

# APPENDIX F

---

## Russian River Estuary Management Project Stipulated Judgment

1. Special Section in Compliance with Stipulated Judgment
2. Lower Russian River alternatives analyzed above 70 cubic feet per second
3. Modeled Levels of Storage in Lake Mendocino and Lake Sonoma

# Special Section in Compliance with Stipulated Judgement

---

## 1. Introduction

The purpose of this “special section” is to provide an analysis of the cumulative water quality impacts that could result from the implementation of the Fish Habitat Flows and Water Rights Project (Proposed Project) in combination with the water quality impacts of the Russian River Estuary Management Project (Estuary Management Project).

This “special section” begins with a description of the legal requirement for this analysis. The chapter then describes the cumulative impact analysis methodology and defines the standards of significance used to determine the potential water quality cumulative impacts of the Proposed Project and the Estuary Management Project.

## 2. Analysis Requirements

This section is prepared in compliance with Section 2 of the Stipulated Judgment in Russian River Watershed Protection Committee v. Sonoma County Water Agency, Sonoma County Superior Court Case No. SCV-250347, dated September 7, 2012. Section 2 states:

2. *As a part of the environmental analysis to be prepared by the Water Agency for the Fish Habitat Flows and Water Rights Project ("Fish Flow Project"), the Water Agency shall prepare an evaluation of the joint water quality impacts of the Estuary Project and the Fish Flow Project. The joint water quality impacts of both projects shall be analyzed in a discrete special section of, or an appendix to, the "cumulative impact analysis" of the draft environmental impact report that is being prepared for the Fish Flow Project. Water quality areas to be addressed shall include, at a minimum, pathogens/bacteria; nutrients; temperature; DO; and turbidity. When providing comments on the draft environmental impact report in regard to the "special section," Petitioner may recommend additional parameters to be addressed, but nothing in this Stipulated Judgment shall require the Water Agency to address such additional parameters. The analysis shall be consistent with CEQA Guidelines §15130 (which requires evaluation of the cumulative impacts of the two projects and other relevant past, present, and future projects). Notwithstanding CEQA Guidelines §15130 or paragraph 12 of this Stipulated Judgment, the analysis in the "special section" shall be made without regard to any conclusions in the Estuary Project EIR, although the Parties recognize that data and background facts that would be considered in the analysis could be taken from the Estuary Project EIR. The "special section" shall analyze the cumulative water quality impacts of the Estuary Management Project and the Fish Flow Project against a baseline consisting of historical Estuary breaching practices and the minimum flow established by the State Water Resources Control Board (State Board) 1986 Decision 1610 (i.e., a 125 cubic feet*

*per second ["cfs"] normal year minimum flow at Hacienda). Applying CEQA Guidelines §15130(b)(3), the "special section" will consider the geographic scope of the joint water quality impacts of the Fish Flow Project and the Estuary Management Project. In accordance with the CEQA Guidelines, the section will provide an explanation of the geographic scope considered in the "special section" and the reasoning for selecting the area of potential joint impacts, including an explanation of whether or not potential joint impacts occur above Vacation Beach, and the factual basis for that conclusion.*

The CEQA Guidelines require that environmental impact reports (EIRs) discuss the cumulative impacts of a project when the project's incremental effects are considerable when viewed in combination with the effects of past, current, and probable future projects. The purpose of this "special section" analysis is to disclose significant cumulative impacts resulting from the Fish Habitat Flows and Water Project's Proposed Project only in combination with Estuary Management Project water quality impacts against a baseline consisting of historical Estuary breaching practices and the minimum instream flows established by the State Water Resources Control Board's (SWRCB) 1986 Decision 1610. The Proposed Project is described in detail in Chapter 3, "Background and Project Description," in this EIR.

### **3. Approach to Analysis**

#### **Geographic Scope**

The potential for project-generated impacts to contribute to a cumulative impact would arise if the impacts are located within the same geographic area. This geographic area may vary, depending upon the environmental resource discussed and the geographic extent of the potential cumulative impact. When considered cumulatively with other projects that may occur in the same geographic vicinity, the scope of analysis is defined by the natural boundaries and physical conditions relevant to each environmental factor.

