

# EXECUTIVE SUMMARY

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## ES.1 Introduction

The Sonoma County Water Agency (Water Agency), as Lead Agency, has prepared this Draft Environmental Impact Report (EIR) for the proposed Russian River Estuary Management Project (Estuary Management Project or proposed project) to provide the public and responsible and trustee agencies reviewing the Estuary Management Project an analysis of the potential effects, both beneficial and adverse, on the environment.<sup>1</sup> This project is intended to fulfill federal mandates to implement adaptive management of the Russian River Estuary (Estuary) to enhance fisheries habitat while minimizing flood risk. Implementation of the Estuary Management Project would involve management of the Estuary as a summer lagoon (during a lagoon management period May 15 to October 15), and continuation of artificial breaching practices during the remainder of the year (described in detail below). This Draft EIR considers the following alternatives to the project: No Project, Habitat Restoration, Temporary Outlet Standpipe, Reduced Project, Jetty Modification, and Alternative Flood Management Measures.

### ES.1.1 Project Background

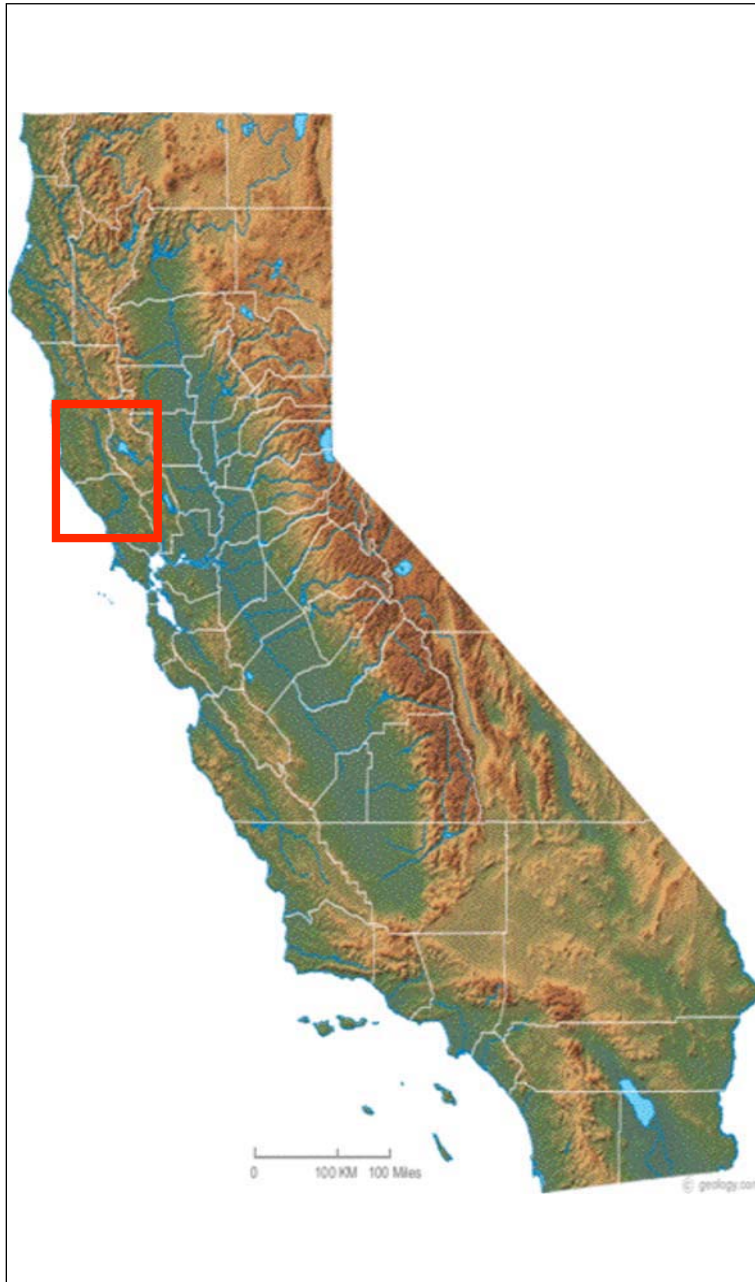
The Russian River watershed encompasses 1,485 square miles of Sonoma and Mendocino Counties. The project area, illustrated in **Figure ES-1**, is located at the Russian River Estuary (Estuary)<sup>2</sup>, approximately 60 miles northwest of San Francisco Bay, near the town of Jenner, Sonoma County, California. The focus of Estuary management activities is the barrier beach that forms at the mouth of the Russian River where it discharges to the Pacific Ocean.<sup>3</sup> The mouth of the Russian River Estuary is located at Goat Rock State Beach, which is owned by California State Department of Parks and Recreation (State Parks). The Estuary extends from the mouth of the Russian River upstream approximately seven miles to the Duncans Mills area beyond the confluence with Austin Creek (Estuary Study Area). Within this area, the Water Agency has developed high resolution water quality, vegetation, biological resources, and bathymetric information which will be used to examine impacts within the Estuary. This is referred to as the

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

<sup>2</sup> Estuary is defined as a partly enclosed coastal body of water with a river flowing into it, and open connection to the ocean (tidally influence). The term "Estuary", in the context of this document, refers to the geographic location of the project, recognizing that the proposed project involves creation of a 'lagoon', which is defined as a freshwater or brackish body of water separated from the ocean by a barrier beach.

<sup>3</sup> Activities will physically occur in the lower Estuary; however some impacts may extend upstream, and are discussed in the resource sections in Chapter 4.0 as applicable.



**Figure ES-1**  
Regional Location

Estuary Study Area and is characterized by three primary reaches: lower, middle and upper reach. (**Figure ES-2**). It is estimated that under certain closed conditions, backwatering may extend upstream as far as Vacation Beach. As such, for certain issue areas, this “maximum backwater area” extending from the mouth of the Russian River to Vacation Beach will be discussed.

The Estuary is open to the ocean tides for much of the year. At certain times, the natural formation of a barrier beach<sup>4</sup> across the mouth of the Russian River cuts off the tidal connection between the ocean and the Russian River and creates a lagoon.<sup>5</sup> The Estuary may close at any time of the year, although the closures occur most often during April to June and again in September to November. Closures result in increasing water levels in the Estuary behind the barrier beach and an increase in the risk of flooding of low-lying properties (SCWA, 2009). Natural breaching of the barrier beach occurs when Estuary water levels exceed the capability of the barrier beach to impound this water, causing localized failure of the barrier beach and creating a tidal channel that reconnects the Russian River to the Pacific Ocean. Historically, private citizens breached the barrier beach, enabling the river to flow into the ocean, in an effort to avoid flooding. In the 1960s, the Sonoma County Public Works Department accepted responsibility for breaching, using heavy equipment. After a county reorganization in the mid-1990s, the Water Agency began to perform activities related to breaching the barrier beach. Currently, the Water Agency artificially breaches the barrier beach when the water surface level in the Estuary is between 4.5 and 7.0 feet, as determined by the gauge at the Jenner Visitor’s Center, in accordance with the *Russian River Estuary Study 1992–1993* (Heckel, 1994). Breaching occurred every year between 1996 and 2009, except 2006.<sup>6</sup>

