessive flows in some portions of the Russian River and Dry Creek, reducing the amount of productive rearing habitat for fisheries, particularly steelhead and coho salmon. Therefore, implementation of the Fish Flow project is anticipated to enhance habitat for these species.

[9] The NMFS Biological Opinion requires that the Water Agency certify its EIR for the Fish Flow Project within four years of filing the petition to change D1610.

With respect to the 2010 Order approving Temporary Urgency Changes, the SWRCB found that the Temporary Urgency Changes described in the Water Agency's petition qualified for a series of categorical exemptions under CEQA, including a Class 7 exemption which consists of "actions taken by agencies to assure the maintenance, restoration, or enhancement of a natural resource where the regulatory process involves procedures for protection of the environment" (California Code of Regulations Title 14, Section 15307).

Relationship to Estuary Management Project

The Fish Flow Project proposes to modify D1610 flows, and is one of the series of actions to be taken by the Water Agency as part of the RRIFR Program in order to maintain compliance with the Russian River Biological Opinion. The Fish Flow Project would alter summer time flows within the Russian River Watershed. As described in **Chapter 3.0, Project Background and Environmental Setting**, the Estuary Management Project is required to accommodate the observed range of inflows to the Estuary following natural closures that occur during the May 15 to October 15 lagoon management period. As noted in **Section 3.1**, these observed flow conditions range from a low of 71 cfs to a high of 1,200 cfs at the Guerneville gage. As such, the Estuary Management Project would accommodate the range of flows under current and future D1610 conditions. Therefore, from a hydrologic standpoint, the Estuary Management Project is D1610 neutral, and not reliant on the implementation of either temporary or permanent changes to D1610. As such, the Estuary Management Project is consistent with current and future potential regulatory minimum instream flow requirements for the lower Russian River.

Potential for Contribution to Cumulative Impacts

The Fish Flow Project proposes alternative minimum instream flows to provide improved summer rearing habitat for steelhead in the mainstem Russian River and Dry Creek. One of the primary goals of the Estuary Management Project is to improve rearing habitat for juvenile salmon and steelhead by increasing the frequency and duration of freshwater lagoon conditions. In general, these two projects would have the potential to contribute to cumulative impacts in the issue areas of hydrology, water quality, biological resources, fisheries, and recreation. A discussion of the potential for these two projects to contribute to cumulative impacts is provided below.

Hydrology. Permanent modification of D1610 flows to the reduced seasonal flows proposed for the Russian River could increase the number of barrier beach closures in a given year, depending upon the hydrologic year type and wave conditions during summer months. As previously noted, the frequency of barrier beach formation and subsequent mouth closure is subject to several factors, the largest of which, during the lagoon management period, appears to be wave activity. However, Russian River flow level is also a contributing factor, and reduction in summer flows would likely increase the number of closure events occurring during the lagoon management period. Depending upon hydrologic year type, reduced summer flows would also assist in the management of outlet channel, as less discharge via the outlet channel would be anticipated. This would reduce the potential for the outlet channel to erode open and re-establish tidal conditions in the Estuary. Considered cumulatively, this would have a beneficial effect on meeting the objectives of the Estuary Management Project, which are to enhance rearing habitat for juvenile

salmonids, particularly steelhead, and to manage Estuary water levels to minimize flood hazard. Rearing habitat may be enhanced by reducing tidal influence on the Russian River Estuary from May 15 to October 15 ("lagoon management period") to increase freshwater habitat available for rearing salmon and steelhead. In considering this cumulative effect, it should be noted that the Estuary Management Project would accommodate the observed range of inflows to the Estuary following natural closures that occur during the May 15 to October 15 lagoon management period.

Water Quality. Reduced inflows into the Estuary could adversely affect water quality conditions, particularly with respect to bacteria and nutrient levels within the Estuary during freshwater lagoon conditions. Reduced flows may reduce the assimilative dilution capacity of Russian River flows upstream of the Estuary, and assuming inputs within the watershed remain constant, could result in increased concentrations of nutrients and indicator bacteria. Diminished water quality would have the greatest potential to occur during dry hydrologic years. As previously discussed in **Section 4.2, Water Quality**, areas upstream of the Estuary (upstream of Austin Creek) are identified by the NCRWQCB as impaired for bacteria. Water quality sampling by various entities, including SCWA have not identified bacterial levels that warrant listing the Estuary as impaired, and the 303(d) listing for bacteria is limited to areas upstream of Austin Creek.

Sampling events in 2009 and 2010 indicate there is a large variation in indicator bacteria levels observed through the different sections of the Estuary. These variations were observed to occur under both open and closed mouth conditions and may be seasonal as well. Although there was no clear pattern of potential lagoon management influences on indicator bacteria levels early in the season, as there were elevated levels observed at various stations during both open and closed conditions, indicator bacteria levels were observed to increase and exceed the recommended guidance values at all stations during and following increased freshwater inflows at the end of September, and during the repeated barrier beach closures in early October. At this time, it is not known what role increased freshwater inflows have on the elevated indicator bacteria levels observed during these closures and whether or not these increases would occur, or persist, without these inflows.

As identified in **Section 4.3, Water Quality**, implementation of the Estuary Management Project would not alter water quality inputs for nutrients or indicator bacteria into the Estuary, and Estuary conditions with the outlet channel established would still include flow through processes. As discussed in **Section 4.2, Hydrology and Flooding**, residence time within the Estuary at inflows of 75 cfs is estimated at approximately 22 days, or approximately one week longer than is experienced under the current practice of artificial breaching. However, because of the lack of nutrient and bacteria data collection during closure conditions, there is insufficient information to definitively conclude whether the Estuary Management Project would result in an increase, decrease, or no substantial adverse effect on nutrient or bacteria levels within the Estuary. Therefore, in the absence of technical certainty, the Water Agency recognizes that the Estuary Management Plan could have the potential to contribute to significant and unavoidable secondary impacts to public health related to nutrient or bacterial levels in the Estuary. When considered cumulatively with the Fish Flow Project, the potential for this occurrence may be increased,

primarily in dry years, when inflow to the Estuary is reduced. The occurrence, nature and timing of potential impacts related to the Fish Flow Project will be confirmed during the environmental review process for that project. These impacts are considered cumulatively considerable.

It should be noted that the conditions of the Russian River Biological Opinion, and the Estuary Management Project's Adaptive Management Plan, include provision for breaching in the event that flooding conditions, water quality conditions, or biological resource conditions warrant. Therefore, no additional mitigation measures are required or available relative to the occurrence of this impact.

Fisheries and Biological Resources. Permanent modification of D1610 flows is intended to improve rearing conditions for juvenile salmonids, and is anticipated to have a beneficial effect on salmonid habitat within the watershed. The Estuary Management Project would contribute cumulatively to enhancement of salmonid habitat within the Russian River system, by improving rearing habitat for juvenile salmon and steelhead within the Estuary by increasing the frequency and duration of freshwater lagoon conditions. Considered cumulatively, these projects would provide cumulative beneficial impacts for juvenile salmon and steelhead, and would contribute to restoration efforts for these species within the Russian River Watershed.

Permanent modification of D1610 flow could result in adverse effects to other non-listed species, due to changes in the summertime flow regime of the Russian River. These effects would be primarily associated with incremental reductions in freshwater habitat availability within the Russian River channel, and would vary depending upon hydrologic year. The Estuary Management Project would also result in changes in non-listed species distribution; however, this change would primarily affect particular marine fish species that currently use the Estuary under open tidal conditions. Although these conditions will continue to exist outside of the lagoon management period, marine species distribution would be altered as the frequency and duration of freshwater lagoon conditions are increased during summer months. This change represents a more natural Estuary condition; therefore, potential impacts to non-listed marine fish species are not considered significant. When considered cumulatively with the Fish Flow Project, the Estuary Management Project would not contribute significantly to adverse effects to other non-listed species.

Harbor seals use regular haulouts located within the Estuary Study Area, including the Jenner (Penny) logs, Paddy's Rock, and Chalanchawi. Under the proposed project, water levels would be increased up to 7 to 9 feet for a longer duration, which could inundate the mudflat/gravel bar areas that provide suitable haulout sites within the river, reducing their availability of haulout locations within the Estuary itself. Such modification of suitable habitat would be a potentially significant impact, as it could affect pinniped resting, foraging, and movement patterns, and rearing activities. Reduced summer flows associated with the Fish Flow Project would not be anticipated to alter this effect, although it may take slightly longer for the Estuary to reach target water elevations, depending upon water year type. When considered cumulatively with the Fish Flow Project, the Estuary Management Project's contribution to impacts to marine mammals would be cumulatively considerable.

Recreation. The Fish Flow Project would reduce summer flows, with potential impacts to recreation, primarily on-stream beneficial uses, such as boating. Reduced flows would have the potential to adversely affect recreational opportunities, although it is anticipated that recreational boating opportunities would be maintained through the lower reach of the Russian River at the flow levels proposed under the Fish Flow Project.

As discussed in **Section 4.7, Recreation**, implementation of the Estuary Management Project would increase water surface elevations within Estuary, resulting in inundation of beach areas and gravel bars used as recreational haulout sites. This could be considered a beneficial effect to recreational boating, and may offset perceived impacts associated with lower flow volumes. Although recreational sites would remain available, their reduction within the Estuary may be perceived as a substantial change in access conditions. Therefore, this impact is considered significant and unavoidable.

Additionally, creation and maintenance of freshwater lagoon conditions could reduce the frequency of favorable sandbar conditions for surfing associated with artificial breaching and tidal estuarine conditions during the lagoon management period. As discussed in **Section 4.7, Recreation**, feasible mitigation measures are not available to reduce these impacts to less than significant levels and meet the project objectives; therefore, these impacts are considered significant and unavoidable. As such, the Estuary Management Project's contribution to cumulative recreational effects would be considered cumulatively considerable.

Coho Broodstock Program

To aid in the recovery effort for state- and federally-endangered Central Coast Coho Salmon, California Department of Fish and Game (CDFG), NMFS, and the USACE initiated the Russian River Coho Salmon Captive Broodstock Program (RRCSCBP) in 2001 with the goal of reestablishing self-sustaining runs of coho salmon in tributary streams within the Russian River basin. Under this program, offspring of wild, captive-reared coho are stocked as juveniles into tributaries within their historic range. The fish are then released during spring and fall and into multiple historic tributaries within the Russian River drainage. Private landowners, government agencies such as Resource Conservation Districts, and other organizations have responded to a decline in coho salmon by conserving and restoring critical habitat within the Russian River Watershed. CDFG, NMFS, and USACE have partnered with University of California Cooperative Extension, Sonoma County Water Agency, Trout Unlimited, and Bodega Marine Lab, to carefully capture, rear, and spawn coho broodstock at the Don Clausen Warm Springs Hatchery. They then release the off-spring as young fish in select tributary streams and monitor their growth and survival until the migration downstream and into the Pacific Ocean. This cycle will be repeated annually, along with the monitoring of adult coho returning three years after their release to tributary streams (Regents of University of California, 2010).

The University of California Cooperative Extension (UCCE) and California Sea Grant Extension Program have worked with agency partners to develop and implement a monitoring and evaluation component for the RRCSCBP. The overall monitoring goal is to evaluate the effectiveness of the RRCSCBP by documenting whether released program fish return to their

streams of release as adults and successfully complete their life cycles. Different hatchery release protocols and stocking environments are assessed to determine the optimal stocking strategies for successfully restoring coho to the Russian River system. Specific monitoring objectives for each release stream include: estimating seasonal instream abundance, comparing seasonal survival rates of spring and fall-released coho, estimating the number of returning adults, estimating juvenile to adult survival rates, measuring coho size and condition, estimating food availability, and documenting baseline flow and temperature regimes. All of these biotic and abiotic metrics are compared among the different program streams. This information will allow agencies to make informed decisions about the future direction of the program and adaptively manage release strategies for optimal survival. Population estimates are determined through habitat surveys (counts of pools and riffles), snorkel counts, and electrofishing surveys (Obedzinski et al., 2009).