The geographic area affected by the Proposed Project overlaps with the area affected by the Russian River Estuary Management Project in the Russian River from Vacation Beach dam downstream to the mouth of the Russian River at Jenner. The Proposed Project would manage water supply releases from Lake Mendocino and Lake Sonoma to provide minimum instream flows in the Russian River and Dry Creek that would improve habitat for listed salmonids and meet the requirements of the Russian River Biological Opinion. The Water Agency's water right permits require the maintenance of minimum instream flows in the Lower Russian River from the river's confluence with Dry Creek to the Pacific Ocean. The geographic area affected by the Estuary Management Project extends from the mouth of the Russian River upstream approximately 7 miles to the Duncans Mills area beyond the confluence with Austin Creek when the river mouth is open. When the river mouth naturally closes as a result of sand being transported into the river inlet and the subsequent formation of a barrier beach, the resulting lagoon conditions back water upstream as far as Vacation Beach. At Vacation Beach, the Vacation Beach dam consists of an 8-foot-tall concrete structure that accepts flashboards to

create a summer recreational impoundment. The lagoon's backwater does not extend beyond the Vacation Beach dam.

## 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 important for short-term construction-related impacts; for example, for a group of projects to generate cumulative impacts (e.g. temporary and/or intermittent noise), they must occur close together in time as well as location. Implementation of the Proposed Project would not include new construction of water facilities, infrastructure, or any other type of construction or land disturbance. As a result, the Proposed Project would not contribute to cumulative short and long-term impacts to water quality associated with construction activities and therefore are not cumulatively considerable and will not be addressed in this cumulative analysis. This analysis assumes that the Estuary Management Project would be implemented concurrently with implementation of the Proposed Project.

## 4. Potential Related Project

For the purpose of this "special section" analysis, the Estuary Management Project has been identified as a related project.

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<sup>1</sup>. Because the Water Agency's water supply facilities and operations have the potential to adversely affect the three listed species, the Water Agency entered into a Memorandum of Understanding (MOU) in December 1997 to participate in a consultation under Section 7 of the federal ESA. The other signatories of the MOU include the United States Army Corps of Engineers (USACE), NMFS, and Mendocino County Russian River Flood Control and Water Conservation Improvement District. The National Marine Fisheries Service issued its *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* (Russian River Biological Opinion) on September 24, 2008 (NMFS 2008). The Russian River Biological Opinion evaluated the impact of the Water Agency's and the USACE's operations on the listed species and identified 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's activities in the Russian River watershed could result in an adverse modification of

---

<sup>1</sup> 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.

critical habitat and jeopardize the continued existence of coho salmon and steelhead in this evolutionary significant unit (NMFS 2008) it.

## **Russian River Estuary Management Project**

The Russian River estuary (Estuary) is located approximately 60 miles (97 kilometers, km) northwest of San Francisco in Jenner, Sonoma County, California. The Estuary extends from the mouth of the Russian River upstream approximately 6 to 7 miles (10 to 11 km) between Austin Creek and the community of Duncans Mills (Heckel 1994).

The Estuary may close throughout the year as a result of a barrier beach forming across the mouth of the Russian River. The mouth is located at Goat Rock State Beach (California Department of Parks and Recreation). Although closures may occur at any time of the year, the mouth usually closes during the spring, summer, and fall (Heckel 1994). Closures result in ponding of the Russian River behind the barrier beach and, as water surface levels rise in the Estuary, flooding may occur. The barrier beach has been artificially breached for decades; first by local citizens, then the County of Sonoma Public Works Department, and, since 1995, by the Water Agency. The Water Agency's artificial breaching activities are conducted in accordance with the Russian River Estuary Management Project recommended in the Heckel (1994) study (Heckel 1994). The purpose of artificially breaching the barrier beach is to alleviate potential flooding of low-lying properties along the Estuary.