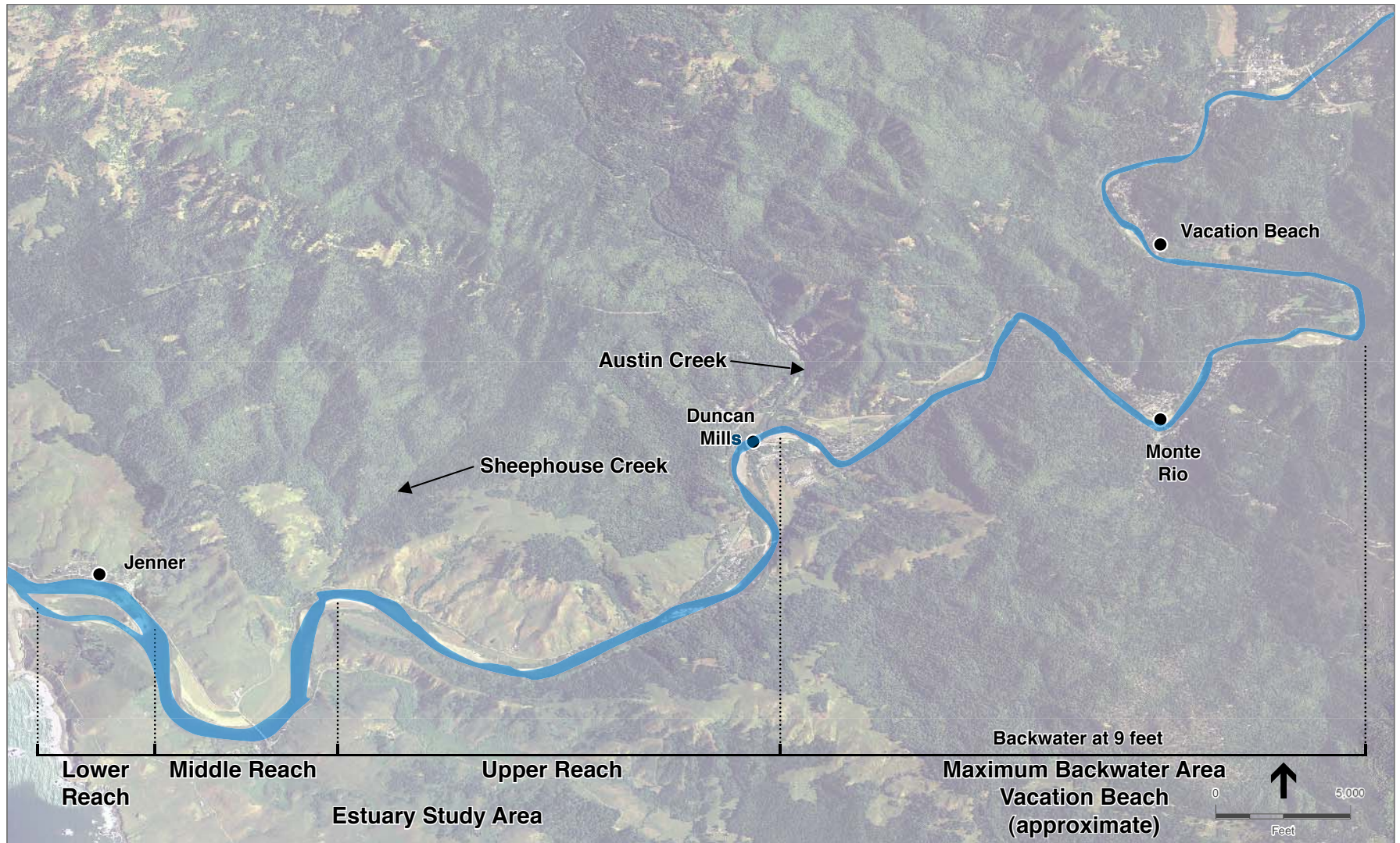
In 2008, the National Marine Fisheries Service (NMFS) issued the *Biological Opinion for Water Supply, Flood Control Operations, and Channel Maintenance conducted by the U.S. Army Corps of Engineers, the Sonoma County Water Agency, and the Mendocino County Russian River Flood Control and Water Conservation District in the Russian River Watershed* (Russian River Biological Opinion).<sup>7</sup> The Russian River Biological Opinion is a culmination of more than a decade of consultation between the Water Agency, the U.S. Army Corps of Engineers (USACE), and NMFS regarding the impact of the Water Agency’s and USACE’s water supply and flood control activities on three fish species listed under the federal Endangered Species Act: Central California Coast steelhead, Central California Coast coho salmon, and California Coastal Chinook salmon. The California Department of Fish and Game (CDFG) issued a consistency determination on November 9, 2009, finding that the Russian River Biological Opinion was consistent with the requirements of the California Endangered Species Act (CESA) and adopted the measures identified in the Russian River Biological Opinion.

<sup>4</sup> For the purposes of this project, the term barrier beach is used to describe closed sandbar conditions, consistent with National Marine Fisheries Service (NMFS) terminology.

<sup>5</sup> A lagoon is formed when a barrier beach restricts tidal exchange in the Estuary.

<sup>6</sup> A detailed description of artificial breaching activities is provided in **Chapter 2.0, Project Description**.

<sup>7</sup> The Russian River Biological Opinion may be accessed online at [www.sonomacountywater.org](http://www.sonomacountywater.org) and may be reviewed at the Water Agency’s office located at 404 Aviation Boulevard, Santa Rosa, CA.



**Figure ES-2**  
Estuary Study Area and Maximum Backwater Area

The Russian River Biological Opinion concluded that the continued operations of Coyote Valley Dam and Warm Springs Dam by the USACE and the Water Agency in a manner similar to recent historic practices, together with the Water Agency's stream channel maintenance activities and Estuary management, are likely to jeopardize and adversely modify critical habitat for endangered coho salmon and threatened steelhead. The Russian River Biological Opinion found that artificially elevated inflows to the Russian River Estuary during the low flow season (May through October) and historic artificial breaching practices have significant, adverse effects on the Russian River's estuarine rearing habitat for juvenile salmonids, particularly steelhead. The historic method of artificial breaching, which is done in response to rising water levels behind the barrier beach, creates a tidal marine environment with shallow depths and high salinity. The Russian River Biological Opinion concludes that the combination of high inflows and breaching practices impact rearing habitat because they interfere with natural processes that would otherwise cause a freshwater lagoon to form behind the barrier beach. According to NMFS, fresh or brackish water lagoons at the mouths of many streams in central and southern California often provide depths and water quality that are highly favorable to the survival of rearing salmon and steelhead.<sup>8</sup>

The Russian River Biological Opinion requires the Water Agency to collaborate with NMFS and CDFG and to modify Estuary management in order to reduce marine influence (high salinity and tidal inflow) and promote a higher water level in the Estuary (formation of a fresh or brackish water lagoon) from May 15 to October 15 (referred to hereafter as the "lagoon management period"). Conditions in a fresh or brackish water lagoon are thought by NMFS to enhance the quality of rearing habitat for juvenile salmonids. The Russian River Biological Opinion prescribes a program of potential, incremental steps to accomplish these conditions, including adaptive management of a lagoon outlet channel on the barrier beach during the lagoon management period. The Water Agency would continue the historical practice of artificially breaching the barrier beach to minimize flooding outside of the lagoon management period.

## ES.1.2 Project Objectives, Purpose, and Need

This EIR has been developed to provide the public and responsible and trustee agencies reviewing the Estuary Management Project an analysis of the potential effects, both beneficial and adverse, on the local and regional environment associated with implementation and operation of the Estuary Management Project. In order to comply with the requirements of the Russian River Biological Opinion, the Water Agency will adaptively manage the Estuary with the primary objectives of enhancing rearing habitat for juvenile salmonids, particularly steelhead, and managing Estuary water levels to minimize flood hazard. Rearing habitat may be enhanced by reducing tidal influence on the Russian River Estuary during the lagoon management period to increase freshwater habitat available for rearing salmon and steelhead. Adaptive management requires: 1) monitoring of biological productivity, water quality, and physical processes in the Estuary in response to the changes in management actions that control water surface elevations in the

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<sup>8</sup> National Marine Fisheries Service. 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 District in the Russian River Watershed. p. 243. September 2008.

estuary-lagoon system; and 2) refinement of management actions to achieve desired water levels to support biological productivity, while simultaneously providing flood management for properties adjacent to the Estuary. In addition to the primary objectives, the Estuary Management Project is intended to assist the Water Agency in its efforts to provide for the health and safety of visitors and employees of the State Beach and Water Agency staff during management activities; and to implement, operate, and maintain management techniques in a technically and economically feasible manner.

### **ES.1.3 Summary of Public Involvement Activities**

In accordance with CEQA Guidelines Section 15082, the Water Agency circulated a Notice of Preparation (NOP) to local, state, and federal agencies, and to other interested parties on May 7, 2010. The NOP was circulated for a 45-day public review period, which ended on June 21, 2010, to solicit both written and verbal comments on the EIR's scope and provide information on the public scoping meeting. Additionally, the NOP presented the background, purpose, description, and location of the proposed project, potential issues to be addressed in the EIR, and contact information for additional information regarding the project. The NOP was directly mailed to 400 parties, and a postcard notification of the NOP's availability was sent to 1,200 parties.

During the scoping period, the Water Agency held two scoping meetings to discuss the project and to solicit public input as to the scope and content of this EIR. Public legal notices and display advertisements were placed in five local newspapers informing the general public of the availability of the NOP and the times and locations of scheduled scoping meetings. The purpose of the scoping meetings was to present the proposed project to the public through use of display maps and handouts describing project components and potential environmental impacts. Attendees were provided an opportunity to voice comments or concerns regarding potential effects of the proposed project. **Appendix 1** of this Draft EIR contains a copy of the NOP and the Scoping Report, which provides a summary of all verbal and written comments received, and copies of the written comments.

A total of 33 comment submittals (letters, emails, comment cards) were received. Collectively, a total of 38 individual verbal comments were received and noted below. Written comments were received from federal agencies, including NMFS; state agencies, including CDFG, California Department of Parks and Recreation, and California Native American Heritage Commission; public organizations, including SealWatch, Russian Riverkeeper, Save the Waves Coalition, Sonoma Coast Surfrider Foundation, Russian River Watershed Protection Committee, Northern California River Watch, Trout Unlimited; and members of the public. The comments included questions regarding the project description and CEQA process, as well as CEQA technical issues, including potential effects on water quality, biological and fisheries resources, hydrology, cultural resources, climate change, and recreational resources.