Impacts Identified

The RRCSCBP establishes a baseline data set and records results of fish releases. In addition to the RRCSCBP, coho young of the year, other fish and non-fish species are captured during the electrofishing portion of the surveys. The intent of the RRCSCBP is enhancement of the fishery populations and developing an understanding of trends and fish population dynamics. Overall, this is considered a beneficial project for fisheries restoration.

Relationship to Estuary Management Project

The continued participation in the RRCSCBP is one of the series of actions to be taken by the Water Agency and USACE as part of the RRIFR Program in order to maintain compliance with the Russian River Biological Opinion. Both the RRCSCBP and the proposed Estuary Management Project are components of the RRIFR Program, located in the Russian River watershed, and would be implemented pursuant to objectives that focus on fisheries enhancement.

Potential for Contribution to Cumulative Impacts

The RRCSCBP would continue the current Coho broodstock program to aid in the recovery effort for state- and federally-endangered Central Coast Coho Salmon. One of the primary goals of the Estuary Management Project is to improve rearing habitat for juvenile salmon and steelhead by increasing the frequency and duration of freshwater lagoon conditions. The Estuary Management Project would minimize flood potential and enhance summer rearing habitat in the Estuary for rearing juvenile salmonids. As such, it would have a beneficial effect by reducing tidal influence and providing a freshwater lagoon condition of salmonid rearing, which, considered concurrently with the beneficial effects to fisheries provided by the RRCSCBP, would be cumulatively beneficial.

Water Diversion Infrastructure

The Water Agency diverts water from the Russian River to meet residential and municipal demands. Water diverted from the underground aquifer is a combination of releases from upstream storage reservoirs and instream flow. The Water Agency's water diversion facilities are located near Mirabel and Wohler Road near the community of Forestville. To provide the primary water supply for its transmission system, the Water Agency operates six radial horizontal

collector wells and seven vertical wells adjacent to the Russian River near Wohler Road and Mirabel, which extract water from the aquifer beneath, and adjacent to, the streambed. The Water Diversion Infrastructure Project consists of replacement of the fish screen at Mirabel Dam and decommission or modification of the infiltration ponds on the East side of the Russian River at the Mirabel/Wohler facility. The fish screen and infiltration ponds are discussed below.

The ability of the Russian River aquifer to produce water is generally limited by the rate of recharge to the aquifer through the streambed. To augment this rate of recharge, the Water Agency utilizes a series of infiltration ponds and an inflatable dam. The inflatable dam is located in the Mirabel area, raises the water level and submerges the intakes to a series of canals that feed infiltration ponds located at Mirabel. The backwater created by the Inflatable Dam also raises the upstream water level and submerges a larger streambed area along the Russian River. This increased depth and wetted surface of the submerged area significantly increases infiltration to the aquifer.

The Russian River in the Mirabel Reach serves primarily as a migration corridor for adult and juvenile salmon and steelhead. Thus, the Inflatable Dam has the potential to impact salmon and steelhead primarily during their upstream and downstream migrations through; 1) altering habitat composition, 2) altering water temperature and water quality in the lower river, 3) impeding downstream migration of juveniles, 4) impeding upstream migration of adults, and 5) altering habitat to favor predatory fish (SCWA, 2000). The Inflatable Dam impounds water over an approximate 3.0 mile (4.8-kilometer) reach of the river. Within the impounded reach, riverine habitat is altered from its natural composition of pool/riffle/run habitats to solely pool habitat (the pool formed behind the Inflatable Dam is referred to as the Wohler Pool. Impounding water behind a dam can lead to an increase in water temperature (SCWA, 2000). Additionally, emigrating smolts drift downstream with the current. A decrease in stream current within the impounded reach may adversely delay smolts emigrating from the river (SCWA, 2000).

The purpose of the existing fish screen is to ensure the safety of the fish in the river and permanent fish ladders provide fish passage when the dam is raised. However, NMFS determined that the existing fish screening facilities performed less than adequately for full protection of fish and downstream migration. Pursuant to the Russian River Biological Opinion, the Water Agency will complete design of a new fish screen at Mirabel by 2011 and will replace the rotary drum fish screens at Mirabel within the next ten years (SCWA, 2009). Replacement will require diversion of the Russian River around the site using coffer dams. The Water Agency anticipates it will require 5 to 7 years to design and construct this project element in coordination with NMFS.[10] A conceptual design includes a new intake with an inclined flat plate fish screen

[10] National Marine Fisheries Service (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, September 24, 2008, page 44.

system, an oversized screen for increased bypass flow control and capacity, and a bypass fishway in the form of a vertical slot fish ladder.[11]

The Water Agency is decommissioning the infiltration ponds on the East side of the Russian River at the Wohler facility. The ponds are used to increase the infiltration area to the collector wells which allows higher rates of pumping. In September 2009, the Water Agency submitted a preliminary plan for the pond decommissioning to NMFS and CFDG for review and comment. This design has been approved and permitted.

Impacts Identified

Construction and installation of the fish screen may result in temporary impacts to water quality, hydrology, recreation, and biological and fisheries resources. Dewatering the work area will require diverting streamflow via coffer dams around the work area and relocating fish from the site. Based on the project's anticipated timing, NMFS expects only juvenile steelhead are likely to be present; coho and Chinook salmon would have likely migrated from the area (NMFS, 2008). The Water Agency will relocate any juvenile steelhead or other sensitive species found in aquatic habitat in work sites. However, the project will result in a long-term benefit to fisheries by reducing potential for entrainment in the water infrastructure. Some limited injury or mortality of juvenile steelhead may also occur as the result of new fish screen installation; however this would be a temporary impact limited to the short-term construction period.[12] Decommissioning of the infiltration ponds would reduce recharge for the Russian River aquifer. As directed in the Russian River Biological Opinion, Water Agency biologists would need to inspect the gravel bars before beginning work to identify environmentally sensitive areas. Permanent vegetation on the riverbanks may be temporarily disturbed but would not be completely removed. Operation of heavy equipment in the active stream channel would be limited to moving equipment to and from the mid-channel gravel bars and breaching cofferdams when needed, and will be very short in duration. No fueling or equipment service would be performed on the gravel bars or within the active floodplain. After gravel bar grading operations are completed, gravel bars would be contoured to at least a 2 percent grade to reduce the potential for stranding fish. Continuously recording turbidity meters would be installed upstream and downstream of gravel bar grading operations to document turbidity levels associated with this action. Breaching of the lower berm for the Mirabel Bar would be conducted late in the evening or early in the morning to reduce visual effects to recreational visitors at Steelhead Beach (NMFS, 2008).[13]

Relationship to Estuary Management Project

The Water Diversion Infrastructure Project is one of the series of actions to be taken by the Water Agency as part of the RRIFR Program in order to maintain compliance with the Russian River Biological Opinion. Both the Water Diversion Infrastructure Project and the proposed Estuary Management Project are components of the RRIFR Program, located in the Russian River watershed, and would be implemented pursuant to objectives that focus on fisheries enhancement.

11 Although not a mandated requirement and dependent on grant funding, the design may also include a fish viewing chamber with a window which will allow for real-time monitoring along with education and outreach opportunities.
12 NMFS, 2008, page xiv.
13 NMFS, 2008, page 47. The Water Agency is not currently pursuing permits for these activities.

Potential for Contribution to Cumulative Impacts

Construction effects associated with the Water Diversion Infrastructure projects are anticipated to be short-term and temporary, and would not directly overlap geographically or spatially with implementation of the Estuary Management Project; therefore these impacts are not cumulatively considerable. Modification of water diversion infrastructure is intended to minimize adverse impacts to designated critical habitat for steelhead; similarly, the Estuary will be managed to enhance the rearing habitat for steelhead. Therefore the long-term benefit to fisheries associated with the proposed Estuary Management Project considered concurrently with the long-term benefit to fisheries associated with the Water Diversion Infrastructure projects, would be cumulatively beneficial to fisheries.

Flood Control: Stream Maintenance Program

The Stream Maintenance Program (SMP) is a component of the RRIFR Program that was developed by the Water Agency to improve the management of streams and channels in the Water Agency's maintenance authority through establishing programmatic guidance for implementing this program. The majority of SMP activities would occur in the Laguna de Santa Rosa, Petaluma River, and Sonoma Creek watersheds. Cities within the Program Area which contain Water Agency-owned or maintained channels include: Cotati, Healdsburg, Petaluma, Rohnert Park, Santa Rosa, Sebastopol, Sonoma, and the Town of Windsor. The SMP was designed to provide flood protection and channel conveyance capacity for channels under Water Agency authority, and obtain and maintain 10-year programmatic permits that regulate program activities. The SMP has three primary activities: sediment management, vegetation management, and bank stabilization. These core maintenance activities occur mainly in engineered flood control channels, but may also occur in other facilities including other in-channel engineered structures, and sediment basins on an as-needed basis. The SMP also involves other smaller and infrequent maintenance activities such as road maintenance, sediment removal around reservoir inlet structures, and debris removal, as described below. The SMP also includes the transport and disposal of collected sediment and vegetation. Activities not covered under the SMP include maintenance activities on the main stems of the Russian River and Dry Creek (Horizon, 2009).

Impacts Identified

The primary adverse impacts of SMP activities identified in the SMP EIR (2009) were short-term, occurring during maintenance, and the period immediately following maintenance. Temporary impacts included adverse effects on aesthetics, dust and emissions from maintenance vehicles, degradation of riparian habitat and associated species, potential exposure to sites of existing chemical contamination, potential for accidental releases of hazardous materials associated with maintenance vehicles and herbicide use, releases of sediment and related effects on water quality, interference with emergency access and response, reduced recreational opportunities during or after maintenance, and effects on local traffic from maintenance vehicles and hauling of sediment and other debris. Over the long term, SMP activities would involve channel maintenance and establishment of a riparian corridor along the maintained channels, which will result in enhanced habitat values, improved water quality, and better aesthetic quality and recreational value (Horizon, 2009).

The SMP EIR identified several significant and unavoidable impacts associated with the SMP. Overall, the long-term effect of maintenance activities would result in a beneficial impact on the aesthetic conditions in the Program Area. However, temporary degradation of visual quality due to site disturbance from maintenance activities could affect sensitive viewer groups. Although best management practices and revegetation activities would be implemented, these short-term adverse impacts would still be considered to be significant. Noise impacts associated with maintenance activities would be significant and unavoidable in the City of Santa Rosa. Channel maintenance activities would involve ground disturbance and vehicle usage that would emit both particulates and ozone precursors. Given the non-attainment status for these pollutants in the San Francisco Bay Air Basin, the project contribution to these significant cumulative impacts would be considerable (Horizon, 2009).

Relationship to Estuary Management Project

The SMP is one of the series of actions to be taken by the Water Agency as part of the RRIFR Program in order to maintain compliance with the Russian River Biological Opinion. Both the SMP and the proposed Estuary Management Project are components of the RRIFR Program, located in the Russian River watershed, and would be implemented pursuant to objectives that focus on fisheries enhancement.

Potential for Contribution to Cumulative Impacts

The Estuary Management Project would minimize flood potential and enhance fisheries habitat for rearing juvenile salmonids. The project would reduce tidal influence and provide a freshwater lagoon condition of salmonid rearing, which, considered concurrently with the beneficial effects to fisheries provided by the SMP, would be cumulatively beneficial. Creation and maintenance of the lagoon outlet channel under the proposed project would have the potential to contribute to cumulative short-term impacts associated with erosion and hydrologic conditions at the mouth of the Russian River. Initial construction of flood control channels under the SMP is complete, so the timing of major impacts would not overlap; however, ongoing maintenance efforts under the SMP would occur within flood control zones throughout Sonoma County. In channels in the vicinity of the Estuary Management Project area, the only work that may occur concurrently with the Estuary Management Project is debris removal, therefore, concurrent implementation of the Estuary Management Project would not result in cumulatively considerable short-term or long-term impacts.