The Russian River Biological Opinion (NMFS 2008) 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 steelhead. The Russian River Biological Opinion states that the historical method of artificial sandbar breaching, which is done in response to rising water levels behind the barrier beach, adversely affects the Estuary's water quality and freshwater depths. The historical artificial breaching practices create a tidal marine environment with shallow depths and high salinity. Salinity stratification contributes to low dissolved oxygen at the bottom in some areas. The Russian River Biological Opinion concluded that the combination of high inflows and breaching practices impact rearing habitat because they interfere with natural processes that cause a freshwater lagoon to form behind the barrier beach. 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.

The Russian River Biological Opinion's RPA 2, Alterations to Estuary Management (NMFS 2008) requires the Water Agency to collaborate with NMFS and to modify estuary water level management in order to reduce marine influence (high salinity and tidal inflow) and promote a higher water surface elevation in the estuary (formation of a fresh or brackish lagoon) for purposes of enhancing the quality of rearing habitat for young-of-year and age 1+ juvenile (age 0+ and 1+) steelhead from May 15 to October 15 (referred to hereafter as the "lagoon management period"). A program of potential, incremental steps are prescribed to accomplish this, including adaptive management of a lagoon outlet channel on the barrier beach to promote higher water surface elevations in the Estuary to enhance habitat for juvenile steelhead rearing habitat.

The Water Agency completed a CEQA process to evaluate the potential impacts associated with implementing the Russian River Estuary Management Project (Estuary Management Project), which would allow for implementation of an outlet channel following natural river mouth closures from May 15 to October 15 (lagoon management season) to enhance habitat for juvenile rearing while maintaining water surface elevations to minimize flood risk, and allowing for artificial breaching practices during the remainder of the year. On December 15, 2010, the Water Agency released the Estuary Management Project Draft EIR for public review. The Final EIR was certified by the Water Agency's Board of Director's on August 16, 2011. A lawsuit was subsequently filed by the Russian River Watershed Protection Committee under CEQA. The litigation was settled in 2012.

### **Impacts Identified**

The Estuary Management Project EIR identified significant and unavoidable impacts that could not be mitigated to water quality because water will stay in a closed estuary for a longer time, there may be an increase in the amount of time that water quality in the Estuary is potentially degraded due to high bacteria or nutrient levels; and some groundwater wells near the Estuary currently experience seasonal saline water intrusion. When the Estuary closes, the salt and fresh waters stratify, and the heavier saltwater could concentrate near the bottom of the Estuary, potentially extending the time period of salinity problems in some wells (Sonoma County Water Agency 2010).

### **Relationship to Proposed Project**

The Estuary Management Project governs the Water Agency's breaching of the Estuary under all foreseeable instream flow conditions, with or without the instream flow levels proposed by the Fish Flow Project. The Water Agency has been managing water levels in the Estuary through breaching since 1995. At the times the Water Agency has breached the Estuary to prevent flooding, instream flows in the Russian River have ranged from 77 cubic feet per second (cfs) to 1,250 cfs. Although the Water Agency is required by the SWRCB to maintain minimum instream flows in the Russian River, flows often greatly exceed the prescribed minimums due to natural flow from unmanaged tributaries on the river. Thus, depending on the year type and season, instream flows into the Estuary are a combination of natural runoff and releases from storage. The Estuary Management Project was developed to govern the Water Agency's breaching activities under all flow conditions, regardless of the level of instream flows, and does not require or make more likely any changes to the existing minimum instream flows. The Proposed Project, on the other hand, proposes to reduce minimum instream flows in the Russian River and Dry Creek. Under the Proposed Project, flows into the Estuary could be lower in some years, particularly during the dry season, depending upon the extent of natural runoff and tributary flows. Reduced minimum flows in the Russian River, and the resultant possible reduced flows into the Estuary, if approved by the SWRCB, may make it easier for the Water Agency to maintain the water levels identified in the Russian River Biological Opinion as beneficial in some years.<sup>2</sup> However, these lower flows are not required in order for the Estuary Management Project to be carried out. The Water Agency must carry out the Estuary

Management Project regardless of whether lower minimum Russian River flows are ever approved by the SWRCB. The Estuary Management Project, as designed and as evaluated in the Russian River Estuary Management Project Draft EIR, is feasible with or without the reduced minimum flows proposed by the Proposed Project.