## ES.2 Proposed Project

### ES.2.1 Continued Artificial Breaching

The Water Agency will continue the historical practice of artificially breaching the barrier beach outside the lagoon management period (May 15 through October 15), as allowed in the Russian River Biological Opinion and described in the *Russian River Estuary Study 1992–1993*, seeking to minimize potential flooding of low-lying properties along the Russian River.<sup>9</sup> Artificial breaching outside of the lagoon management period typically consists of the following actions:

1. 24 hours prior to breaching, the Water Agency contacts State Parks lifeguards and posts signs and barriers to minimize potential hazards to beach visitors.
2. A bulldozer or similar equipment is offloaded at the parking lot at Goat Rock State Beach and driven onto the beach via an existing access point. This access point and barrier beach driving route are currently used by lifeguarding trucks and other State Park vehicles.
3. A “pilot channel” is cut at a depth that allows flows from the lagoon to scour sand into the ocean. The size of the pilot channel varies, depending on the height of the barrier beach, the level of the tide, and the surface level of water in the estuary. A typical channel is approximately 100 feet long, 25 feet wide, and 6 feet deep. The amount of sand that is moved ranges from less than 100 cubic yards to approximately 1,000 cubic yards. The sand is placed onto the beach adjacent to the pilot channel. The orientation of the pilot channel is generally perpendicular to the ocean, the shortest distance from the River across the barrier beach.
4. After the pilot channel is dug, the last upstream portion of the barrier beach is removed, allowing lagoon water to flow into the ocean.
5. Flows in the pilot channel scour sand, deepening and widening the channel to create a full tidal connection between the Estuary and the ocean. Within a day after breaching, the tidal channel’s width often exceeds 100 feet in width (PWA, 2010). Channel widening washes the excavated sand into the ocean.
6. The channel is monitored and equipment is driven back to the existing access point and loaded for transport. Signage and barriers are removed, and the channel is periodically monitored by Water Agency staff.

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<sup>9</sup> NMFS requires estuary management from May 15 through October 15; the Water Agency would continue current artificial breaching practices outside this period. NMFS’ includes continued artificial breaching in their Russian River Biological Opinion, Part III, Description of the Proposed Action, Subpart B.2, Estuary Management (page 20), which provides for the Water Agency to periodically excavate a pilot channel across the lowest point of the sand bar at the mouth of the Russian River when the estuary elevation rises to a point where low lying properties are threatened with flooding. The breaching actions will likely take place 4 to 11 times per year for the next fifteen years” (NMFS, 2008; page 20).

## ES.2.2 Lagoon Adaptive Management

To comply with conditions stipulated in the Russian River Biological Opinion, the Water Agency will pursue an alternative approach for management of water levels in the Estuary, and will adaptively manage a lagoon outlet channel<sup>10</sup> to achieve an average daily water surface elevation of at least 7 feet during the lagoon management period from May 15 to October 15.<sup>11</sup>

The Estuary is a dynamic system subject to riverine and tidal influence such that lagoon formation is dependent on variables including riverine freshwater inflow, ocean wave conditions, beach sediment, and geologic structure of the river. During the lagoon management period, following natural formation of the barrier beach and the freshwater lagoon, the Water Agency would create an outlet channel at an elevation that would allow for overflow from the lagoon, thereby maintaining a more steady water surface elevation within the lagoon that would minimize property inundation. Physical establishment of the outlet channel during the lagoon management period would be similar in terms of equipment and duration as artificial breaching. Once established, it is anticipated that the outlet channel will allow for longer duration of freshwater lagoon conditions during summer months and improve rearing habitat for juvenile salmonids.

In the event that the outlet channel erodes the barrier beach to re-establish a tidal inlet, the Water Agency would resume adaptive management of the outlet channel's width, slope, and alignment, in consultation with the NMFS and CDFG after ocean wave action naturally reforms the barrier beach and closes the tidal inlet. This "maintenance" of the outlet channel would provide for the continuation of the lagoon conditions that have been established. As such, project implementation would increase the duration of freshwater lagoon conditions from the typical 5 to 14 day duration currently experienced, to an estimated 1 month to 5 month duration. A lagoon lasting for longer duration would be consistent with freshwater lagoons observed in some other coastal river systems.

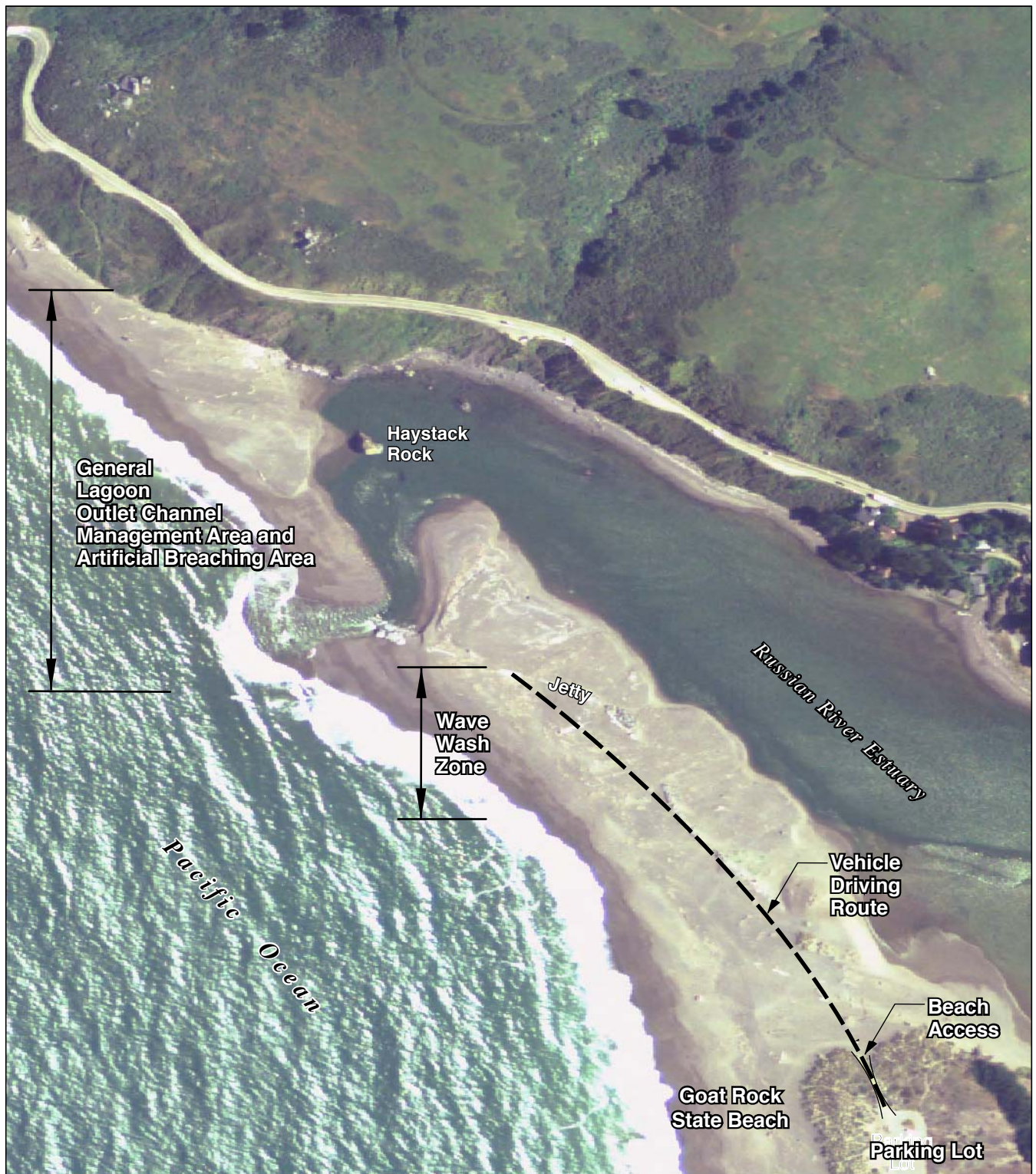
The channel would be located within the area that it has been observed to naturally occur, between the jetty and approximately 1,500 feet to the northwest (**Figure ES-3**). Channel length would vary based upon location, but a hydraulic gradient would be established to provide for overflow while minimizing channel erosion. The outlet channel would not be excavated as deeply, narrowly, or with as steep a gradient as the pilot channels currently implemented by the Water Agency, which are designed to allow flow velocities to erode a wider and deeper channel that downcuts into the barrier beach and reopens the Estuary to tidal action. The dimensions and location of the outlet channel would be dependent on beach formation topography and forecasted river flow and ocean conditions at the time of outlet channel creation. The Estuary may close at any time of the year, although the closures occur most often between spring and late fall. This is a

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<sup>10</sup> No new engineered structures or mechanical devices, temporary or permanent, will be a part of the outlet channel implementation.

<sup>11</sup> NMFS considered the possibility that artificial breaching may be required during the lagoon management period to minimize flooding risk and included allowances for such activities in the Incidental Take Statement: "We estimate that the Agency will need to artificially breach the lagoon using methods that do not create a perched lagoon twice per year between May 15 and October 15 during the first three years covered by this opinion, and once per year between May 15 and October 15 during years 4-15 covered by this opinion" (NMFS, 2008; page 302).