Dry Creek Habitat Enhancement

NMFS biologists have determined that cold water released from Lake Sonoma into Dry Creek is ideal for coho salmon and steelhead, but the current flow velocities of the water released from Lake Sonoma, which range from 110 to 175 cfs, are not optimal for young coho and steelhead survival (NMFS, 2008). The Russian River Biological Opinion addresses this problem by mandating the creation of pools, backwaters and side channels on six miles of the 15-mile creek over a 12-year period. The Russian River Biological Opinion also requires the Water Agency to construct five projects on tributaries which serve as the rearing habitat for many of the yearlings raised by the coho broodstock program at the Don Clausen Fish Hatchery. The initial implementation phase includes a 1,250-foot habitat restoration project on the Grape Creek (also known as Wine Creek).

The Water Agency, in partnership with Sotoyome Resource Conservation District and landowners, enhanced pools, shade, and shelter for young salmon and steelhead to grow during the critical first year or two in freshwater before migrating to the ocean. California Department of Fish and Game and NMFS were involved in permitting for the project. The second phase of the Grape Creek project, which involves the stabilization of eroding stream banks, additional log structures, and riparian planting along 750 feet of stream, is slated to begin fall 2010. In coming years, additional Dry Creek tributary enhancement projects will improve the ability of adult salmon and steelhead to migrate upstream by modifying bridges, culverts, and difficult to ascend areas in Grape, Wallace, Crane, and Mill Creeks, as summarized below in **Table 5-2**.

Dry Creek habitat enhancement is scheduled to begin implementation in 2013 (five years after completion of the Russian River Biological Opinion), however the Water Agency is implementing interim actions to promote recovery and survival of salmonids in the Dry Creek area. If habitat enhancement does not result in significant improvements by 2018, the Water Agency would pursue alternative methods, such as construction of a bypass pipeline that would convey water from the dam to the Russian River so that instream flows in Dry Creek could be reduced.

The Water Agency is moving forward with the Willow Creek Fish Passage Enhancement Project. Willow Creek is a tributary to the lower Russian River that once supported an abundant subpopulation of coho salmon. While Willow Creek continues to support significant potential spawning and rearing habitat, access to habitat is blocked by impassable road culverts and a shallow braided channel that passes through a forested wetland. CDFG has identified artificial structures that are passage barriers for one or more life stages of anadromous salmonids within Willow Creek. The project will include restoration of 7.3 and 4.7 miles of salmonid spawning and rearing habitat, respectively, for all life stages by replacing culverts and a bermed roadway with a 43-foot single span bridge. The Water Agency will fund pile installation and rough grading and culvert removal.

Impacts Identified

Environmental documentation for Dry Creek Habitat Enhancements is being prepared, but pending completion; however the types of impacts anticipated include short-term construction-related impacts, such as sedimentation and siltation, vegetation removal, hydrology, and water quality. Over the long-term, Dry Creek Habitat Enhancements are expected to provide benefits to fisheries, riparian corridors, and water quality. Instream work would include dewatering activities, which could temporarily impact fish and would require diverting streamflow around the work area and relocating fish from the site. Implementation of habitat enhancement in Dry Creek would potentially affect cultural resources, vegetation, and recreational uses. The Willow Creek Fish Passage Restoration Project has undergone CEQA review and would result in short-term construction related effects associated with culvert replacement and bridge installation, and would provide long-term benefits to fisheries.

Relationship to Estuary Management Project

The Dry Creek Enhancement Project is one of the series of actions to be taken by the Water Agency as part of the RRIFR Program in order to maintain compliance with the Russian River Biological Opinion. Both the Dry Creek Enhancement Project and the proposed Estuary

TABLE 5-2
PROPOSED INTERIM RESTORATION PROJECTS

Project Name	Impacts	Restoration Action	Increased Area of Fish Production
Crane Creek Fish Passage Access Project	Impacted by previous gravel mining and channelization; severe downcutting obstructs salmonid passage	Removal of barrier	5,021 m^2
Crane Creek Instream Habitat Improvement Project	Although pool frequency is high, pool shelter is low ; Areas are incised and highly erosive	Bio-engineered bank stabilization, increased riparian setbacks, streambed toe stabilization; large woody debris/ boulder structures (plunge weir, boulder/log weirs, digger logs, covers); native revegetation	655 m^2
Grape Creek Fish Passage Enhancement Project	Artificial structures, grade control structures, culverts during certain flow levels at West Dry Creek Road stream crossing is passage barrier	Modify hydraulics through culverts; arched culvert with natural channel bottom	1,977 m^2
Grape Creek Instream Habitat Improvement Project	Low pool shelter	Installation of cover structures in existing pools; bio-engineered bank stabilization, increased riparian setbacks, streambed toe stabilization; large woody debris/ boulder structures (plunge weir, boulder/log weirs, digger logs, covers); native revegetation	730 m^2
Wine Creek Instream Habitat Improvement Project	Low pool shelter; low pool-to-riffle ratios	Riparian zone improvements to reduce sedimentations, stream temperatures, urban and agricultural runoff, increase pool-to-riffle rations. Planting native low canopy species and overstory tree species	390 m^2
Wallace Creek Fish Passage Enhancement Project	Passage barrier at Wallace Creek/ Mill Creek Road stream crossing	Modify hydraulics within culvert at certain flow levels to prolong amount of time culvert it passable; arched culvert with natural channel bottom	5,990 m^2
Purrington Creek Fish Passage Enhancement Project	Passage barrier to adult and juvenile coho and steelhead at Sonoma County road crossing culvert	Culvert removal and restoration of natural channel bottom; or culvert retrofit (i.e. curbing, baffles)	2,650 m^2
Willow Creek Fish Passage Enhancement Project	Spawning and rearing habitat blocked by road culverts and shallow braided channel in forested wetland.	CDFG funding for road projects to reduce non-point source sedimentation; California State Parks projects	9,580 m^2
Mill Creek Fish Passage Improvement	Undermined flashboard dam on private property obstructs passage of adult and juvenile coho and steelhead	Seek landowner permission to design and implement a step pool fishway	23,760 m^2
Redwood Creek Fish Passage Improvement Design	Undermined Arizona concrete structure obstructs passage of adult and juvenile coho and steelhead	Design and implement a step pool fishway	3,950 m^2

NOTE: highlighted cells indicate projects the Water Agency will consider for implementation.

SOURCE: NMFS, 2008.

Management Project are components of the RRIFR Program, located in the Russian River watershed, and would be implemented pursuant to objectives that focus on fisheries enhancement.

Potential for Contribution to Cumulative Impacts

The Estuary Management Project would have a long-term beneficial effect by reducing tidal influence and providing a freshwater lagoon conditions for salmonid rearing, which, considered concurrently with the beneficial effects to fisheries provided by the habitat enhancements along Dry Creek, would be cumulatively beneficial. Creation and maintenance of the outlet channel would have the potential to contribute to cumulative impacts associated with short-term erosion and hydrology conditions at the mouth of the Russian River. However, concurrent implementation of the Estuary Management Project would not result in cumulatively considerable short-term impacts, and would contribute to a beneficial cumulative effect on fish habitat.

Other Local Projects

Jenner Creek Bridge Replacement

The Jenner Community Club is replaced a damaged bridge that provides access across Jenner Creek (Jenner Gulch) to the Jenner Community Center, located at 10432 Highway 1 in Jenner. Jenner Creek perennial stream is a north-bank tributary to the Russian River near its confluence with the Pacific Ocean. During winter storms in 2006, heavy rainfall increased water velocity and volume in Jenner Creek, increasing flood waters to an elevation that damaged the bridge abutments, rendering the bridge unsafe for vehicular use. This bridge was the primary access to the Monte Rio Fire Protection District firehouse for emergency vehicles. The project included removal of existing bridge and reconstructing and replacing it with a longer (45 feet), wider (12 feet), and more structurally sound bridge engineered to pass larger flood events. Jenner Creek provides moderate to high quality spawning habitat for steelhead and coho (NMFS, 2008b). The project includes a revegetation plan, vegetated boulder treatment, root wad placement, and coir log installation to provide aquatic habitat and slope stability. The project, except for final revegetation work, is complete.

Impacts Identified

This site is considered an environmentally sensitive area. Construction activities included but are not limited to clearing, grading, excavation, stockpiling, and reconstruction of existing facilities involving removal and replacement. Work also involved dewatering activities using a coffer dam, and subsequent fish relocation. Dewatering was conducted in accordance with a Dewatering Plan prepared by the project engineers, Prunuske Chatham, Inc. Construction-related impacts include short-term erosion, noise, disturbance of existing vegetation, increased truck trips and construction vehicle access, instream impacts associated with dewatering, and potential release of hazardous materials or fuels. There was an active water line attached to the bridge, so the project proponent coordinated with Sonoma County Department of Public Works to maintain water service. Avoidance measures are being implemented to protect California red-legged frog, Approximately 0.52 acres of riparian habitat would be affected (USFWS, 2008). The project will be completed in accordance with all permits, including but not limited to permits from USFWS,

NMFS, a CDFG Streambed Alteration Agreement and a SWRCB National Pollutant Discharge Elimination System (NPDES) general construction permit. Best management practices, including tree protection, erosion control via proper soil stockpiling, covering, and silt fencing, litter removal, and hazardous material spill prevention, and access are being implemented to minimize impacts.

Relationship to Estuary Management Project

The Jenner Creek Bridge Replacement Project is located adjacent to the Estuary, and is therefore within the geographic scope that could contribute to cumulative impacts during its implementation.

Potential for Contribution to Cumulative Impacts

Impacts associated with the Jenner Creek Bridge Replacement Project, considered concurrently with the proposed Estuary Management Project, could be cumulatively considerable. However, construction is not expected to directly overlap, and the nature of impacts differs between the projects. Adverse impacts associated with the Bridge Replacement Project are primarily temporary, construction-related impacts and long-term impacts are expected to restore spawning habitat in the disturbed area; whereas adverse effects associated with the Estuary Management Project expected over the long-term to affect recreation, vegetation, and hydrology.

North Coast Integrated Regional Water Management Plan

The North Coast Integrated Regional Water Management Plan (IRWMP) was adopted in 2007 to coordinate seven counties and 70 partnering entities to implement basin scale water management strategies. The North Coast Region covers Del Norte, Humboldt, Trinity and Mendocino counties; major portions of Siskiyou and Sonoma Counties; and small portions of Glenn, Lake, Modoc and Marin. The IRWMP provides guidance for future planning and management of North Coast waterways. The IRWMP is implemented through a variety of restoration, facility improvement, and erosion control projects, including the following currently funded restoration projects located in Sonoma County (North Coast Regional Partnership, 2007):

1. **Sonoma County Water Recycling and Habitat Preservation Program (Phase 2a).** Santa Rosa Urban Reuse Pilot Project, located in the City of Santa Rosa, Sonoma County, involves the construction of pipelines, pump stations and filtration. The benefits of the Santa Rosa Urban Reuse Project include improved water supply reliability; reduced conflicts; enhanced salmonid habitat because of reduced diversions from the Russian River; and water quality improvements because of reduced recycled water discharges to the Laguna de Santa Rosa and Russian River.

   The project goals are to: 1) restore and enhance habitat for environmental benefit in general and for the following protected species, including salmonids (Coho and Chinook salmon and steelhead) in the Russian River; California tiger salamander; and plants (Sonoma sunshine, Sebastopol meadowfoam, Burke's goldfields); 2) expand the use of recycled water for agricultural and urban irrigation to add water supply diversity and reliability to the region; 3) improve water quality in the Russian River and its tributaries; 5) reduce agricultural diversions in sensitive areas of the Russian River and its tributaries by supplying recycled

water for irrigation in the Alexander Valley area; 5) reduce reliance on water supply diversions from the Russian River and diversify urban supplies by providing recycled water to urban sites currently supplied from the Russian River system; and 6) contribute to the achievement of total maximum daily loads (TMDLs) for the Laguna de Santa Rosa. CEQA was completed in June 2006 and the project was subject to local grading and building permits, waste discharge requirements, and Clean Water Act Section 505.