## 5. Approach To Cumulative Analysis

The analysis of cumulative impacts focuses on the impacts of the implementation of the Proposed Project on water quality along with the Estuary Management Project's identified impacts, that when considered concurrently, may result in a cumulatively considerable impact.

### Standards of Significance

The standards of significance and methodology used to determine cumulative impacts under the same environmental resource categories as the impacts of the Proposed Project are based on the standards of significance and methodology outlined in Chapter 4.2, "Water Quality" of this EIR.

Based on the Appendix G of California Environmental Quality Act (CEQA) Guidelines, project implementation would have significant impacts and environmental consequences on water quality resources if it would result in any of the following:

- Violate any water quality standards or waste discharge requirements;
- Otherwise substantially degrade water quality.

Implementation of the Proposed Project would not involve any construction activities or new or changed facilities. Therefore, there would be no temporary or permanent impacts on water resources resulting from construction or maintenance activities.

### Methodology

For the Fish Flow Project's potential impacts to water quality, the cumulative impact analysis addresses whether a significant cumulative impact would occur and whether the Fish Flow Project's contribution to a cumulative impact would be cumulatively considerable. As defined in CEQA Guidelines Section 15065(a)(3), "cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects. CEQA Guidelines Section 15130(a)(3) indicates that a project's contribution is less than cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact.

#### *Baseline Condition*

The Baseline Condition considered in this analysis includes the hydrologic index and minimum instream flows required by the Water Agency's water right permits established by the SWRCB's Decision 1610 and assumes that delivery curtailments required by the SWRCB under certain hydrologic conditions are met. The Baseline Condition also assumes that flows diverted from the Eel River into the Russian River via Pacific Gas and Electric Company's (PG&E) Potter

Valley Project (PVP) are in accordance with the 2004 license issued by the Federal Energy Regulatory Commission (FERC) for PG&E's operation of PVP. Baseline conditions include historical Estuary breaching practices.

### *Proposed Project*

The Proposed Project incorporates the proposed Russian River Hydrologic Index, the accompanying minimum instream flow requirements, and full Water Agency water right demand of 75,000 AFY, as discussed in Chapter 3, "Background and Project Description." All other assumptions remain the same as in the Baseline Condition.

## 6. Cumulative Impact Analysis

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 Proposed Project's incremental effect and the effects of other projects is not significant. Furthermore, the discussion below explains if the Proposed 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 than the impact discussion provided in Chapter 4, "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.

### Proposed Project

The Fish Flow Project EIR identified a single significant and unavoidable impact related to water quality in the Lower Russian River in the area of geographic overlap with the Estuary Management Project related to biostimulatory substances, which is summarized below.

**Impact 4.2-4: Changes to minimum instream flows could result in a violation of water quality standards or waste discharge requirements or otherwise degrade water quality relating to biostimulatory substances in the Russian River. (Significant and Unavoidable)**

High concentrations of biostimulatory substances including nitrogen, phosphorus, and algae (chlorophyll-a) could have a negative effect on water quality in the Russian River, including the Estuary. High levels of nutrients can contribute to excessive algal growth in river and streams, causing nuisance conditions which can affect dissolved oxygen, pH, and temperature and the overall quality of aquatic habitat. Excessive algal growth can affect the aesthetics of the river negatively impacting contact and non-contact recreation. Excessive algal growth can also contribute to the proliferation of blue-green algae, which in turn can pose a risk to contact recreation through the release of cyanotoxins into the water column.

During the process of developing statewide criteria for biostimulatory substances, the State Water Resources Control Board (SWRCB) has found that a given concentration of nitrogen and phosphorus does not consistently result in nuisance conditions in a given stream, and concluded that a single nutrient concentration threshold is not appropriate for identifying when nuisance conditions may be occurring. As a result, the SWRCB began developing criteria for algal biomass concentrations that can cause nuisance conditions. Ultimately, this algal biomass concentration would then be used in individual streams to identify site specific nutrient concentration thresholds and potentially chlorophyll-a concentrations that may indicate when a nuisance condition is occurring. An algal biomass threshold was developed using data from rivers and streams throughout the state, however there is no algal mass data from the Russian River that can be used to analyze the Proposed Project against the Baseline Condition.