SOURCE: ESA, 2010

Russian River Estuary Management Project . 207734.01

**Figure ES-3**  
Estuary Management Area

period of generally lower instream flows and increased creation of barrier beach conditions due to wave activity. Review of flow data for the 115 closure events occurring between 1996 and 2009 indicated a median flow at the USGS Guerneville Gauge for these events is 250 cubic feet per second (cfs), with a minimum flow of 71 cfs and a maximum flow of 1,120 cfs. Therefore, closure events due to barrier beach formation have occurred over a wide range of flow conditions. During the lagoon management period, the outlet channel would be expected to perform over a range of flow conditions that could be experienced between May 15 and October 15. The outlet channel dimensions are estimated to be approximately 30-foot wide and 100 –feet long, based on a wide and short channel planform alignment that would minimize scour potential. The dimensions of an outlet channel created along either alignment are constrained by the acceptable excavation volumes per the Water Agency’s regulatory permits. The outlet channel is estimated to be 0.5 to 2.0 feet deep (PWA, 2010).

Various channel locations within the area shown in **Figure ES-3** and configurations may be pursued in an effort to adapt to other project variables. However, the configuration described above is within the range of likely outlet channel dimensions. Consideration of other project variables include bed slope and bed elevation, as well as an alignment that will maximize site features, including use of areas that experience reduced wave energy to increase suitability and success of the outlet channel.

## ES.3 Environmental Impacts and Mitigation Measures

### ES.3.1 Impact Assessment Methodology

The analysis of environmental impacts is based upon the environmental setting applicable to each resource/issue and the manner in which the implementation, operation, and maintenance of the Estuary Management Project or alternatives would affect the environmental setting and related resource conditions. In accordance with CEQA requirements and guidelines, the impact assessment methodology also considers the following three topics: (1) the regulatory setting, and whether the Estuary Management Project would be consistent with adopted federal, State and Local regulations and guidelines, (2) growth-inducing impacts, and (3) cumulative impacts. Regulatory compliance issues are discussed in each resource/issue area section. The EIR document is organized according to the following technical issue area categories, which are listed in the order in which they appear in **Chapter 4.0**:

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

The Draft EIR addresses environmental issues that could result in potentially significant environmental effects from project implementation. Significance criteria have been developed for each environmental issue analyzed in this Draft EIR and are defined at the beginning of each impact analysis section. In order to provide for a comprehensive and systematic evaluation of potential environmental consequences to the resource/issue areas, the environmental impact assessments for the Estuary Management Project are based upon a classification system, categorized as follows:

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

### ES.3.2 Mitigation Measures

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

### ES.3.3 Findings

An overview of environmental impacts by resource area is provided below based on the detailed impact finding and mitigation measures for the Proposed Project provided in **Chapter 4.0 Environmental Impacts and Mitigation Measures**. **Table ES-1**, at the end of this Executive Summary, provides a more detailed summary of all the environmental impacts and mitigation measures identified for the Estuary Management Project.

#### Less than Significant and Less than Significant with Mitigation

For the Estuary Management Project, based on technical review and evaluation against the environmental and regulatory setting, the impacts to the following environmental resources were determined to be less than significant or less than significant with mitigation.

- |                               |  |
|-------------------------------|--|
| 1. Geology, Soils, Seismicity | 5. Transportation and Traffic                      |
| 2. Land Use and Agriculture   | 6. Hazards and Hazardous Materials                 |
| 3. Noise                      | 7. Public Utilities and Services and Public Safety |
| 4. Air Quality                | 8. Aesthetics                                      |

#### Beneficial

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

1. **Habitat Availability.** Maintenance of water surface elevations of 7 to 9 feet would increase the storage volume in the Estuary by approximately 2,771 acre feet (7 feet) and up to 4,565 acre feet (9 feet), thereby increasing potential habitat availability for juvenile salmonids.

## Significant and Unavoidable

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

2. **Private Property Inundation.** Maintenance of water surface elevations of 7 to 9 feet would inundate the shoreline portions of properties adjacent to the Estuary for a longer duration, depending upon outlet channel performance. There is no feasible mitigation for this potential impact and, therefore, it is considered significant and unavoidable.
3. **Risk of Inundation Due to Tsunami.** In the very unlikely event of a tsunami of sufficient magnitude, the project may result in 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 and, therefore, it is considered significant and unavoidable.
4. **Water Quality.** Project implementation could seasonally increase nutrient and pathogen levels as a result of changes in residence time. There is no feasible mitigation for this potential impact and, therefore, it is considered significant and unavoidable.
5. **Groundwater Quality.** Project implementation could result in secondary effects to groundwater quality due to increased duration of saline groundwater conditions over the saline conditions that are currently experienced. There is no feasible mitigation for this potential impact and, therefore, it is considered significant and unavoidable.
6. **Inundation of Estuary Haulout Locations.** Increased water levels would seasonally inundate pinniped haul out locations, reducing the potential haul out area within the Estuary. There is no feasible mitigation for this potential impact and, therefore, it is considered significant and unavoidable.
7. **Elimination or modification of recreational resources.** Implementation of the proposed project would reduce the occurrence of tidal channel conditions during summer months, thereby reducing the occurrence of resulting sandbar conditions desirable for surfing. Additionally, inundation would seasonally reduce recreational beach area within the Estuary. There is no feasible mitigation for this potential impact and, therefore, it is considered significant and unavoidable.

## ES.4 Alternatives

This Draft EIR describes and evaluates a reasonable range of alternatives to the Estuary Management Project, in accordance with CEQA Guidelines Section 15126(a). Alternatives to the Estuary Management Project were presented in the Russian River Biological Opinion, as part of the adaptive management program, and identified through the public scoping process. Particular emphasis was placed on developing feasible alternatives which would reduce impacts to water quality, biological resources, and recreational resources.

In total, the alternatives screening process has culminated in the identification and screening of approximately 10 potential alternatives for the Estuary Management Project. These alternatives range from no management in the estuary, to increased artificial breaching, and from passive versus active management techniques, as well as structural alternatives.

The detailed results of the alternatives screening analysis are contained in Chapter 6 of the EIR. Provided below are summary descriptions of the alternatives which meet the basic project objectives, lessen significant impacts, and are feasible, and were therefore carried forward for further analysis. Section 6.2.2, Alternatives Identified but Not Considered Further, provides information related to other alternatives considered and the rationale for elimination from further consideration.

## ES.4.1 No Project Alternative

The No Project Alternative assumes that the lagoon outlet channel portion of the proposed project would not be implemented, and would include two scenarios: 1) consideration of existing conditions without the project; and 2) consideration of “reasonably foreseeable” future conditions without the proposed project.

Under the No Project Alternative, the Water Agency would continue artificial breaching activities during the lagoon management period, consistent with current practices. In considering existing conditions under a “no project scenario”, this would result in periodic breaching of the barrier beach when it becomes established. It is not possible to ascertain how many artificial breaching events would be required each year, but there have been an average of six artificial breaching events annually over the last 14 years, however, of the years during which artificial breaching was implemented, the maximum number of breaching events was 15 artificial breach attempts in 2009, and a minimum of one artificial breaches in 2004. It is anticipated that the number of breaching events would continue to be consistent with historical variation, depending upon hydrologic year type and Pacific Ocean wave patterns. This alternative assumes that the Water Agency could acquire the necessary permits for breaching activities. In considering a “reasonably foreseeable future conditions” scenario, the same scenario would apply; the Water Agency would continue artificial breaching activities during the lagoon management period, consistent with current practices. This scenario also assumes that the agencies with legal jurisdiction will continue to issue/extend necessary permits for the Water Agency to continue to carry out breaching activities. Although not legally required to manage water surface elevations within the Estuary to protect private property, the Water Agency has provided these services since the 1990s, and it is reasonable to assume that the Water Agency would continue to do so and would continue to obtain and operate under necessary permits, assuming the Water Agency has adequate staff and financial resources.

Implementation of the No Project Alternative would avoid significant and unavoidable impacts related to increased water levels in the Estuary for a longer duration. These include potential water quality impacts associated with prolonged closure of the barrier beach, as tidal mixing would continue to occur. Additional impacts that would be avoided include inundation of properties, increased risk of flooding in the event of a tsunami, changes in the distribution of both natural vegetation communities, effects to harbor seal haulout, and modification of recreation opportunities, including both surfing opportunities and recreational haul-out opportunities in the Estuary. It is uncertain if the No Project Alternative would reduce or avoid secondary effects to groundwater impact, or if existing conditions would persist. However, implementation of the

No Project Alternative would result in the continuation of current conditions within the Estuary, which have been found to be detrimental to federally listed salmonids, and could result in the Water Agency being out of compliance with the Russian River Biological Opinion.

Implementation of the No Project Alternative would not provide habitat opportunity for rearing juvenile salmonids associated with the provision freshwater lagoon conditions, including the provision of up to 4,416 acre feet of storage within the maximum backwater area (9 feet) for a longer duration during the lagoon management period. As such, implementation of the No Project Alternative would not meet project objectives related to the enhancement of salmonid habitat within the Estuary. Therefore, based on the inability to achieve the project objectives, the No Project Alternative is not considered environmentally superior.