2. **Sediment Reduction and Habitat Improvements in Four Russian River Tributaries.** This project, sponsored by California Land Stewardship Institute, involved removal of invasive non-native plants, the creation and enhancement of wetlands, and the acquisition, protection, and restoration of open space and watershed lands, non point source pollution reduction, management, and monitoring, and watershed management planning and implementation. The project was implemented July 2006 through July 2010 to provide detailed technical information specific to the fine sediment TMDLs on four major tributaries to the Russian River and prioritize implementation of sediment reduction and riparian and aquatic habitat enhancement projects. The Russian River is not scheduled for completion of its TMDL for fine sediment until at least 2011. However, there are few evaluations of streams in the basin detailed enough to be used in preparation of a TMDL. Watershed assessments were completed to assist in identification of historic and current sediment sources, information needed for the fine sediment TMDL for the Russian River. This approach also supplied a baseline from which to demonstrate quantitative improvements. The four selected sub-basins represent a variety of land uses, including forestry, grazing, rural residential housing and vineyards, and support steelhead trout and Coho salmon.

3. **Russian River Arundo Removal and Habitat Restoration Project.** The Sotoyome Resource Conservation District (RCD) removed invasive Arundo donax from the riparian corridors of the Russian River and its tributaries to restore riparian habitat and native plant diversity in an effort to enhance fisheries habitat, wildlife habitat, improve water quantity & quality, and reduce fire danger. In 2000 Circuit Rider Productions, documented the extent of Arundo donax in the Russian River in the report *Invasion Status, Impacts and Effective Control of Arundo donax in the Russian River Watershed.* At that time there was documentation of 236 acres of Arundo donax within the watershed, involving 53 tributaries and hundreds of private landowners. The Sotoyome RCD in collaboration with Mendocino RCD, Circuit Rider Productions, and the California Conservation Corps developed a program for removal and restoration of the riparian corridors affected by this invasive species. This project is already underway in both Mendocino and Sonoma counties. CEQA documentation, DFG and NPDES permits are completed or pending and a majority of landowners have committed to project implementation.

4. **Laguna de Santa Rosa Restoration.** Laguna de Santa Rosa Foundation recently sponsored and completed (September 2009) restoration of riparian corridor along 5 miles of the Laguna de Santa Rosa, protection and stabilization of channel banks through fencing and re-vegetation, and invasive species control. A three- to five- acre vernal pool complex, and, in a site overgrown by invasive Ludwigia, a 15-acre wetland were designed. Altogether this project consists of 6 components which produce synergistic improvements on a broad spatial scale. (1) Barlow/Balletto and Wetlands Park: Riparian restoration and weed control. (2) Kelly Farm: Oak savannah restoration. (3) Dei and Aggio channel enhancement: Riparian restoration and bank protection, cattle fencing and off-stream cattle watering area. (5) Stone Farm and CDFG Wildlife Area: Riparian restoration and weed

control in area impacted by Ludwigia. (5) Balletto Vernal Pool Project: Planning for restoration of three to five acres of degraded seasonal wetlands and for public access components, linking with existing trail plans. (6) George Town Hummock and Swale Project: Planning for wetland restoration of 15 acres impacted by invasive Ludwigia.

Impacts Identified

Many of the IRWMP projects listed above, at various stages of completion; associated impacts included effects to local land uses, water quality, vegetation and sensitive species, and erosion. Over the long-term, the projects improved riparian areas and fisheries habitat.

Relationship to Estuary Management Project

The projects listed above are located within the Russian River Watershed; however, they are located within the upper reaches of the Russian River, and are not located within the geographic scope of the proposed Estuary Management Project.

Potential for Contribution to Cumulative Impacts

These projects have been implemented and therefore short-term effects to local land uses, water quality, vegetation and sensitive species, and erosion have already occurred and would not be cumulatively considerable. The above-mentioned projects include a variety of habitat enhancing techniques designed to improve the area and connectivity of fisheries habitat. One of the primary goals of the Estuary Management Project is to improve rearing habitat for salmonids; therefore, the Estuary Management Project, when considered concurrently with the beneficial impact to fisheries under habitat restoration projects, would be considered cumulatively beneficial. The goals of the North Coast IRWMP are closely aligned with the habitat objective of the Estuary Management Plan, and on the whole, contribute to cumulative improvements in habitat and water quality in the Russian River watershed.

Regulatory and Other Cumulative Projects

303 (d) Listing of impaired waterways in Marin, Sonoma, and Napa Counties

As described in **Section 4.3, Water Quality**, the U.S. Environmental Protection Agency (USEPA) is responsible for water quality management under the Clean Water Act and has delegated this authority in California to the SWRCB. Section 303(d) of the Clean Water Act requires SWRCB to identify water bodies that do not meet water quality objectives. Each state submits an updated 303(d) list biannually. The list identifies impaired water bodies, the pollutant or stressor causing the impairment, and establishes a priority for developing a control plan, or a TMDL. TMDL is a program that has been developed to recover 303(d) list water bodies, and defines the total amount of material a water body can regularly assimilate and still maintain water quality at levels that protects beneficial uses designated for that water body. SWRCB delegates this responsibility in part to the Regional Water Quality Control Boards. A water quality control plan and an implementation plan are developed for each water body and pollutant/stressor.

Impacts Identified

Waterways in northern Sonoma County, including the Russian River, are regulated by the North Coast RWQCB. The Russian River is widely impaired by sedimentation and siltation, among other pollutants as a result of agricultural practices, channel erosion, highway, road, or bridge construction, hydromodification[14], and a range of other potential sources (NRWQCB, 2007a). Affected reaches in the Lower Russian River include Austin Creek (81 miles affected) and the Monte Rio area of Guerneville from the confluence of Dutch Bill Creek to the confluence of Fife Creek. Affected reaches in the Middle Russian River include Sulphur Creek (85 miles affected), Geyserville, Mark West Creek (99 miles affected), Santa Rosa Creek (87 miles affected), Warms Springs (255 miles affected), and Lake Sonoma reservoir. Reaches of the Upper Russian River, including Coyote Valley, are also listed (NCRWQCB, 2007a).

Several projects are underway to recover 303(d) listed waterbodies via the establishment of Total Maximum Daily Loads (TMDLs). The TMDL process is a tool for implementing water quality standards and is based on the relationship between pollutant sources and in-stream water quality conditions. The TMDL establishes the maximum allowable loadings of a pollutant that can be discharged to a water body while still meeting applicable water quality standards. The TMDLs allocation calculation for each water body must include a margin of safety to ensure that the water body can be utilized for its State–designated uses (USEPA, 2002). TMDLs are intended to address all significant stressors which cause or threaten to cause impairments to beneficial uses, including point sources (e.g., urban water discharges), nonpoint sources (e.g., runoff from fields, streets, range, or forest land), and naturally occurring sources (e.g., runoff from undisturbed lands). Within California, TMDLs are implemented through RWQCB Basin Plans (RWQCB, 2007b).

Relationship to Estuary Management Project

The 303(d) list applies to impacted areas within the geographic scope of the Estuary Management Project. The status of the majority of the Russian River as impaired is important in consideration of the cumulative contribution of the Estuary Management Project.

Potential for Contribution to Cumulative Impacts

As discussed in **Section 4.3**, **Water Quality**, key parameters, including salinity, dissolved oxygen, and temperature, were analyzed to determine whether the longer duration of a freshwater lagoon under the lagoon management period would have a significant effect on water quality. The Estuary Management Project would not result in increased contribution to existing pollutant levels or sources that would exacerbate existing exceedances of thresholds or result in the listing of new reaches of the Russian River on the 303(d) list. The cumulative analysis for this potential impact is discussed in more detail in **Section 5.3** below.

[14] Hydromodification is defined by the U.S. Environmental Protection Agency as alteration of the hydrologic characteristics of coastal and noncoastal waters, which in turn could cause degradation of water resources.

Gravel Mining and the Aggregate Resources Mining Plan

Gravel mining was a common practice along the middle reach of the Russian River. The Aggregate Resources Mining (ARM) Plan includes policies on phasing out terrace pit mining and not permitting new terrace pit mining proposals after 2006, but still allowing instream mining. There are several remaining terrace sites; however implementation of the ARM Plan limits extraction to a sustainable level. The Sonoma County ARM Plan, adopted in 1981 and updated in 1995 provides the regulatory guidelines for management of aggregate mining and includes:

1. the Aggregate Mining Plan: lands available for future supplies of aggregate material
2. Managed Resources/ Open Space Plan: protection of riparian habitats, reclamation, and agricultural land preservation
3. Identification of mining operations, including terrace mining, carried out in flood plain

Impacts Identified

Gravel mining typically causes environmental impacts such as erosion, incision of tributaries, and channelization.

Relationship to Estuary Management Project

The mining operations governed by the ARM Plan are located within the Russian River Watershed, and have historically occurred within the geographic scope of the Estuary Management Project.

Potential for Contribution to Cumulative Impacts

As discussed in **Sections 4.1, Geology and Soils,** and **4.3**, **Water Quality**, the Estuary Management Project would not be contribute to erosion/sedimentation, channel incision, or resource extraction impacts generally associated with mining operations, and therefore would not be cumulatively considerable when implemented in conjunction with gravel mining operations. The Estuary Management Project is intended to enhance fisheries habitat; it does not involve any mineral or aggregate mining, and short-term effects to water quality associated with sedimentation would be reduced to a less than significant level. Therefore, the Estuary Management Project's contribution to these types of impacts would be less than cumulatively considerable.

Implementation of AB 2121 – Policy for Maintaining Instream Flows

To protect flows that support threatened and endangered anadromous fish, NMFS and CDFG jointly developed "Guidelines for Maintaining Instream Flows to Protect Fisheries Resources Downstream of Water Diversions in Mid-California Coastal Streams" for new water rights applications in 2002. On September 30, 2005, the California State Legislature enacted Water Code section 1259.5 [Assembly Bill (AB) 2121 (Stats. 2005, Ch. 953, §§1-3)], which required the SWRCB to adopt a policy for principles and guidelines to maintain instream flows in coastal streams within the counties of Marin, Sonoma, Napa, Mendocino and Humboldt by January 2008. Shortly after AB 2121 was signed, two conservation groups, Trout Unlimited and Peregrine Audubon Society filed a petition to assist the SWRCB in implementation of the policy. To satisfy AB 2121 commitments, SWRCB developed Resolution 2005-0070, and drafted the "Policy for

Maintaining Instream Flows" (2010). The purpose of the instream flow requirements established under AB 2121 is to protect native fish populations and fishery resources. By implementing seasonal limits on diversions, minimum bypass flow requirements, and limits on maximum cumulative diversions rights within a watershed, the policy encourages more natural hydrograph responses, or streamflows that would more closely mimic natural or unimpaired streamflow, which would be more conducive to the survival of anadromous fish. Enforcement provisions are also included in the AB 2121 streamflow protection policy.

Identified Impacts

The Substitute Environmental Document prepared for the North Coast Instream Flow Policy (SWRCB, 2007) concluded that the adoption of the policy would not result in any direct environmental impacts. It is anticipated that the policy would increase wintertime flow and duration in local streams by requiring a minimum bypass flow at local diversion points. This would have beneficial impacts on biological resources, riparian habitat, fisheries, water quality and water resources.

Relationship to Estuary Management Project

AB 2121 applies to diversions within the geographic scope of the Estuary Management Project. It is anticipated effect would be to increase in-stream flows over time as the policy is implemented on a case by case basis, likely reducing the level of local diversions.

Potential for Contribution to Cumulative Impacts

The primary objectives of the Estuary Management Project are to minimize flood potential and enhance fisheries habitat for rearing juvenile salmonids. As such, it would have a beneficial effect to fisheries, consistent with the goal of the Instream Flow Policy, which, considered cumulatively, would provide beneficial effects to fisheries.