There is no simulation model available for the Russian River that can adequately simulate algal biomass or nutrient and chlorophyll-a concentrations under a range of different flows. In the absence of an available model, total nitrogen, total phosphorus and chlorophyll-a data were relied upon to analyze the Proposed Project against the Baseline Condition for potential changes to impacts in the Russian River.

Estuaries are complex, dynamic ecosystems, normally experiencing changes between seasons, between years, and between different places in the same estuary. For an evaluation of the potential effects to the water quality in the Russian River Estuary due to minimum instream flow changes in the Lower Russian River, when anticipating future conditions, the determination of significance is compared to Baseline Conditions. Under Baseline Conditions, water depth, temperature, and salinity, as well as other water quality parameters, fluctuate at varying degrees and continuously across a wide range of values and flows into the Estuary and are dependent in large part on the strength of the tidal cycle during open conditions and the frequency, timing, and duration of river mouth closures, as well as the presence of external factors including potential pollutants along the near shore line that are inundated during river mouth closures. The shift from an estuary to lagoon conditions and resultant changes to water quality conditions in the underlying saline layer and overlying freshwater layer typically begin to occur within hours after river mouth closure and are not dependent on dry season minimum instream flow rates. Therefore, because lagoon conditions in the Estuary are part of the Baseline Condition, changes to minimum instream flows would have the greatest effect on biostimulatory substances during open river mouth conditions.

Several exceedances of the California Department of Public Health (CDPH) recommended freshwater *E. coli* concentration of 235 MPN have been recorded in the backwater area during late summer and early fall river mouth closures when the shoreline becomes inundated, often capturing previously deposited animal waste. These closures often overlap with the removal of summer recreational dams that appear to influence bacterial concentrations as well.

These elevated *E. coli* values occur under normal Baseline Condition instream flows and reduced temporary urgency change flows that are similar to the Proposed Project minimum instream flows.

Maximum *E. coli* concentrations were observed to remain below the CDPH recommended concentrations for freshwater beaches during 2009, 2011, and 2012 at all monitoring stations during open river mouth conditions, with instream flows similar to Baseline Condition instream flows (Table 4.2-6). Maximum *E. coli* concentrations were also observed to remain below the CDPH recommended concentrations for freshwater beaches during 2013, 2014, and 2015 at all monitoring stations during open river mouth conditions, with instream flows similar to the Proposed Project instream flows (Table 4.2-6).