## ES.4.2 Habitat Restoration Alternative

In California coastal lagoons, productive juvenile steelhead rearing habitat is available in freshwater and brackish water quality conditions. Under current management, when the Estuary channel is tidal, freshwater habitat is primarily available in the upper Estuary (from Sheephouse Creek to Austin Creek) and at confluences with tributaries (Jenner Creek, Willow Creek, Sheephouse Creek, Freezeout Creek, and Austin Creek), with brackish water quality in the middle Estuary (from Bridgheaven to Sheephouse Creek). In addition, a productive invertebrate prey community is necessary to provide a food base for rearing juvenile steelhead. Improving habitat diversity and structure complexity in locations of optimal water quality that currently exist in the Estuary could improve rearing conditions for juvenile steelhead, thereby achieving the Russian River Biological Opinion mandate to improve freshwater habitat for juvenile steelhead. Under a Habitat Restoration Alternative, the Water Agency would identify areas in the Russian River or other tributaries that, if restored, could provide salmonid rearing habitat. Under this alternative, it is assumed that the Water Agency would continue to artificially breach the barrier beach when water levels approach 4.5 to seven feet to provide flood management, consistent with existing practices. This alternative would provide rearing habitat for salmonids using alternate techniques, but of equivalent quality and quantity of habitat. This type of habitat restoration is common in other coastal lagoons. The Water Agency would identify potential areas, such as sloughs and backwater areas along the upper Estuary, Willow or Austin Creeks in which the strategies, including vegetation restoration, installation of instream structural cover (i.e. woody features), and backwater slough enhancement, could be implemented. This alternative would partially meet the basic project objectives and would meet legal and technical feasibility criteria. However this alternative would not achieve the NMFS' directives to establish a lagoon.

The Habitat Restoration Alternative would benefit fisheries and fish habitat by increasing suitable areas and providing vegetative cover and rearing areas. Implementation of the Habitat Restoration Alternative would avoid significant and unavoidable impacts related to increased water levels in the Estuary for a longer duration. These include potential water quality impacts<sup>12</sup> associated with prolonged closure of the barrier beach, as tidal mixing would continue to occur. Additional impacts that would be avoided include increased risk of inundation of properties, increased risk of flooding in the event of a tsunami, changes in the distribution of both natural vegetation

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<sup>12</sup> It is uncertain if this alternative could reduce the groundwater impact or if existing conditions would persist.

communities, modification of recreation opportunities, including both surfing opportunities and recreational haul-out opportunities in the Estuary. It is uncertain if the Habitat Restoration Alternative would reduce or avoid secondary effects to groundwater impact, or if existing conditions would persist. The Habitat Restoration Alternative would not increase the frequency of equipment use beyond current practices.

Implementation of the Habitat Restoration Alternative would not provide habitat opportunity for rearing juvenile salmonids associated with the provision freshwater lagoon conditions, including the provision of up to 4,416 acre feet of storage within the maximum backwater area (9 feet) for a longer duration during the lagoon management period. As such, implementation of the No Project Alternative would not meet project objectives related to the enhancement of salmonid habitat within the Estuary. Therefore, based on the inability to achieve the project objectives, the Habitat Restoration Alternative, in and of itself, is not considered environmentally superior.

### ES.4.3 Temporary Outlet Standpipe

An Outlet Standpipe alternative would involve a temporary structure that would be installed during the lagoon management period to allow for outflow from the Russian River to maintain a perched lagoon. The standpipe would be designed to operate to achieve a water level of seven to nine feet in the lagoon. The standpipe would be a passive system, installed as an inclined, closed pipe, tilted a few degrees to the horizontal to transfer Russian River outflow to the ocean via gravity. The standpipe would need to be surge protected and inclined to a degree to prevent backflow of ocean water into the Estuary. The temporary outlet standpipe could be anchored to the jetty or installed in a northwest orientation across the barrier beach and attached to the rip rap along the cliffs to the northwest of the beach management area. This structure would require periodic maintenance throughout the lagoon management period to correct for damage from tidal action and sediment accumulation in the standpipe. This temporary structure would be removed at the end of the lagoon management period. However, substantial engineering, environmental, permitting, and other constraints would be associated with development and implementation of an alternative that included installation of a temporary standpipe within the barrier beach at Jenner to convey outflow from the Estuary and to ensure performance that would maintain protection of private property from flooding.

The Temporary Outlet Standpipe would not avoid significant and unavoidable effects associated with increased water levels in the Estuary for a longer duration. These include potential water quality impacts associated with prolonged closure of the barrier beach, increased risk of inundation of properties, increased risk of flooding in the event of a tsunami, modification of recreation opportunities, including both surfing opportunities and recreational haul-out opportunities in the Estuary. It is uncertain if the Temporary Outlet Standpipe would reduce or avoid the secondary effects to groundwater impact, or if existing conditions would persist.

Implementation of the Temporary Standpipe Alternative could potentially meet the project objectives. However, because implementation of the temporary outlet standpipe has substantial technical uncertainties, would increase aesthetics and public safety impacts, and would not avoid

impacts associated with increased water levels for a longer duration within the Estuary, it is not considered the environmentally superior alternative.

## **ES.4.4 Reduced Project Alternative**

A “reduced project” alternative is a commonly analyzed type of project alternative that is intended to achieve project objectives while simultaneously avoiding or incrementally reducing the severity of significant impacts associated with a proposed project. A Reduced Project Alternative would involve all of the elements of the proposed Estuary Management Project, including artificial breaching outside of a lagoon management period, and creation of an outlet channel following a natural closure to support freshwater conditions during the lagoon management period. However it represents an incremental decrease such that the maximum target water level would be reduced to eight feet maximum (instead of nine feet maximum with a seven foot average elevation). This would be accomplished through management of the outlet channel bed elevation to maintain a lower water level. This would be accomplished through management of the outlet channel bed elevation to maintain a lower water level. This alternative would reduce environmental effects and would meet the basic project objectives and would meet all legal and technical feasibility criteria.

## **ES.4.5 Jetty Modification Alternative**

Jetty construction began in 1929, followed by construction of a seawall in 1939. Over time, the roadway, seawall and railroad have deteriorated significantly. Only portions of these components are visible, with the remainder encased in the sand dunes. Approximately 200 feet of the jetty protrudes from the beach into the ocean. While the landward half of the jetty retains most of its original concrete cap, the seaward half has deteriorated considerably. Removal of the jetty and its base material would require excavation along the jetty alignment and demolition and excavation of the base structure. Although the Water Agency does not own, operate, maintain, or have jurisdiction over the jetty structure, it is mandated in the Russian River Biological Opinion to develop the study plan to analyze the effects of the Russian River Estuary jetty on Estuary water levels and on beach morphology, as well as for evaluating alternatives that modify the jetty to achieve target estuarine water levels. The jetty study plan will establish a conceptual model, workplan, and associated costs for subsequent analysis of the effects of the Russian River Estuary jetty on estuary water levels and on beach morphology, as well as for evaluating alternatives that modify the jetty to achieve target estuarine water levels. Through the study plan, the Water Agency will identify alternative management actions to achieve targeted water surface elevations, such as full or partial jetty removal, jetty notching, or other potential uses of the jetty as a mechanism for water surface elevation control. This element would require coordination with State Parks and USACE. Under the Russian River Biological Opinion, implementation of jetty removal is conditional upon the results of the study. The study plan is anticipated to be developed by 2011. The Russian River Biological Opinion establishes responsibility for removal or modification of the jetty, dependent on the results of the jetty study, with the USACE.

Implementation of the Jetty Modification Alternative in and of itself would not meet project objectives related to the enhancement of salmonid habitat within the Estuary, as it cannot be



demonstrated that modification of the jetty alone would enhance salmonid habitat. Rather, modification of the jetty to improve flow through could represent a sub-alternative that could enhance salmonid habitat in conjunction or combination with the other alternatives identified. Therefore, the Jetty Modification Alternative is not considered environmentally superior. As provided for in the NMFS' Russian River Biological Opinion, the Water Agency will continue to develop and implement a work plan to analyze the potential for jetty modification to result in beneficial effects to salmonid habitat. As required in the Russian River Biological Opinion, NMFS and the Water Agency will re-examine jetty modification, and its ability to enhance conditions for salmonids in the Estuary, if it is determined that implementation of the Estuary Management Project is unsuccessful.

## ES.4.6 Alternative Flood Control Measures

As stipulated by NMFS in the Russian River Biological Opinion, if creation of the outlet channel does not reliably achieve the targeted annual and seasonal Estuary water surface elevations prescribed by the Russian River Biological Opinion, the Water Agency may also evaluate the feasibility of actions to avoid or mitigate potential damage to low-lying structures or properties adjacent to the estuary that are currently threatened with flooding and inundation when the barrier beach closes and the estuary water surface elevation rises above 9 feet. Pursuant to conditions in the NMFS' Russian River Biological Opinion, the Water Agency developed and submitted to NMFS a list of structures, properties, or infrastructure that are susceptible to flooding/ inundation as a result of sandbar formation and Estuary closure. Potential alternative flood control actions, including private property owners making physical modification to or raising of their structures to avoid flooding or inundation damage associated with restoration of estuarine functions, would only be pursued, as required in the Russian River Biological Opinion, if the following conditions exist:

1. It must be determined that adaptive management of the outlet channel is not able to reliably achieve the targeted annual and seasonal Estuary water surface elevations by the end of 2013;
2. Estuary monitoring results indicate that freshwater or low salinity brackish (oligohaline) habitats, or temporary closure of the Estuary provides substantial benefit to rearing juvenile steelhead; and
3. Monitoring results indicate that no adverse effects to other populations of Russian River salmonids are occurring from raised lagoon water surface elevations.