5.3 Description of Cumulative Effects

5.3.1 Approach to Analysis

This section reviews the potential cumulative effects of creating and maintaining the outlet channel and lagoon management period as part of the Estuary Management Project concurrently with other Sonoma County projects, specifically within the Russian River Watershed listed in **Tables 5-1** and **5-2**.

Pursuant to CEQA Section 15130(a) (1), the discussion below provides rationale to explain why cumulative impacts are not considered significant when the combined cumulative impact associated with the project's incremental effect and the effects of other projects is not significant. Furthermore, the discussion below explains if the Estuary Management 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 [CEQA Section 15130(a) (3)].

This discussion reflects the severity of the impacts and their likelihood of occurrence, but is developed at a lesser level of detail that the impact discussion provided in **Chapter 4.0, Environmental Setting, Impacts, and Mitigation Measures** [CEQA Guidelines Section 15130(b)].The discussion is guided by standards of practicality and reasonableness, and focuses 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 impact discussions generally follow the issue areas and impact statements analyzed in **Chapter 4.0, Environmental Setting, Impacts, and Mitigation Measures**, but focus primarily on the resources that may be adversely affected by either the Estuary Management Project or the projects listed in **Section 5.2** that, when considered concurrently, may result in a cumulatively considerable impact.

Table 5-3 provides a summary of water resource projects, their geographic relationship to the Estuary Management Project area, the types of impacts anticipated for their implementation, and the potential for the Estuary Management Project to contribute to cumulative impacts associated with these projects.

5.3.2 Construction Related Impacts

Impact 5.1: Short-term (Construction-related) Cumulative Impacts. Concurrent construction of the projects within the Russian River Watershed in northern Sonoma County could result in cumulative short-term impacts associated with construction activities. (Less than Significant with Mitigation)

The Estuary Management Project would not involve typical construction activities, but rather it would include short-term activities associated with the outlet channel creation or artificial breaching activities as required. Long-term operational activities associated with the Estuary Management Project are partly a continuation of existing practices. These activities would potentially coincide with implementation of the projects described in Table 5-1. As described in Chapter 4.0, the short-term impacts associated with the proposed Estuary Management Project include temporary generation of noise, traffic and access disruptions that could affect adjacent land uses, wildlife, aesthetics, public services and utilities, or recreational visitors. These impacts could contribute to a cumulatively significant effect if incurred in conjunction with impacts from other related projects (Table 5-1). However, Estuary Management Project impacts could be mitigated to less than significant levels identified in Chapter 4.0. Furthermore, these impacts would be localized to the outlet channel location at Goat Rock State Beach, and do not directly overlap geographically with any other recent, planned or ongoing, or foreseeable future project identified in Table 5-1; therefore the cumulative impact is equivalent to the impacts described n Chapter 4.0. Due to their short-term nature, and the inclusion of appropriate mitigation measures as established in Chapter 4.0, the Estuary Management Project's contribution to short-term impacts is not cumulatively considerable.

TABLE 5-3
SUMMARY OF OTHER PLANS, POLICIES, PROGRAMS, AND HABITAT RESTORATION PROJECTS AND RELATIONSHIP TO ESTUARY MANAGEMENT PROJECT

Project Name	Project Impacts	Located in Russian River Watershed?	Located in Bay Area Airshed?[1]	Estuary Management Project Contribution?	Estuary Management Project Contribution Type	Estuary Management Project Contribution Significant?	Estuary Management Project Contribution Cumulatively Considerable?
WATER RESOURCE AND HABITAT ENHANCEMENT PROJECTS							
Russian River Instream Flow and Restoration Program (RRIFR)							
Temporary Urgency Change Petition	• Short-term Flow Changes • Hydrology • Water Quality • Recreation • Fisheries	Yes	Yes	Yes	• Flow Changes • Hydrology • Water Quality • Fisheries • Recreation	No Yes Yes Beneficial Yes	No Yes Yes Beneficial Yes
Modifications to D1610	• Long-term Flow Changes • Hydrology • Water Quality • Fisheries • Recreation	Yes	Yes	Yes	• Flow Changes • Hydrology • Water Quality • Fisheries • Recreation	No Yes Yes Beneficial Yes	No Yes Yes Beneficial Yes
Dry Creek Habitat Enhancements	• Construction • Water Quality • Fisheries	Yes	Yes	Yes	Hydrology Water Quality Fisheries	No No Beneficial	No No Beneficial
Coho Broodstock Program (US Army Corps of Engineers)	• Fisheries	Yes	Yes	Yes	Fisheries	Beneficial	Beneficial
Water Diversion Infrastructure	• Construction • Operations • Fisheries	Yes	Yes	Yes	Fisheries	Beneficial	Beneficial
LAND USE AND POLICY							
North Coast Regional Water Quality Control Board Basin Plan/303(d) List	• Water Quality	Yes	Yes	No	None	No	No
General Plan Development/ Infrastructure	• Construction • Operations • Growth	Yes	Yes	No	None	No	No
Local Coastal Program	• Long-term Implementation • Recreation • Aesthetics • Coastal Resources	Yes	Yes	Yes	Recreation/ Access Beneficial Uses Aesthetics Coastal Resources	Yes No No No No	Yes No No No No

TABLE 5-3 (Continued)
SUMMARY OF OTHER PLANS, POLICIES, PROGRAMS, AND HABITAT RESTORATION PROJECTS AND RELATIONSHIP TO ESTUARY MANAGEMENT PROJECT

Project Name	Project Impacts	Located in Russian River Watershed?	Located in Bay Area Airshed?[1]	Estuary Management Project Contribution?	Estuary Management Project Contribution Type	Estuary Management Project Contribution Significant?	Estuary Management Project Contribution Cumulatively Considerable?
LAND USE AND POLICY (cont.)							
Sonoma County Aggregate and Mining Resources Plan	• Erosion • Water Quality • Mineral Resources	Yes	Yes	No	None	No	No
Assembly Bill 2121	• Hydrology • Water Quality • Fisheries	Yes	Yes	No	None	No	No
North Coast Integrated Regional Water Management Plan	• Construction • Operations • Hydrology • Fisheries • Vegetation • Recreation	Yes	Yes	Yes	Fisheries Hydrology Water Quality	Beneficial No No	Beneficial No No

[1] The term "airshed" is defined by the Bay Area Air Quality Management District (BAAQMD) as a geographical area of which, because of topography, meteorology, and climate, shares the same air. For analysis of the Estuary Management Project, airshed refers to all areas that share the same air within the action area. This term is an applicable in the analysis of cumulative impacts on air quality as a result of concurrent construction or operation of projects within the same spatial and temporal locations.

Mitigation Measures

Mitigation Measures in **Chapter 4.0, Environmental Setting, Impacts, and Mitigation Measures**.

Impact Significance: Less than Significant.

5.3.3 Long-Term Impacts

Impact 5.2.1: Cumulative Long-term Geologic Impacts (Seismic Events and/or Beach Erosion). Concurrent creation of the outlet channel and continued artificial breaching with other projects proposed in the Russian River Watershed and other habitat enhancement projects could result in cumulative long-term risk of impacts related to groundshaking and surface fault rupture during major earthquakes, or lead to erosion of beach sands or river bank. (Less than Significant)

Components of the Estuary Management Project could be exposed to damage from earthquakes and geologic hazards. Seismic events could cause failure of the lagoon outlet channel. However this would not expose people or habitable structures to increased risk; therefore this impact is considered less than significant. As such, failure of facilities that are created as part of the Estuary Management Project, in conjunction with seismically-induced failure of other projects in the area, would not result in potential incremental increased risk of disruptions to water supplies, or damage to other infrastructure, or public safety, and is therefore not considered cumulatively considerable. Considering that geohazards are unavoidable and unpredictable, Estuary Management Project facilities would be exposed to damage from earthquakes and geologic hazards. Implementation of standard design criteria and appropriate design measures would reduce this impact to less than significant. Therefore, the Estuary Management Project's contribution to this seismic risk impact would not be cumulatively considerable.

Creation of the outlet channel could result in short-term erosion on the barrier beach. However, the beach is a dynamic system that is already subject to erosive forces of tidal action; therefore the level of erosion on the barrier beach potentially associated with the proposed project would not be considered significant. The projects identified in Table 5-1 are not anticipated to directly result in beach erosion, therefore, the cumulative impact would be equivalent to the impact identified in Chapter 4.0, and as such, the Estuary Project would not have a cumulatively considerable contribution.

Mitigation Measures

Mitigation Measures in **Chapter 4.0, Environmental Setting, Impacts, and Mitigation Measures**.

Impact Significance: Less than Significant.

Impact 5.2.2: Cumulative Long-term Hydrologic Impacts. Implementation of the Estuary Management Project, in combination with other identified cumulative projects within the Russian River Watershed and habitat enhancement projects, would alter the existing drainage pattern at the Estuary mouth, which could result in increased potential for inundation of parcels adjacent to the Estuary. (Cumulatively Significant and Unavoidable)

Implementation of projects identified in **Section 5.2**, as well as general development within the Russian River Watershed, would have the potential to increase flood flows during runoff events, and may increase the 100-year floodplain elevations in the vicinity of the Estuary. Implementation of the Estuary Management Project would not be expected to contribute to potential increase in 100-floodplain elevations, or increases in stormwater runoff or peak velocities.

However, during the lagoon management period, implementation of the Estuary Management Project would increase water surface elevations within the maximum backwater area, as well as the duration over which the target water surface elevations (e.g., 4.5 feet to 9 feet, with an average of 7 feet) would be maintained, depending upon the performance of the outlet channel. Within the Estuary Study Area, portions of approximately 78 parcels would be inundated at a water surface elevation of 9 feet. In most cases, the area of inundation would comprise channel margin ("shoreline") and beach areas only, and no structures (e.g., homes, sheds, septic tanks, boat docks, etc.) would be directly affected. However, in a few cases, a preliminary analysis using aerial photographs, elevation data, and parcel information (SCWA, 2010) suggests that existing structures, primarily boat docks, would be inundated at a water surface elevation between 7 and 9 feet. Similar effects may occur to additional properties within the maximum backwater area between Austin Creek and Vacation Beach.

The increase in the elevation and duration over which these structures would be annually inundated, could result in potentially more damage than that which is sustained under existing conditions. With respect to these parcels and structures, this would be a potentially significant impact resulting from implementation of the project; **Mitigation Measure 4.2.2** would reduce this impact to the degree feasible relative to structures that may be inundated for a longer duration. However, no mitigation measures are available to reduce or avoid the inundation of private parcels to an elevation of up to 9 feet along the shoreline within the maximum backwater area for longer durations during the lagoon management period. Therefore, the Estuary Management Projects contribution to impacts related to inundation of properties along the Estuary shoreline during the lagoon management period would be cumulatively considerable, and would therefore be cumulatively significant and unavoidable.

Mitigation Measures

No mitigation measures are available to reduce this impact and meet the project objectives.

Impact Significance: Cumulatively Significant and Unavoidable.

Impact 5.2.3: Cumulative Long-term Tsunami Effect. Implementation of the Estuary Management Project, in combination with other identified cumulative projects within the Russian River Watershed and habitat enhancement projects, could increase the risk to people or structures within this area to loss, injury, or death involving flooding in the unlikely event of a tsunami. (Cumulatively Significant and Unavoidable)

Projects identified in **Section 5.2**, are generally outside of the Estuary, and would not be anticipated to affect tsunami response. General development within and adjacent to the mapped tsunami flood zone along the Russian River Estuary would have the potential to increase the risk of inundation in the unlikely event of a tsunami.

Though tsunamis are extremely rare events, and the specific effect of elevated Estuary water levels upon the tsunami flood risk cannot be reliably quantified at this point, the increase in the duration of target Estuary water levels would, nonetheless, likely increase the overall risk of flooding associated with a tsunami. Since the duration of elevated Estuary water levels would be increased as a result of the project (e.g., from less than a few days, on average, to approximately one to five months, on average, where the Estuary water levels would be at or near 7 feet), the subsequent probability of a tsunami (of sufficient magnitude to cause damage) occurring concurrently with elevated Estuary water levels would also be increased. It should be noted that increased storage conditions currently occur episodically, but their duration is limited by artificial breaching practices currently implemented by the Water Agency.