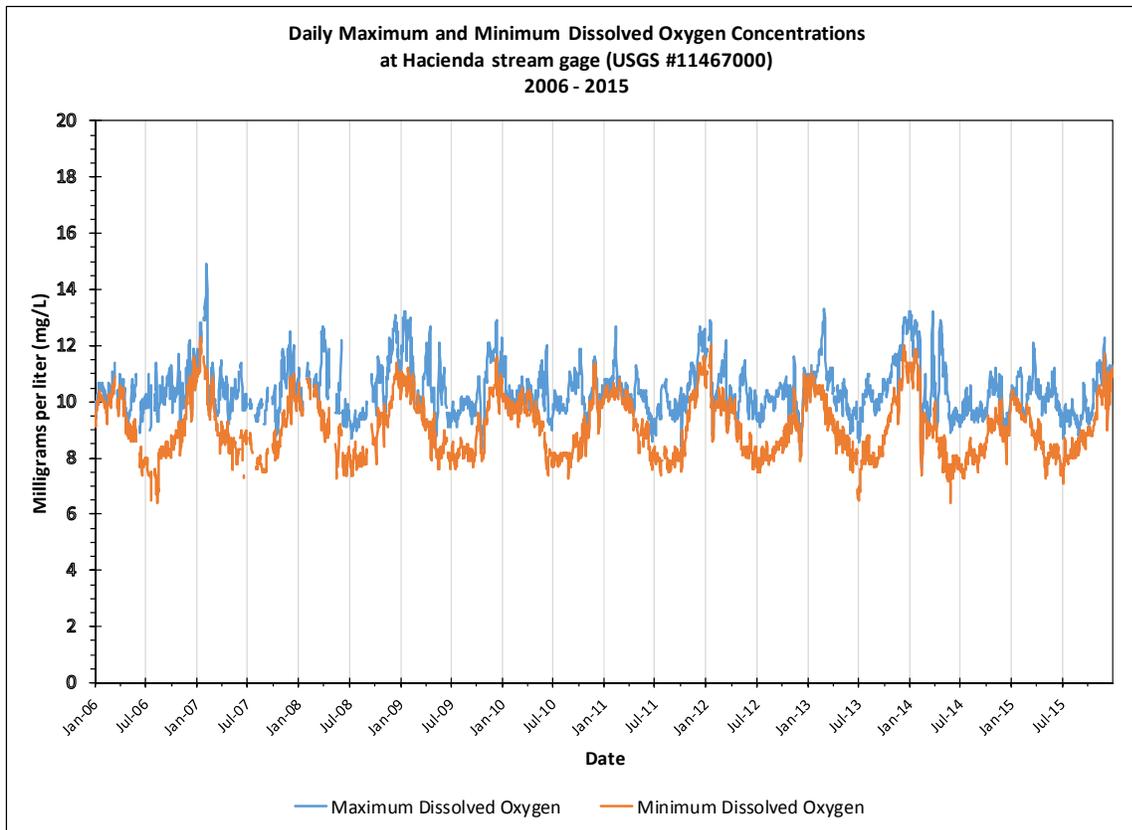
**Table 4.2-4. Annual Nutrient and chlorophyll-a Concentrations at USGS Russian River near Hacienda stream gage (USGS 11467000), Vacation Beach, Monte Rio, Patterson Point, Casini Ranch, and Duncans Mills for the years 2010 through 2015. Bold values represent exceedances of the USEPA recommended criteria for total nitrogen, total phosphorus, and chlorophyll-a.**

Year	Stations Sampled <sup>1</sup>	Total Nitrogen		Total Phosphorus		Chlorophyll-a		Flow*			Total Sample Events
		Median (mg/L)	Mean (mg/L)	Median (mg/L)	Mean (mg/L)	Median (mg/L)	Mean (mg/L)	Median (cfs)	Mean (cfs)	Range (cfs)	
2010	Monte Rio, Casini Ranch, Duncans Mills	0.25	0.25	<b>0.032</b>	<b>0.034</b>	0.00069	0.00085	172	232	146 - 660	21
2011	Monte Rio, Casini Ranch, Duncans Mills	0.37	0.37	<b>0.047</b>	<b>0.048</b>	<b>0.0032</b>	<b>0.0032</b>	219	290	129 - 767	39
2012	Hacienda, Monte Rio, Casini Ranch, Duncans Mills	0.21	0.29	<b>0.026</b>	<b>0.025</b>	0.00025	0.00068	117	137	100 - 323	69
2013	Hacienda, Monte Rio, Casini Ranch, Duncans Mills	0.28	0.27	<b>0.039</b>	<b>0.044</b>	0.0012	0.0016	100	110	77 - 177	73
2014	Vacation Beach, Monte Rio, Patterson Point, Casini Ranch,	0.28	0.27	<b>0.041</b>	<b>0.043</b>	0.0012	0.0014	96	102	70 - 147	76
2015	Vacation Beach, Monte Rio, Patterson Point, Casini Ranch,	0.24	0.24	<b>0.034</b>	<b>0.034</b>	0.0014	0.0015	88	103	66 - 183	64

\* Measured at USGS 11467000 Russian River near Guerneville (Hacienda) stream gage station.

Total nitrogen concentrations in the Lower Russian River were observed to remain below USEPA recommended criteria during all years with instream flows similar to Baseline Conditions and the Proposed Project. The highest median and mean total nitrogen concentrations in the Lower Russian River occurred in 2011 with instream flows similar to Baseline Condition instream flows (Table 4.2-4). Total phosphorus concentrations in the Lower Russian River were observed to exceed the USEPA recommended criteria during all years with instream flows similar to Baseline Conditions and the Proposed Project. In addition, the highest median and mean total phosphorus concentrations occurred in 2011 with instream flows similar to Baseline Condition instream flows (Table 4.2-4). The highest median and mean values for chlorophyll-a in the Lower Russian River occurred in 2011, with instream flows similar to Baseline Condition instream flows. However, median and mean chlorophyll-a concentrations did not exceed the USEPA recommended concentration in any of the three years.