Implementation of this alternative would increase water surface elevations within the Estuary, and would rely on natural breaching events to maintain water levels below a defined water level. This would incrementally reduce the storage capacity available within the Estuary. Additionally, without a defined outflow channel, or mechanism to establish one, lands above the defined water level could be affected in the event that natural breaching does not occur in a manner or timeframe that accommodates inflow into the Estuary. The Russian River Biological Opinion attempts to minimize breaching and tidal conditions during the lagoon management period; however natural breaching is anticipated to occur under this scenario. Therefore, implementation of this alternative may not achieve all of the project objectives.

Implementation of this alternative would affect existing and proposed land uses at approximately 120 parcels along the Estuary, and would require the relocation of existing facilities to avoid effects from inundation. Under this alternative, portions of Highway 1 would potentially flood. Furthermore, this alternative would not reduce the effect of seawater intrusion into adjacent groundwater wells. Therefore, this alternative is not considered environmentally superior to the proposed project.

## **ES.5 Summary Comparison of the Estuary Management Project and Alternatives**

### **ES.5.1 Environmentally Superior Alternative**

The Reduced Project Alternative would achieve the dual project objectives of enhancing rearing habitat for juvenile salmonids, particularly steelhead, and managing Estuary water levels to minimize flood hazard. This alternative would have the potential to comply with the objectives of the Russian River Biological Opinion, which specifically requires the Water Agency to modify its Estuary management practices; however, it would not attain the average water surface elevation of 8 feet as identified in the Russian River Biological Opinion. It would reduce the significant impacts associated with increased water levels for a longer duration, including tsunami risk, flood risk to properties and structures, and reduce the extent of vegetation changes and impacts to shoreline beach access. It would not reduce impacts to recreation (surfing), or groundwater. Implementation of the Reduced Project Alternative would reduce significant and unavoidable impacts associated with private property inundation, incrementally reducing the total number of parcels affected within the Estuary Study Area. It is anticipated that water surface elevations of 8 feet would avoid structures such as boat docks. It would also incrementally reduce the area of gravel bar/mudflat inundation within the Estuary Study Area by approximately 5 acres, thereby reducing inundation effects to pinniped haul outs, and recreational beach area. Implementation of the Reduced Alternative would provide an additional total volume of 3,599 acre-feet of storage; this represents a reduction in storage provided by the proposed project by approximately 966 acre-feet. Although the impacts reduced by the Reduced Project Alternative would remain significant and unavoidable, implementation of the Reduced Project Alternative is considered environmentally superior to the Proposed Project, as it would meet the project objectives and would minimize the area of inundation, and the potential significant unavoidable impacts, associated with the proposed project.

Although this alternative may be considered environmentally superior, the Water Agency is directed by the Russian River Biological Opinion to maintain higher water levels envisioned under the Estuary Management Plan. Implementation of this alternative, or use of a different water surface elevation to achieve project objectives and minimize impacts, could be achieved through the mechanism of the Adaptive Management Plan, which provides for modification of Estuary Management in coordination with NMFS and CDFG, based upon monitoring and experience gained through project implementation.

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## ES.6 Impact Summary Table

**Table ES-2**, included at the end of this section, summarizes the environmental impacts associated with each of the Estuary Management Project. For impacts determined to be significant, mitigation measures are presented and the impact significance after mitigation is shown.

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## ES.7 References

Heckel, M., *Russian River Estuary Study, 1992-1993*, Prepared for Sonoma County Department of Planning and California State Coastal Conservancy, 1994.

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.

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

Sonoma County Water Agency (SCWA), *Request for Marine Mammal Protection Act Incidental Harassment Authorization, Russian River Estuary Management Activities*, September 2009.

**TABLE ES-2  
SUMMARY OF IMPACT DETERMINATIONS AND MITIGATION MEASURES**

Impact	Mitigation Measures	Impact Determination
<b>GEOLOGY AND SOILS</b>		
4.1.1: Seismicity. In the event of a major earthquake in the region, seismic ground shaking could trigger seismic-related ground or slope failures, including liquefaction, and/or landslides at the beach, outlet channel, and/or along the banks of the lagoon to be formed behind the outlet channel that could expose people or structure to adverse effects.	None Required	LTS
4.1.2: Beach Erosion. The proposed Estuary Management Project could result in conditions that lead to the erosion on the beach at the outlet channel or along the banks of the Estuary formed behind the outlet channel. Changes in water levels could undermine additional bank areas resulting in localized erosion or the loss of topsoil.	None Required	LTS
4.1.3: Unstable Beach Sands, Landslides, Liquefaction: The proposed Estuary Management Project involves moving the beach sands at the outlet channel. These beach sands are considered a geologic unit of soil that is unstable, or that would become unstable as a result of the project activities, and could potentially result in on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse.	None Required	LTS
4.1.4: Expansive Soils. The proposed Estuary Management Project could be located on expansive soils, as defined in Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property.	None Required	LTS
<b>HYDROLOGY AND FLOODING</b>		
4.2.1. Alteration of drainage. The creation and maintenance of the outlet channel would alter the existing drainage pattern within the Estuary, and this could result in increased sedimentation or erosion.	None Required	LTS
4.2.2. Property Inundation. The creation and maintenance of the outlet channel would alter the existing drainage pattern at the Estuary mouth, which could result in increased potential for inundation of parcels adjacent to the Estuary.	4.2.2: Concerning the nine parcels and associated structures (i.e., boat docks or boat ramps on seven of the parcels, and homes or other buildings on the other two parcels) identified above, and presented in more detail in a previous analysis (SCWA, 2010), the Water Agency shall work with the property owners to identify measures that would, if necessary, substantially minimize or avoid any damages to existing structures that would occur as a result of implementing the project (i.e., increased flooding durations at the 7 to 9 foot elevation). The Water Agency shall survey these properties in greater detail to more accurately and precisely determine the elevation of the structures potentially at risk; this information shall be kept on record at the Water Agency and a copy shall be provided to each of the property owners.	SU

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**TABLE ES-2 (Continued)**  
**SUMMARY OF IMPACT DETERMINATIONS AND MITIGATION MEASURES**

Impact	Mitigation Measures	Impact Determination
<b>HYDROLOGY AND FLOODING (cont.)</b>		
4.2.3. Tsunami Risk. A portion of the project area is located within a mapped tsunami hazard zone, and therefore could be inundated in the unlikely event of a tsunami. Subsequently, increased water levels in the Estuary could increase the risk to people or structures within this area to loss, injury, or death involving flooding in the event of a tsunami.	No Feasible Measures Available	SU
<b>WATER QUALITY</b>		
4.3.1. Water Quality during channel creation. The action of creating the outlet channel during the lagoon management period could adversely affect the water quality in the Estuary.	None Required	LTS
4.3.2. Water Quality during sandbar breaching. The change in the barrier beach breaching operations during the lagoon management period could adversely affect salinity, temperature and dissolved oxygen levels in the Estuary.	None Required	LTS
4.3.3: Nutrients and Pathogens. The change in the barrier beach breaching operations during the lagoon management period could adversely affect the water quality due to increased nutrient or indicator bacteria levels in the Estuary.	No Mitigation Required or Available	SU
4.3.4: The change in the barrier beach breaching operations during the lagoon management period (i.e., May through October) 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.	No Mitigation Required or Available	SU
<b>BIOLOGICAL RESOURCES</b>		
4.4.1. Short-term impacts to Special-Status Plant and Animal Species. The creation and maintenance of the lagoon outlet channel could adversely affect special-status plant and animal species.	<p>4.4.1a: In addition to implementing measures identified in the Standard Operating Procedures (SOP), a pre-construction biological resources survey shall be conducted to identify special-status plants and butterflies (or larval host species) and nesting birds present within 150 feet of the general location of the outlet channel management area and access route. The pre-construction survey shall:</p> <ul style="list-style-type: none"> <li>• Be conducted by a qualified biologist no more than 30 days prior to commencement of the lagoon management period (defined as from May 15 to October 15). The biologist shall have familiarity with special-status plants and butterflies (or larval host species) of the area and experience with conducting special-status species and nesting bird surveys.</li> </ul>	LSM

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**TABLE ES-2 (Continued)  
SUMMARY OF IMPACT DETERMINATIONS AND MITIGATION MEASURES**