In considering the increased duration of higher water surface elevations, and the increase in risk with respect to people, adequate warning would likely be given in the event of a potential tsunami generating event. This would not necessarily mitigate or alleviate the increased risk of loss as it pertains to existing structures or property (i.e. equipment, cattle, etc.). Given the uncertainty of the magnitude of this potential impact, and lacking more Estuary-specific information concerning tsunami effects, the following conclusion regarding significance is made: in the unlikely event that a tsunami of sufficient magnitude occurs within the Jenner area during the 5 month lagoon management period, the project would result in an increased risk of structural damage or loss for properties just outside of the areas that would currently be inundated by tsunami-related flooding. There is no feasible mitigation for this potential impact. Therefore, the Estuary Management Project's contribution to this impact would be considerable, and as such, is considered cumulatively significant and unavoidable.

Mitigation Measures

No mitigation measures are available to reduce this impact and meet the project objectives.

Impact Significance: Cumulatively Significant and Unavoidable.

Impact 5.2.4: Sea Level Rise. The Estuary Management Project could be affected by an increase in sea level rise. (Less than Significant)

As previously discussed in the **Section 4.2, Hydrology and Flooding**, climate change is likely to occur, but its timing and magnitude are uncertain. When it occurs, it could alter the hydrologic setting of the Estuary. The aspects of climate change which are likely to alter the proposed project and its impacts are increased sea level rise and wave energy. Other aspects of climate change which may alter the proposed project and its impacts are riverine discharge and wind-forced currents.[15] This analysis assumes a one meter rise in sea level as the worst-case-scenario, and identifies potential impacts to the proposed project. It should be noted that implementation of the proposed project would not affect or alter the occurrence or timing of climate change or sea level rise; rather, this discussion reviews potential future scenarios, and their potential effect on the successful implementation of the Estuary Management Plan Project.

Beach Morphology

Climate change, in the form of sea level rise and increased wave energy, is likely to alter the beach morphology at the mouth of the Russian River by increasing coastal erosion, thereby forcing the beach berm barrier in front of the estuary to transgress landward (PWA, 2010). This transgression will occur so that the beach berm is in equilibrium with the higher wave runup caused by both an increase in sea level rise and wave energy.

While the jetty and its remnant infrastructure (roadway, seawall, and railroad) are in place, the increase in sea level rise and wave energy will remove sand from in front of the jetty structures, but may be hindered from building the berm beach barrier further inland by the structures. Once sand is removed from in front of the structures, they will be exposed to the full force of the wave energy. This wave energy will probably damage and remove the structures, much as it has already done at the end of the concrete jetty which protrudes into the ocean and at the locations where overwash has breached the structures. Once the jetty structures deteriorate, transgression of the beach berm barrier is likely to continue landward at a pace unhindered by any remnant structures.

In response to a changing tidal prism, waves, and riverine discharge, the timing and/or frequency of the estuarine inlet closure may change (Largier et al., 2010). The manner in which the closures may change is difficult to assess at this time because closure occurs as a result of interactions between the timing and magnitude of tides, waves, and riverine discharge. Changes to these factors in response to climate change are not known at sufficient level of detail to predict how their interaction may affect closure.

Operations of the Proposed Outlet Channel - Outlet Channel Morphology

As described above in the section of beach morphology impacts, climate change may alter the timing and/or frequency of estuarine inlet closures. Since outlet channel operations are initiated in response to inlet closure, changes to the timing and frequency of inlet closures would have a

[15] It should be noted that this project would not contribute to sea level rise; therefore the analysis and mitigation do not include any reduction or prevention measures; rather this discussion focuses on potential effects of sea level rise on the project.

corresponding effect on outlet channel operations. As noted above, the potential change to closures is difficult to predict with the current level of understanding. If closures are more frequent during the management period, outlet channel implementation and maintenance may need to occur more frequently. Similarly, less frequent closures may reduce outlet channel implementation and maintenance.[16] Closure timing is particularly significant for the outlet channel since there may be a relative narrow window in the late spring and early summer, the start of the management season, when river flows are low enough and wave energy is high enough to cause closure. If climate change alters this balance, for instance, by increasing the duration of high riverine flows in the late spring and early summer, the Estuary may not close at the start of the management period as frequently as it has in the past, thereby limiting the likelihood of implementation of the outlet channel until wave energy increases in magnitude in the fall at the end of the management period.

Changes to sea level rise, wave direction, and wave energy, as well as the resulting change to overall beach morphology, may alter the manner in which the outlet channel migrates across the beach berm barrier (Behrens and Largier, 2010). In turn, these changes may affect the habitat objectives of the outlet channel, e.g. its ability to create a non-tidal, freshwater lagoon.

Operations of the Proposed Outlet Channel - Seepage through the Beach Berm Barrier

Increased sea level rise could reduce the difference in water level between the lagoon and the ocean.[17] This water level difference, along with the hydrogeologic properties of the beach sand, determines the seepage rate through the beach berm barrier. Seepage through the beach berm barrier may be an important factor in maintaining the water level inside the lagoon. If seepage is reduced by higher sea level, the outlet channel may need to convey additional water to maintain lagoon water levels and prevent flooding. If the outlet channel is operating close to the threshold for sand transport (PWA, 2010), the increased conveyance demands caused by reduced seepage may make it more difficult to maintain the outlet channel without it scouring and breaching the barrier beach.

Flooding of Property Adjacent to Estuary

One mechanism for flooding of property adjacent to the Estuary is closure followed by increasing water levels. Climate change may alter the timing and frequency of inlet closures, but current understanding does not indicate how closure may be altered. Since the proposed project continues to include artificial breaching as a flood hazard mitigation measure, the proposed outlet channel will not affect the flood hazard of properties adjacent to the estuary. If sea level rise and increased wave energy contribute to more frequent closures, the Water Agency may be called on to send construction equipment onto the beach more frequently. The increase in closure events is likely to be similar for no project, proposed project, and project alternatives since these alternatives do not affect either ocean water levels or waves.

---

16 As noted in **Chapter 2.0, Project Description**, the frequency of equipment operation on the barrier beach during the lagoon management period may be incrementally increased compared to existing conditions, and could include up to 18 maintenance activities over the course of the lagoon management period, depending upon the performance of the outlet channel. This represents a potential increase over existing artificial breaching activities.

17 Unless the beach berm height increased commensurately with sea level rise.

Mitigation Measures

Mitigation Measure 5.2.4: The Water Agency shall monitor occurrence of sea level rise and implement adaptive management strategies to manipulate outlet channel elevation, alignment, and width; or implement more frequent outlet channel maintenance.

Impact Significance: Although the effects of sea level rise on the proposed project are not fully known, implementation of the above mitigation measure would ensure that the Water Agency and other regulatory agencies incorporate sea level rise into the adaptive management plan for the Estuary to continue to meet project objectives. The project itself would not have any direct effect on sea level rise. Therefore, potential impacts associated with the proposed Estuary Management Project are not considered to be cumulatively considerable.

Impact 5.2.5: Cumulative Long-term Impacts on Water Resources. Implementation of the Estuary Management Project, in combination with other identified cumulative projects within the Russian River Watershed and habitat enhancement projects, could result in cumulative long-term impacts to water quality related to nutrient and indicator bacteria levels. (Cumulatively Significant and Unavoidable)

Reduced inflows into the Estuary could reduce water quality conditions, particularly with respect to bacteria and nutrient levels within the Estuary during freshwater lagoon conditions. Reduced flows may reduce the assimilative dilution capacity of Russian River flows upstream of the Estuary, and assuming inputs within the watershed remain constant, could result in increased concentrations of nutrients and indicator bacteria. Reduced water quality would have the greatest potential to occur during dry hydrologic years. As previously discussed in **Section 4.3, Water Quality**, areas upstream of the Estuary (upstream of Austin Creek) are identified by the NCRWQCB as impaired for bacteria. Water quality sampling by various entities, including SCWA 2004, have not identified bacterial levels that warrant listing the Estuary as impaired, and the 303(d) listing for bacteria is limited to areas upstream of Austin Creek. Sampling events in 2009 and 2010 indicate there is a large variation in indicator bacteria levels observed through the different sections of the Estuary. These variations were observed to occur under both open and closed mouth conditions and may be seasonal as well.

As identified in **Section 4.3, Water Quality**, implementation of the Estuary Management Project would not alter water quality inputs for nutrients or indicator bacteria into the Estuary, and closed Estuary conditions with the outlet channel established would still include flow through processes, although residence time within the Estuary would be increased by approximately one week compared to existing artificial breaching conditions. However, because of the limited nature of nutrient and indicator bacteria data collection during closure conditions, there is insufficient information to definitively conclude whether the adaptive management program would result in an increase, decrease, or no substantial adverse effect on nutrient or bacteria levels within the Estuary. Therefore, in the absence of technical certainty, the Estuary Management Plan would have the potential to contribute to significant and unavoidable secondary impacts to public health related to nutrient and bacterial levels in the Estuary. When considered cumulatively with the

Fish Flow Project, the potential for this occurrence may be increased, primarily in dry years, when inflow to the Estuary is reduced. The occurrence, nature and timing of potential impacts related to the Fish Flow Project will be confirmed during the environmental review process for that project. However, these impacts are considered cumulatively considerable.

It should be noted that the conditions of the Russian River Biological Opinion, and the Estuary Management Project's Adaptive Management Plan, include provision for breaching in the event that flooding conditions, water quality conditions, or biological resource conditions warrant. Therefore, no additional mitigation measures are required or available relative to the occurrence of this impact.

Mitigation Measures

No mitigation measures are available to reduce this impact and meet the project objectives.

Impact Significance: Cumulatively Significant and Unavoidable.

Impact 5.2.6: Cumulative Long-term Groundwater Impacts. Implementation of the Estuary Management Project, in combination with other identified cumulative projects within the Russian River Watershed and habitat enhancement projects, could change the duration and/or geographic extent of saline conditions in the Estuary. This could extend the period of time groundwater wells experience brackish water intrusion. (Cumulatively Significant and Unavoidable)

Projects identified in **Section 5.2** are generally outside of the Estuary and corresponding groundwater basin, and would not be anticipated to affect groundwater conditions. General development within and adjacent to along the Russian River Estuary that relies on groundwater use would have the potential to alter groundwater conditions. Additionally, implementation of the Fish Flow Project would reduce summer instream flows; this reduction could alter water quality within the Estuary, and could contribute to secondary effects to groundwater quality identified for the Estuary Management Project.

As noted in **Section 4.2**, the project could possibly extend the amount of time that some groundwater wells experience higher salinity during certain times of the year. The existence of salinity in groundwater wells, itself, is not a significant effect of the project because salt water influence has reportedly already been a recurring condition in wells located along the Estuary since at least the 1950s. However, there is insufficient information to conclude whether the adaptive management program would result in an increase, decrease, or no substantial adverse effect on the background or current brackish groundwater conditions in and adjacent to the Estuary.

Reduced instream flows related to the Fish Flow Project could also have the potential to contribute to secondary water quality effects along the Estuary. Anecdotal information indicates that brackish water conditions within the groundwater may be related to overall freshwater flows

within the Estuary, and that freshwater conditions within wells are improved with the onset of increased flows in the river following storm events. However, because of the lack of groundwater data along the Estuary, there is insufficient information to definitively conclude whether the adaptive management program would result in an increase, decrease, or no substantial adverse effect on groundwater quality within the Estuary. Therefore, in light of the existing, although limited, data and in the absence of technical certainty, the Estuary Management Plan would have the potential to contribute to significant and unavoidable secondary impacts to groundwater quality in the Estuary. When considered cumulatively with the Fish Flow Project, the potential for this occurrence may be increased, primarily in dry years, when inflow to the Estuary is reduced. The occurrence, nature and timing of potential impacts related to the Fish Flow Project will be confirmed during the environmental review process for that project. However, these impacts are considered cumulatively considerable.