Dissolved oxygen data was collected at the USGS Hacienda stream gage under a variety of instream flows during Baseline Conditions that are similar to the Proposed Project minimum instream flow requirements.



**Figure 4.2-11. Daily Maximum and Minimum Dissolved Oxygen Concentrations at USGS Russian River near Guerneville (Hacienda) stream gage (USGS 11467000) between 2006 and 2015.**

DO concentrations at Hacienda fluctuate on a daily, seasonal, and yearly basis. DO concentrations tend to be higher during wet season months (November through April) when water temperatures are cooler, and the level of primary production and respiration associated with plant and algal growth decline. The availability of nutrients in the water column can also affect DO concentrations. These nutrients can accumulate in standing water during an extended period of time and contribute to biostimulatory conditions. These conditions can promote excessive plant and algal growth that can alter the concentration of DO through photosynthesis and respiration.

Under the Proposed Project, instream flows in the Lower Russian River, including the Estuary, would be similar to instream flows recorded in the Lower Russian River in 2013 (Table 4.2-4). The Lower Russian River had elevated median and mean total phosphorus concentrations during 2013, 2014, and 2015 that exceeded the USEPA recommended criteria, with instream flows similar to the Proposed Project (Table 4.2.4). The median and mean chlorophyll-a concentration did not exceed the USEPA recommended criteria in 2013, 2014, or 2015 (Table 4.2-4). However, DO concentrations at Hacienda were observed to fluctuate with both

depressed and supersaturation DO concentrations during 2013, 2014, and 2015 with inflows similar to the Proposed Project. Concentrations of biostimulatory substances exceeded the USEPA recommended criteria for all three years, and would likely continue to exceed USEPA recommended criteria under the Proposed Project. Therefore, these continued exceedances of USEPA recommended criteria for biostimulatory substances could result in a violation of water quality standards or waste discharge requirements or otherwise substantially degrade water quality. There is much uncertainty about biostimulatory conditions in the Russian River. Elevated concentrations of biostimulatory substances exist under Baseline Conditions. Given these uncertainties, implementation of the Proposed Project could result in an impact on water quality related to biostimulatory conditions, and as such, the impact could be significant and unavoidable.

### **Estuary Management Project**

The Estuary Management Project EIR identified a significant and unavoidable impact related to water quality in the Russian River Estuary in the area of geographic overlap with the Proposed Project related to nutrient and indicator bacteria levels in the Estuary.

**Estuary EIR Impact 4.3.3: 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. (Significant and Unavoidable)**

### **Cumulative Analysis**

The Proposed Project did not identify an impact to indicator bacteria. The combined cumulative impacts of the Proposed Project and the Estuary Management Project related to nutrients and biostimulatory conditions would be cumulatively considerable. Stratification in the estuary during lagoon outlet conditions could result in the freshwater layer being exposed to more sunlight and the well-oxygenated surface layer would be susceptible to biostimulatory conditions. Therefore, the potential for continued exceedances of USEPA recommended criteria for biostimulatory substances under the Proposed Project that could result in violations water quality standards or waste discharge requirements or otherwise substantially degrade water quality. There is much uncertainty about biostimulatory conditions in the Russian River. Elevated concentrations of biostimulatory substances exist under Baseline Conditions. Given these uncertainties, implementation of the Proposed Project could result in an impact on water quality related to biostimulatory conditions, and as such, the impact could be significant and unavoidable.

### **Estuary Management Project**

The Estuary Management Project EIR identified a significant and unavoidable impact related to water quality in the Russian River Estuary in the area of geographic overlap with the Proposed Project related to change in the duration and/or geographic extent of saline conditions in the Estuary.