Impact	Mitigation Measures	Impact Determination
<b>BIOLOGICAL RESOURCES (cont.)</b>		
4.4.1 (cont.)	<ul style="list-style-type: none"> <li>• If no special-status plants or butterflies (or larval host species), or nesting birds are encountered, no further mitigation would be required for at least 30 days, unless additional measures are required by regulatory permit conditions obtained for the proposed project.</li> <li>• Additional pre-construction surveys, specifically for nesting birds, shall be conducted such that no more than 30 days will have lapsed between the survey and outlet channel creation or maintenance activities.</li> <li>• If a special-status plant or larval host species for special-status butterflies or nesting birds are encountered, the location shall be documented and species-specific avoidance and minimization measures shall be prepared by the qualified biologist in coordination with the Agency and appropriate resource agencies.</li> <li>• The avoidance and minimization measures shall be implemented to prevent the loss of the species or abandonment of active nests, but shall also take the goal of the proposed project (i.e., managing the lagoon water surface elevations high enough to enhance salmon rearing habitat while also minimizing flooding of the low-lying properties) into consideration.</li> </ul> <p>4.4.1b: As part of the safety tailgate meeting specified in the SOP, a worker environmental awareness training shall be included to inform construction personnel of their responsibilities regarding sensitive biological resources that are present within 150 feet of the general location of the outlet channel management area and access route. The training shall comply with the following measures:</p> <ul style="list-style-type: none"> <li>• The training shall be developed by a qualified biologist familiar with the sensitive biological resources that are known or have the potential to occur in the area.</li> <li>• The training shall be completed by all construction personnel before any work occurs in the outlet channel management area, including construction equipment and vehicle mobilization. If new personnel are added to the proposed project, the Water Agency shall ensure that new personnel received training before they start working. The subsequent training of personnel can include the use of written materials from the initial training rather than in-person training by the biologist.</li> <li>• The training shall provide educational information on the special-status species that are known or have potential to occur in the area, how to identify the species, as well as other sensitive biological resources (e.g., sensitive natural communities, federal and state jurisdictional waters). The training shall also review the required mitigation measures to avoid impacts on the sensitive resources, and penalties for noncompliance with biological mitigation requirements.</li> </ul>	

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**TABLE ES-2 (Continued)**  
**SUMMARY OF IMPACT DETERMINATIONS AND MITIGATION MEASURES**

Impact	Mitigation Measures	Impact Determination
<b>BIOLOGICAL RESOURCES (cont.)</b>		
4.4.2. Short-term impacts to Sensitive Natural Communities. The creation and maintenance of the lagoon outlet channel could adversely affect sensitive natural communities.	Implement Mitigation Measure 4.4.1b.	LSM
4.4.3. Short-term impacts to Waters and Wetlands. Creation and maintenance of the lagoon outlet channel could adversely affect federal and state jurisdictional waters.	Implement Mitigation Measure 4.4.1b.	LTS
4.4.4. Short-term impacts to Wildlife Movement and Nursery Sites. Creation and maintenance of the lagoon outlet channel could interfere with wildlife movement or impede the use of nursery sites.	Implement Mitigation Measure 4.4.1b.	LTS
4.4.5. Short-term impacts to Local Policies. Creation and maintenance of the lagoon outlet channel would not conflict with any local policies or ordinances protecting biological resources.	None Required	NI
4.4.6. Sensitive Natural Communities. Long-term adaptive management of the Estuary as a lagoon could adversely affect sensitive natural communities.	None Required	LTS
4.4.7. Special-Status Plant and Animal Species. Long-term adaptive management of the Estuary as a lagoon could adversely affect special-status plant and animal species.	None Required	LTS
4.4.8: Protected Marine Mammals. Long-term adaptive management of the Estuary as a lagoon could adversely affect protected marine mammal species.	4.4.8: In compliance with the IHA (NMFS, 2010c), the Agency will conduct seal counts at the Jenner haulout and at nearby coastal and upriver haulout sites in accordance with methods described in the Agency's <i>Russian River Management Activities Pinniped Monitoring Plan</i> (Pinniped Monitoring Plan), dated September 9, 2009. If, during implementation of the Pinniped Monitoring Plan (SCWA, 2009), decreases in overall use at the Jenner haul-out are correlated with increases in use at the three closest haul-outs, the Water Agency shall consult with NMFS and CDFG to alter the Estuary Management Plan such that the haul-out site is maintained as a resource. The IHA does not provide for long-term harassment or alteration of habitat conditions that would contribute to abandonment of the Jenner haul out.	SU
4.4.9: Waters and Wetlands. Long-term adaptive management of the Estuary as a lagoon could adversely affect federal and state jurisdictional waters.	None Required	LTS
4.4.10: Wildlife Movement and Nursery Sites. Long-term adaptive management of the Estuary as a lagoon could interfere with wildlife movement or impede the use of nursery sites.	Implement Mitigation Measure 4.4.8	LSM

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**TABLE ES-2 (Continued)**  
**SUMMARY OF IMPACT DETERMINATIONS AND MITIGATION MEASURES**

Impact	Mitigation Measures	Impact Determination
<b>BIOLOGICAL RESOURCES (cont.)</b>		
4.4.11: Local Policies and Ordinances: Adaptive management of the lagoon would not conflict with any local policies or ordinances protection biological resources.	None Required	LTS
<b>FISHERIES</b>		
4.5.1: Habitat Availability. Estuary management to promote freshwater lagoon conditions would increase the frequency, duration and volume of freshwater storage within the Estuary during the lagoon management period, thereby increasing potential habitat availability for juvenile salmonids.	None Required	Beneficial
4.5.2: Habitat quality. Management of the Estuary could result in changes in water quality conditions (water temperature, dissolved oxygen, and salinity) becoming stressful for rearing salmonids, special status, and other native fish species inhabiting the Estuary, resulting in reduced quantity and quality of habitat.	None Required	LTS
4.5.3: Essential Fish Habitat. Management of the Russian River Estuary could affect essential fish habitat (EFH) for various federally marine managed species within the Pacific Salmon FMP, the Coastal Pelagics FMP, and the Pacific Groundfish FMP.	None Required	LTS
<b>LAND USE AND AGRICULTURE</b>		
4.6.1: Divide an Existing Community. The proposed project would physically divide or temporarily disrupt an established community.	None Required	LTS
4.6.2: Conflict with Applicable Plans and Policies. The proposed project may conflict with applicable state and/or local land use plan, policy, or regulation of an agency with jurisdiction over the project, including, but not limited to the general plan, specific plan, local coastal plan, or zoning ordinance adopted for the purpose of avoiding of mitigating an environmental effect.	None Required	LTS
4.6.3: Conflict with HCCPs. The proposed project may conflict with applicable habitat conservation plan or document which aims to protect threatened or endangered species and/or their critical habitat.	None Required	BI
4.6.4: Permanent Conversion of Important Farmland. The proposed project could convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.	None Required	NI

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**TABLE ES-2 (Continued)**  
**SUMMARY OF IMPACT DETERMINATIONS AND MITIGATION MEASURES**

Impact	Mitigation Measures	Impact Determination
<b>LAND USE AND AGRICULTURE (cont.)</b>		
4.6.5: Conflict with Williamson Act Contracts. The proposed project would conflict with existing zoning for agricultural use or a Williamson Act Contract.	None Required	LTS
4.6.6 Loss or conversion of Forestland. The proposed project would result in loss of designated forest land. The proposed project would temporarily restrict access and beneficial use of recreational sites or facilities.	None Required	LTS
<b>RECREATION</b>		
4.7.1: Disruption of Use of Recreational Facilities. The proposed project would temporarily restrict access and beneficial use of recreational sites or facilities.	No Feasible Measures Available	SU
4.7.2: Eliminate or Modify an Existing Recreational Resource. The proposed project would likely reduce the occurrence of open channel tidal conditions conducive to surfing activities.	No Feasible Measures Available	SU
Impact 4.7.3: Deterioration of Recreational Facilities.	None Required.	LTS
<b>CULTURAL RESOURCES</b>		
4.8.1: Change in the significance of a historical resource or unique archaeological resource. The Estuary Management Project could cause a substantial adverse change in the significance of a historical resource or unique archaeological resource.	<p>4.8.1: The Water Agency will implement the following measure:</p> <p><i>Inadvertent Discovery of Historical and Unique Archaeological Resources.</i> If discovery is made of items of historical or archaeological interest, the contractor shall immediately cease all work activities in the area (within approximately 100 feet) of discovery. Prehistoric archaeological materials might include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish remains; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-period materials might include stone, concrete, or adobe footings and walls; filled wells or privies; and deposits of metal, glass, and/or ceramic refuse. After cessation of excavation the contractor shall immediately contact the Water Agency, State Parks, and the U.S. Army Corps of Engineers. The contractor shall not resume work until authorization is received from both agencies.</p> <ul style="list-style-type: none"> <li>In the event of unanticipated discovery of archaeological materials occurs during construction, the Water Agency shall retain the services of a qualified professional archaeologist to evaluate the significance of the items prior to resuming any activities that could impact the site.</li> </ul>	LSM

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**TABLE ES-2 (Continued)**  
**SUMMARY OF IMPACT DETERMINATIONS AND MITIGATION MEASURES**