Mitigation Measures

No mitigation measures are available to reduce this impact and meet the project objectives.

Impact Significance: Cumulatively Significant and Unavoidable.

Impact 5.2.7: Cumulative Long-term Impacts on Biological Resources. Implementation of the Estuary Management Project, in combination with other identified cumulative projects within the Russian River Watershed and habitat enhancement projects, could result in cumulative long-term impacts to biological resources. (Cumulatively Significant and Unavoidable)

Artificial breaching or lagoon outlet channel creation and maintenance under the Estuary Management Project could have a short-term effect on sensitive plant species (i.e. Tidestrom's lupine in dune habitat) that have a high potential to be located within the project area; however the impact would be reduced through pre-construction survey and avoidance measures **(Mitigation Measure 4.4.1)** established in **Section 4.4, Biological Resources**. Harbor seals disturbance during outlet channel creation and maintenance may be a nuisance and constitute take under the Endangered Species Act; however the project incorporates measures required under the Incidental Harassment Authorization, and therefore the project's take would be less than significant. No other projects listed in **Table 5-1** are anticipated to have a direct adverse effect on dune habitats or pinnipeds. Therefore, the Estuary Management Project's potential impacts during artificial breaching and creation of the outlet channel, in combination with projects described in **Section 5.2**, would not contribute to a cumulatively significant impact to these biological resources; the project contribution would be less than cumulatively considerable.

Long-term implementation and increased duration of the freshwater lagoon may have significant adverse effects that, considered concurrently with other projects in the Russian River Watershed, may be cumulatively considerable. The projects considered in **Table 5-1** are anticipated to have adverse impacts on biological resources. Potential contribution to impacts to species types are summarized below.

Natural Communities

As discussed in the analysis provided in **Section 4.4, Biological Resources**, increased duration of inundation anticipated during the lagoon management period may result in loss and/or conversion of sensitive plant communities. The change in the hydrologic regime may result in the change of the location, extent, and composition of the vegetation communities within the Estuary. Affected natural vegetation communities include, but are not limited to, Coastal and Valley Freshwater Marsh and North Coastal Riparian Scrub. Based on the affected acreages and anticipated transitions, this impact is considered less than significant. Other projects within the Russian River Watershed could also contribute to disruption or loss of rare plant habitat, if implemented. These projects have completed or will be required to complete the appropriate level of CEQA compliance and permitting, including the establishment of mitigation measures to minimize or offset loss of habitat.

As noted in **Section 4.0**, the adaptation of vegetative communities along the shoreline fringe of the Estuary is difficult to predict, as it is subject to several factors. It is anticipated that conditions resulting from the Estuary Management Plan would be consistent with the range of conditions currently experienced in the Estuary, and that its implementation would result in conditions that are more natural relative to observed conditions in other estuary systems on the West Coast.

Plants, Amphibians, Reptiles, and Birds

Although the change in duration of inundation could affect freshwater marsh and riparian communities, it is anticipated that while some freshwater marsh and riparian habitat may be lost in the lower elevations of the Estuary, some may be gained in the upper elevations (i.e., some additional wetland and riparian vegetation may grow above the managed surface water elevation because increasing groundwater levels would induce suitable conditions for the establishment of such vegetation, such as prolonged inundation or soil saturation during the growing season. Therefore, effects on specials-status plant and animals species potentially occurring in these habitats could be offset by the habitat gains. Additionally, estuaries are complex, dynamic ecosystems, normally experiencing changes between seasons, between years, and between different places in the same estuary. Plant and animal species within these systems are adapted to fluctuating environmental conditions. For these reasons, the loss or modifications of the freshwater marsh and riparian habitats is not expected to result in a substantial adverse effect on specials-status plants and animals potentially occurring within these communities. Therefore, the impacts of the Estuary Management Project, considered concurrently with other projects, are not cumulatively considerable.

Special-status birds, such as various wading birds, shorebirds, seabirds, and water birds, using the open water habitat and beaches, gravel bars, and mudflats of the Russian River for roosting and/or foraging could be adversely affected by lagoon adaptive management. Beaches, gravel bars, and mudflats may become submerged, and depths of the open water habitat may become less suitable for foraging by some species, while favored by others. Although the loss or modifications of these habitats could result in concentration of birds in fewer locations, it is not expected to result in a substantial adverse effect on any special-status birds potentially using the open water habitat and beaches, gravel bars, and mudflats of the Russian River. As discussed

above, estuary species are adapted to fluctuating environmental conditions. Additionally, suitable roosting and foraging habitat is present along the northern California coast. Therefore, the impacts of the Estuary Management Project, considered concurrently with other projects, are not cumulatively considerable.

Marine Mammals

Lagoon adaptive management could adversely affect harbor seals, as well as California sea lions and northern elephant seals (collectively referred to as pinnipeds), through habitat loss or modification during the one to five month lagoon management period. This potential habitat modification would include impeded access into the Estuary due to barrier beach closure and establishment of an outlet channel; and inundation of interior river haulouts. Based upon observation of use during shallow outlet channel conditions, effects related to impeded access are not considered significant with mitigation identified in **Section 4.4.** However, harbor seals use regular haulouts located within the Estuary, including the Jenner (Penny) logs, Paddy's Rock, and Chalanchawi. Under the proposed project, water levels would be increased up to 7 to 9 feet for a longer duration, which could inundate the mudflat/gravel bar areas that provide suitable haulout sites within the river, reducing their availability of haulout locations within the Estuary itself. Such modification of suitable habitat would be a potentially significant impact, as it could affect pinniped resting, foraging, and movement patterns, and rearing activities. Therefore, the impacts of the Estuary Management Project, considered concurrently with other projects, would be cumulatively considerable.

Jurisdictional Waters and Wetland Habitat

The Estuary Management Project could result in extended duration of higher water levels, which would become the new "ordinary high water" thereby adjusting the extent of jurisdictional waters. However, if water surface elevations do not establish the elevation of 7 feet as the ordinary high water, there would not be a net change in the extent of federal and state jurisdictional waters. Therefore, no significant impact (i.e. net loss of waters) is anticipated. Implementation of other projects within the Russian River Watershed would have the potential to impact wetland features. These projects have completed or will be required to complete the appropriate level of CEQA compliance and permitting, including the establishment of mitigation measures to minimize or offset loss of wetlands and sensitive habitats. As necessary, mitigation would be established as part of the USACE 404 Permit and CDFG 1602 permitting processes. In general, the character of the potential impact associated with the proposed Estuary Management Project is different than the impacts (i.e. conversion, removal, fill of wetland areas as a result of development) generally associated with other permanent conversion impacts to wetlands; therefore, the impacts of the Estuary Management Project, considered concurrently with other projects, is not cumulatively considerable.

Nursery Sites and Migratory Corridors

As discussed in the analysis provided in **Section 4.4, Biological Resources**, there would be no significant impact on the movement of wildlife along the Russian River corridor. There could be some adverse change in the availability of riverine marsh, tributary streams, or back-channel

ponds for amphibian breeding (nursery) sites. In the wetland communities where these sites occur, the discussion under Impact 4.4.6 (Natural Communities) predicts a combination of offsetting increases or losses as the water is retained for longer periods. Impacts to harbor seal pupping would be addressed through mitigation measures incorporated under the IHA. Projects identified in Table 5-1 are not anticipated to incur direct results to nursery sites or migratory corridors. The Estuary Management Project is determined to have a less than significant effect, and therefore, considered concurrently with other project impacts, represents a less than significant contribution to cumulative effects on nursery and migration sites.

Mitigation Measures

Mitigation Measures in **Section 4.4, Biological Resources**.

Impact Significance: Impacts related to inundation of pinniped river haulout sites would be Cumulatively Significant and Unavoidable.

Impact 5.2.8: Cumulative Long-term Impacts on Fisheries. Implementation of the Estuary Management Project, in combination with other identified cumulative projects within the Russian River Watershed and habitat enhancement projects, could result in cumulative long-term impacts to fisheries. (Cumulatively Beneficial)

As discussed in **Section 4.5, Fisheries**, all potential impacts related to CEQA criteria were evaluated and found to be less than significant and beneficial to fisheries resources in the Estuary. Management of a freshwater lagoon is expected to result in greater estuarine habitat productivity, increased juvenile growth, and potential subsequent adult recruitment. The adaptive management element of the Estuary Management Project is designed to reduce the likelihood of additional impacts to fish species through a range of monitoring, assessment, agency consultation, and management actions. The effects to fisheries from the Estuary Management Project, considered concurrently with the beneficial fisheries effects from other habitat restoration projects in the Russian River Watershed (Section 5.2), would contribute to a cumulatively beneficial effect.

Mitigation Measures

No Mitigation Measures are required.

Impact Significance: Cumulatively Beneficial.

Impact 5.2.9: Cumulative Long-term Impacts on Land Use. Implementation of the Estuary Management Project, in combination with other identified cumulative projects within the Russian River Watershed and habitat enhancement projects, could result in cumulative long-term impacts to land use and agricultural resources. (Less than Cumulatively Considerable)

Water levels resulting from increased duration of the freshwater lagoon under the Estuary Management Project have the potential to temporarily inundate locally-important farmland and grazing land within the Estuary Management Project area. As discussed in **Section 4.6, Land Use and Agricultural Resources**, it is anticipated that these impacts would not result in permanent conversion of agriculture land. Other projects described in **Section 5.2** are not anticipated to contribute to disruption or loss of farmlands, if implemented. These projects have been completed or would be required to complete the appropriate level of CEQA compliance and permitting, including the establishment of mitigation measures to minimize or offset loss of farmlands, as necessary. In combination with other projects described in **Section 5.2**, the Estuary Management Project would not have a cumulatively considerable contribution to the loss of farmlands.

Mitigation Measures

No mitigation measures are required.

Impact Significance: Less than Significant.

Impact 5.2.10: Cumulative Impacts to Recreation. Implementation of the Estuary Management Project, in combination with other identified cumulative projects within the Russian River Watershed and habitat enhancement projects, could result in cumulative long-term impacts to recreation and recreational facilities. (Cumulatively Significant and Unavoidable)

As discussed in **Section 4.7, Recreation**, the Estuary Management Project has the potential to modify or eliminate the surf break during the lagoon management period. The surf break is associated with open tidal conditions, either occurring naturally or immediately following artificial breaching activities. Other projects in the Russian River Watershed, Sonoma's coastal area, or other habitat restoration projects would not directly result in degradation of the surf break at this location. However, as previously noted, reduced summer flows associated with the Fish Flow Project would likely increase the number of closure events occurring during the lagoon management period. Depending upon hydrologic year type, reduced summer flows would also assist in the management of the outlet channel, as less discharge via the outlet channel would be anticipated. This would reduce the potential for the outlet channel to erode open and re-establish tidal conditions in the Estuary. Considered cumulatively, it should be noted that the Estuary Management Project is designed to accommodate the observed range of inflows to the Estuary following natural closures that occur during the May 15 to October 15 lagoon management period.

Surf swells in the Sonoma Coast region are typically smaller during summer months; and anecdotal information asserts that, during summer months, the wave break elsewhere in the region is not comparable to the wave break at the Russian River mouth that is supported by open, tidal conditions at the Russian River mouth. The reduction or loss of this surf break occurrence during summer months is of particular concern to local surfers (ESA, 2010). Although the project would not directly eliminate this temporarily-occurring recreational resource for the duration of the year, the project would likely reduce the occurrence of the surf break at Goat Rock for current users during the lagoon management period.