**Estuary EIR Impact 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. (Significant and Unavoidable)**

### **Cumulative Analysis**

The Estuary Management Project EIR identified a significant and unavoidable impact related to water quality in the Russian River Estuary in the area of geographic overlap with the Proposed Project related to change in the duration and/or geographic extent of saline conditions in the Estuary. The Proposed Project did not identify groundwater impacts in the Russian River and Dry Creek, including the Estuary. The Proposed Project would not increase the frequency of river mouth closures, but could extend the duration of closures or outlet channel conditions by reducing the rate at which water surface elevations in the Estuary rise. The combined cumulative impacts of the Estuary Management Project related to the duration and/or geographic extent of saline conditions in the Estuary would be cumulatively considerable and continue to be significant and unavoidable as identified in the Estuary Management Project EIR.

## 7. References

Heckel, M. 1994. *Russian River Estuary Study 1992-1993*. Prepared for Sonoma County Water Agency.

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 [...]." *Endangered Species Act, Section 7 Consultation*. National Marine Fisheries Service, September 24.

Sonoma County Water Agency. 2010. "Russian River Estuary Management Project Draft Environmental Impact Report December 2010."

# Alternatives Analyzed Above 70 cfs

This section is prepared in compliance with Section 3 of the Stipulated Judgment in Russian River Watershed Protection Committee v. Sonoma County Water Agency. Section 3 states:

3. *The Water Agency shall analyze as part of the Fish Flow Project EIR whether a higher minimum instream flow in the Russian River at Hacienda Beach, other than the 70 figure specific in the 2008 National Marine Fisheries Service’s Russian River Biological Opinion, would “meet the goals of restoring functional salmonid rearing habitat in .. the estuary ..., while promoting water conservation and limiting adverse effects on other instream resources,” as permitted by the Biological Opinion. As part of the alternatives analysis and screening required by Section 15126.6 of the CEQA Guidelines, the Fish Flow Project EIR will consider as alternatives as least two flow regimes that have minimum flows above 70 cfs at Hacienda, for example 90 cfs, 100, cfs, or 110 cfs.*

As described in Chapter 7, “Alternatives” of the Fish Flow Project EIR, the alternatives analysis included minimum instream flow alternatives that were above the 70 cfs recommended in the Lower Russian River by the Russian River Biological Opinion. These alternatives are summarized below.

**Table 1. Lower Russian River Minimum Instream Flow Alternatives above 70 cfs evaluated in Fish Flow Project EIR Alternatives Analysis**

Alternative	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct 1-15	Oct 16-31	Nov	Dec
F6	85	85	85	85	85	85	85	85	85	85	85	85	85
F7	100	100	100	100	100	100	100	100	100	100	100	100	100
F8	85	85	85	85	85	85	85	85	85	85	85	85	85
F9	100	100	100	100	100	100	100	100	100	100	100	100	100
F10	85	85	85	85	85	85	85	85	85	85	85	85	85
F12	85	85	85	85	85	85	85	85	85	85	85	85	85
F15	125	125	125	125	85	85	85	85	85	85	125	125	125
F16	150	150	150	150	85	85	85	85	85	85	150	150	150
F17	150	150	150	150	100	100	100	100	100	100	150	150	150

See Chapter 7, “Alternatives”, for this analysis.

# Modeled Levels of Storage in Lake Mendocino and Lake Sonoma

---

This section is prepared in compliance with Section 4 of the Stipulated Judgment in Russian River Watershed Protection Committee v. Sonoma County Water Agency. Section 4 states:

- 4. The Water Agency commits to model in the Fish Flow Project EIR the changes in storage in Lake Mendocino and Lake Sonoma resulting from implementation of lower minimum instream flows under various hydrologic scenarios. The analysis in the Fish Flow Project EIR will contain model results showing the levels of water storage in Lake Mendocino and Lake Sonoma under different flow alternative and different hydrologic conditions.*

Model results for the Proposed Project, No Project 1, and No Project 2 alternatives evaluated in the Fish Flow Project EIR are provided in Appendix G. Model results include Lake Mendocino and Lake Sonoma storage volumes under varying percent occurrences of storage.