Impact	Mitigation Measures	Impact Determination
<b>CULTURAL RESOURCES (cont.)</b>		
4.8.1 (cont.)	<ul style="list-style-type: none"> <li>In the case of an unanticipated archaeological discovery, if it is determined that the find is potentially eligible for listing in the California and/or National Registers, and the site cannot be avoided, the Water Agency shall provide a research design and excavation plan, prepared by a qualified archaeologist, outlining recovery of the resource, analysis, and reporting of the find. The research design and excavation plan shall be approved by the Water Agency, State Parks, and U.S. Army Corps of Engineers. Implementation of the research design and excavation plan shall be conducted prior to work being resumed. Upon project approval, the Water Agency will coordinate with State Parks and U.S. Army Corps of Engineers to develop an action plan that can be implemented in the event that flooding is imminent and breaching must occur immediately.</li> </ul>	
4.8.2: Human Remains. The Estuary Management Project could disturb human remains, including those interred outside of formal cemeteries.	<p>4.8.2: The Water Agency will implement the following measures:</p> <p><i>Discovery of Human Remains.</i> If potential human remains are encountered, the Water Agency shall halt work in the vicinity of the find and contact the Sonoma County coroner in accordance with Public Resources Code Section 5097.98 and Health and Safety Code Section 7050.5. The Water Agency will also notify by telephone the U.S. Army Corps of Engineers archaeologist and permit manager. If the coroner determines the remains are Native American, the coroner will contact the Native American Heritage Commission (NAHC). As provided in Public Resources Code Section 5097.98, the NAHC will identify the person or persons believed to be most likely descended from the deceased Native American. The Most Likely Descendent (MLD) makes recommendations for means of treating the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98. Work shall cease in the immediate area until the recommendations of the appropriate MLD are concluded.</p>	LSM
4.8.3: Culturally sensitive plants. The Estuary Management Project could adversely affect the distribution of natural vegetation communities along the Estuary shoreline, such that availability of culturally significant plants is reduced.	None Required	LTS
<b>NOISE</b>		
4.9.1: Ambient Noise Levels. The Estuary Management Project would result in periodic noise levels above existing ambient conditions.	4.9.1: Time of Day Limits and Notice to Residents. The Water Agency shall limit activities at the lagoon outlet channel that involve the use of heavy equipment to between local sunrise to local sunset. The Water Agency shall also provide advanced notification to each residence within 2,000 feet of the lagoon outlet channel site regarding the planned activities at the site. Notification shall be provided at least one week in advance of the planned activities, or as soon as possible based on beach and water level conditions, at the site and shall include the time restriction requirements and contact information of a Water Agency staff person.	LSM

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**TABLE ES-2 (Continued)**  
**SUMMARY OF IMPACT DETERMINATIONS AND MITIGATION MEASURES**

<b>Impact</b>	<b>Mitigation Measures</b>	<b>Impact Determination</b>
<b>NOISE (cont.)</b>		
4.9.2: Ground-borne Vibration. Estuary Management Project activities would generate ground-borne vibration levels.	None Required	LTS
<b>AIR QUALITY</b>		
4.10.1: Criteria Pollutants. The Estuary Management Project would result in periodic emissions of criteria pollutants.	None Required	LTS
4.10.2: Toxic Air Contaminants (TACs). The Estuary Management Project would result in emissions of TACs that could pose a health risk to sensitive receptors located in the project vicinity.	None Required	LTS
4.10.3: Objectionable Odors. The Estuary Management Project could create objectionable odors.	None Required	LTS
4.10.4: Greenhouse Gas Emissions. The Estuary Management Project would result in the generation of GHG emissions.	None Required	LTS
4.10.5: Conflict with Climate Action Plan. The Estuary Management Project could conflict with a plan designed to reduce GHG emissions.	None Required	LTS
<b>TRAFFIC</b>		
4.11.1: Conflict with Transportation Policies. The Estuary Management Project could conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.	None Required	LTS
4.11.2: Emergency Access. The Estuary Management Project could substantially impede access to local streets or adjacent uses, including access for emergency vehicles.	None Required	LTS
4.11.3: Increased Traffic Safety Hazards. The Estuary Management Project could substantially increase traffic safety hazards due to increased traffic volumes.	None Required	LTS
4.11.4: Roadway Wear. The Estuary Management Project could cause substantial damage or wear of roadways by increased movement of heavy vehicles.	None Required	LTS

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**TABLE ES-2 (Continued)**  
**SUMMARY OF IMPACT DETERMINATIONS AND MITIGATION MEASURES**

Impact	Mitigation Measures	Impact Determination
<b>TRAFFIC (cont.)</b>		
4.11.5: Parking. The Estuary Management Project could result in inadequate parking capacity.	None Required	LTS
<b>HAZARDS AND HAZARDOUS MATERIALS</b>		
4.12.1: Use of Hazardous Materials. The Estuary Management Project could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	None Required	LTS
4.12.2: Accidental Releases of Hazardous Materials. The Estuary Management Project could create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.	4.12-2: To minimize the potential for accidental spills from equipment and to provide for a planned response in the event that an accidental spill does occur, the Water Agency shall implement the following construction best management practices:  1. Prohibit on-site fueling of vehicles and construction equipment;  2. Maintain spill containment and clean up equipment onsite; and,  3. Ensure that construction personnel are trained in proper material handling, cleanup, and disposal procedures.	LSM
4.12.3: Emergency Access. The Estuary Management Project could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	None Required	LTS
<b>PUBLIC SERVICES AND UTILITIES AND PUBLIC SAFETY</b>		
4.13.1: Emergency Response Times and Public Facilities. The Estuary Management Project could result in substantial adverse physical impacts associated with the provision of, or the need for, new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services: fire protection, police protection, schools, parks, other public facilities.	None Required	LTS
4.13.2: Conflict with regulatory requirements. The Estuary Management Project could conflict with wastewater treatment requirements of the applicable Regional Water Quality Control Board.	None Required	LTS

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**TABLE ES-2 (Continued)**  
**SUMMARY OF IMPACT DETERMINATIONS AND MITIGATION MEASURES**

Impact	Mitigation Measures	Impact Determination
<b>PUBLIC SERVICES AND UTILITIES AND PUBLIC SAFETY (cont.)</b>		
4.13.3: Public Safety. The Estuary Management Project could substantially affect public safety at the outlet channel location during channel creation.	4.13.1: Following outlet channel creation or artificial breaching, the Water Agency will install semi-permanent signage notifying beach users of channel conditions, potential for safety hazards from beach erosion or hydrologic action, and emergency contact information. Signage should be posted and maintained at key locations, such as the parking lot at Goat Rock State Beach Parking lot, the unofficial beach access trail located on the north side of the beach off Highway 1, and 100 feet on either side of the outlet channel.	LTS
4.13.4: Septic Tanks. The Estuary Management Project could substantially affect the function of septic tanks or other alternative waste water disposal systems.	None Required	LTS
4.13.5: Mosquito Abatement. The Estuary Management Project could increase the frequency and duration of water levels in the Estuary during the lagoon management period, and would inundate vegetated areas adjacent to the existing shoreline. Increased inundation area could increase potential mosquito breeding habitat adjacent to the Estuary.	None Required	LTS
<b>AESTHETICS</b>		
4.14.1: Scenic Vistas. The Project may have a substantial adverse effect on a scenic vista.	None Required	LTS
4.14.2: Visual Character. Implementation of the Estuary Management Project may degrade the existing visual character of the area.	None Required	LTS
4.14.3: Scenic Resources. Implementation of the Estuary Management Project may substantially damage scenic resources, such as scenic highway corridors and scenic landscape units.	None Required	LTS
<b>CUMULATIVE</b>		
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.	None Required	LSM
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.	None Required	LTS

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**TABLE ES-2 (Continued)**  
**SUMMARY OF IMPACT DETERMINATIONS AND MITIGATION MEASURES**

Impact	Mitigation Measures	Impact Determination
<b>CUMULATIVE (cont.)</b>		
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.	No Feasible Measures Available	Cumulatively Significant and Unavoidable
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.	No Feasible Measures Available	Cumulatively Significant and Unavoidable
5.2.4: Sea Level Rise. The Estuary Management Project could be affected by an increase in sea level rise.	None Required	LTS
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 bacteria and nutrient levels.	No Feasible Measures Available	Cumulatively Significant and Unavoidable
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.	No Feasible Measures Available	Cumulatively Significant and Unavoidable
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.	Mitigation Measures in Section 4.4, Biological Resources.	Cumulatively Significant and Unavoidable
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.	None Required	Cumulatively Beneficial

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**TABLE ES-2 (Continued)**  
**SUMMARY OF IMPACT DETERMINATIONS AND MITIGATION MEASURES**

Impact	Mitigation Measures	Impact Determination
<b>CUMULATIVE (cont.)</b>		
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.	None Required	LTS
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.	No Feasible Measures Available	Cumulatively Significant and Unavoidable
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.	None Required	LSM
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.	None Required	LSM
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.	None Required	LTS
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.	None Required	LTS
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.	None Required	LTS

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