During the non-management period from October 16 through May 14, it is anticipated that ocean topography off-shore of Goat Rock State Beach would return to previous conditions and the surfing location would provide the same recreational experience for users as existing conditions. However, in light of local incidental recreational benefit enjoyed under current management practices, this reduction in the occurrence of surf break conditions is considered a significant impact. There are no available/ feasible mitigation measures that would effectively reduce or avoid the impact; therefore it is considered unavoidable.[18]

In addition to effects to surfing conditions, the increased frequency and duration of closures could result in longer inundation of shoreline properties and riverfront beaches, both relatively large, contiguous areas, as well as smaller, more discrete areas immediately adjacent to the active channel margin. Recreation facilities adjacent to the Estuary include Willow Creek Open Space, Willow Creek Environmental Camp, and private boat docks, and beaches (i.e. at Rien's Sandy Beach campsite and Casini Ranch). Riverfront beaches within the project area are used as stopovers/rest areas, picnicking spaces, and sunbathing areas by recreational users, particularly kayakers and boaters on the River. Reduced beach area could be an inconvenience to recreational users. When considered cumulatively with lower flow conditions associated with the Fish Flow Project, the quality of recreational boating experience in the lower Russian River and Estuary could be adversely affected during dry hydrologic years.

Within the Estuary, at water surface elevations of 9 feet, beach area would remain present at most gravel bar locations, and riverside access to these gravel bars would still be available. Higher water surface elevations within the Estuary may be perceived as a benefit to recreational boaters within the lower 10 miles of the Russian River, and could offset lower flows. However, no mitigation measures are available to reduce or avoid the inundation of gravel bar and shoreline beaches to an elevation of up to 9 feet along the Estuary shoreline for longer durations that could occur during the lagoon management period. Therefore, these impacts are considered significant and unavoidable.

[18] As recorded in **Appendix 1.2**, participants in the scoping process recommended construction of an artificial reef to reduce adverse impacts to surfing; however construction of a physical structure is anticipated to incur direct, however short-term, adverse environmental effects to marine life, hydrology, and geomorphology during construction. Some case studies demonstrate that artificial reefs can be multi-purpose, designed to improve sediment retention and protect beach from erosion, and constructed of materials that could enhance marine habitat. The artificial reef would function to dissipate swell energy across the entire length of the reef for the primary purpose of protecting beaches from erosion and sediment loss. Cases of successful artificial reefs are most prevalent outside of North America, in locations that are subject to severe weather (i.e. monsoons). Feasibility studies would need to be undertaken to determine if an artificial reef would be appropriate or functional in the Russian River area. Additionally, there is no guarantee that construction of an artificial reef would, in fact, improve surfing conditions; it would be entirely dependent on ocean conditions.

Mitigation Measures

No mitigation measures are available to reduce this impact and meet the project objectives.

Impact Significance: Cumulatively Significant and Unavoidable.

Impact 5.2.11: Cumulative Long-term Impacts on Cultural and Historic Resources. Implementation of the Estuary Management Project, in combination with other identified cumulative projects within the Russian River Watershed and habitat enhancement projects, could result in cumulative long-term impacts to cultural resources. (Less than Significant)

Although no adverse impacts to archaeological or paleontological resources or human remains are anticipated, water levels associated with increased duration of the freshwater lagoon have the potential to result in long-term impacts related to the conversion natural vegetation communities that support culturally significant plants. It is likely these vegetation communities would adapt to a new hydrologic regime and re-establish new communities; however for the purposes of this cumulative analysis, a conservative approach is warranted. Other projects within the Russian River Watershed could contribute to disruption or loss of cultural sites, areas that support culturally significant plants, or archaeological remains, if implemented. These other projects have completed or will be required to complete the appropriate level of CEQA compliance and permitting, including the establishment of mitigation measures to minimize or avoid impacts to cultural resources. Therefore, the Estuary Project's cumulative contribution to permanent impacts to culturally significant plants, would not be cumulatively considerable.

Impact Significance: Less than significant.

Impact 5.2.12: Cumulative Long-term Noise Impacts. Implementation of the Estuary Management Project, in combination with other identified cumulative projects within the Russian River Watershed and habitat enhancement projects, could result in a cumulatively considerable net increase in ambient noise. (Less than Cumulatively Considerable)

The Estuary Management Project would not result in long-term noise impacts. Therefore in combination with the projects described in Section 5.2, the Estuary Management Project would not have a cumulatively considerable contribution to long-term ambient noise levels.

Mitigation Measures

Mitigation Measures in **Section 4.9, Noise**.

Impact Significance: Less than significant with mitigation.

Impact 5.2.13: Cumulative Impacts from Greenhouse Gas Emissions. Implementation of the Estuary Management Project, in combination with other identified cumulative projects within the Russian River Watershed and habitat enhancement projects, could result in a cumulatively considerable net increase in GHG emissions or criteria pollutants for which the region is in non-attainment under applicable standards. (Less than Cumulatively Considerable)

The Estuary Management Project would contribute negligible amounts of greenhouse gas emissions (GHG) associated with operation of mechanical equipment during lagoon outlet channel creation and maintenance. Concurrent implementation of projects described in **Section 5.2** would also contribute to GHG emissions. These projects have completed or will be required to complete the appropriate level of CEQA compliance and permitting, including the establishment of mitigation measures to minimize or offset GHG emissions. Due to the limited nature of the Estuary Management Project's GHG emissions, and the mitigation measures established in **Section 4.10, Air Quality**, the Estuary Management Project impact would be less than significant and would not have a cumulatively considerable contribution.

Criteria Pollutants. As demonstrated in **Table 5-1,** there are a number of projects in the area that would overlap with implementation of the Estuary Management Project. However, according to the *BAAQMD CEQA Guidelines*, a project's cumulative impact on air quality is considered less than significant if it does not have an individually significant operational air quality impact and it is consistent with the local general plans as well as the regional air quality plan (BAAQMD, 1999). As demonstrated in **Section 4.10, Air Quality**, the Estuary Management Project would not result in significant increases in long-term emissions of criteria pollutants. As such, the proposed project would not conflict with an applicable local or regional air quality plan and would not be cumulatively considerable. The contribution of the Estuary Management Project to air quality impacts within the airshed would be less than cumulatively considerable.

Mitigation Measures

No mitigation measures are required.

Impact Significance: Less than Significant.

Impact 5.2.14: Cumulative Long-term Traffic Impacts. Implementation of the Estuary Management Project, in combination with other identified cumulative projects within the Russian River Watershed and habitat enhancement projects, could result in a cumulatively considerable net increase in traffic congestion or exceedance of applicable road standards. (Less than Cumulatively Considerable)

Traffic impacts associated with the Estuary Management Project would be less than significant and limited to four to five vehicles during lagoon outletchannel creation and maintenance. The Estuary Management Project would not result in long-term traffic impacts and projects identified in Table 5-1 are not anticipated to incur impacts on roadways to be affected by the proposed Estuary Management Project; therefore the Estuary Management Project's contribution to long-term increased roadway conditions or traffic congestion would be less than cumulatively considerable.

Mitigation Measures

No mitigation measures are required.

Impact Significance: Less than Significant.

Impact 5.2.15: Cumulative Long-term Visual Impacts. Implementation of the Estuary Management Project, in combination with other identified cumulative projects within the Russian River Watershed and habitat enhancement projects, could result in a cumulatively considerable visual impacts or permanent change in aesthetic characteristics. (Less than Cumulatively Considerable)

Creation of the outlet channel would be generally consistent with existing aesthetic conditions and would not change the visual character of the area. Furthermore, the projects included in **Table 5-1** are not anticipated to impact scenic resources in the Estuary Management Project area. The cumulative impact from the proposed project and the projects described above in **Section 5.2** would be less than significant.

Mitigation Measures

No mitigation measures are required.

Impact Significance: Less than Significant.

5.4 References

Behrens, Dane and John Largier, Bodega Marine Laboratory, University of California Davis, *Preliminary Study of Russian River Estuary: Circulation and Water Quality Monitoring 2009 Data Report*, February 15, 2010.

CALFED Independent Science Board, Memorandum to Delta Vision Blue Ribbon Task Force regarding Sea Level Rise and Delta Planning, September 6, 2007, http://deltavision.ca.gov/BlueRibbonTaskForce/Sept2007/Handouts/Item_9.pdf, Accessed on October 1, 2008.

Horizon Water and Environment (Horizon), *Stream Maintenance Program Draft Environmental Impact Report*, Prepared for Sonoma County Water Agency, January 2009.

Largier John, Cheng, Brian, and Kelley Higgason, *Climate Change Impacts, Gulf of the Farallones and Cordell Bank National Marine Sanctuaries*, Report of a Joint Working Group of the Gulf of the Farallones and Cordell Bank National Marine Sanctuaries Advisory Councils, 2010.

National Marine Fisheries Service (NMFS), *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, September 24, 2008.

North Coast Regional Partnership Del Norte, Humboldt, Mendocino, Modoc, Siskiyou, Sonoma, and Trinity Counties, *North Coast Integrated Water Management Plan, Phase 1*, July 2007, http://www.northcoastirwmp.net/docManager/1000006298/NCIRWMP_Phase_I_2007.pdf, Accessed July 26, 2010.

North Coast Regional Water Quality Control Board (NCRWQCB), *2006 CWA Section 303 (d) List Water Quality Limited Segments Requiring TMDLs*, 2007a.

North Coast Regional Water Quality Control Board, *Water Quality Control Plan for the North Coast Region (Basin Plan)*, January 2007b.

Obedzinski, M., J.C. Pecharich, J.A. Davis, S. Nossaman, P.G. Olin, and D.J. Lewis. R*ussian River Coho Salmon Captive Broodstock Program Monitoring Activities: Annual Report, July 2007 to June 2008*, University of California Cooperative Extension and Sea Grant Program. Santa Rosa, California, 2009.

Philip Williams and Associates (PWA), *Russian River Estuary Outlet Channel Adaptive Management Plan Year 1, 2010*, prepared for Sonoma County Water Agency, June 23, 2010.

Regents of University of California, *Russian River Coho Salmon Captive Broodstock Program, Homepage*, Updated April 20, 2010, Accessed August 2010.

San Francisco Bay Conservation and Development Commission, A Sea Level Rise Strategy for the San Francisco Bay Region, 2008, http://www.bcdc.ca.gov/planning/climate_change/SLR_strategy.pdf, Accessed on October 2, 2008.

Sonoma County Permit and Resource Management Department (PRMD), *Homepage* and *Environmental Impact Reports*, http://www.sonoma-county.org/prmd/index.htm and http://www.sonoma-county.org/prmd/docs/eir/index.htm, Accessed July 26, 2010.

Sonoma County Transportation and Public Works, *Current Road, Refuse, and Airport Projects*, http://www.sonoma-county.org/tpw/projects/road_current.asp, Accessed July 26, 2010.

Sonoma County Water Agency (SCWA), Projects, http://www.scwa.ca.gov/projects/, Accessed July 26, 2010.

Sonoma County Water Agency (SCWA), Mirabel Fish Screen Reconfiguration Feasibility and Alternatives Study, Final Report, December 2009. Sonoma County Water Agency (SCWA), Mirabel Fish Screen Reconfiguration Feasibility and Alternatives Study, Final Report, December 2009.

Sonoma County Water Agency (SCWA), *Results of the Sonoma County Water Agency's Mirabel Rubber Dam/Wohler Pool Reconnaissance Fish Sampling Program 1999*, October 1, 2000.

State Water Resources Control Board, Division of Water Rights (SWRCB*), Draft Substitute Environmental Document for Policy for Maintaining Instream Flows in Northern California Coastal Streams*, December 2007.

U.S. Environmental Protection Agency (EPA), *Overview of the TMDL Process*,2002, http://yosemite.epa.gov/R10/water.nsf/ac5dc0447a281f4e882569ed0073521f/2ac95839fe692ab6882569f100610e6a?OpenDocument, accessed: 8 August 2010.

U.S. Fish and Wildlife Service (USFWS), Biological Opinion for the Proposed Jenner Community Club Fire Station Bridge Replacement, Sonoma County, California (FEMA-1628-DR0CA PW#2721), 2008b.