Appendix 3.1

Accessibility Statement

For accessibility assistance with this document, please contat Sonoma County Water Agency, Environmental Resources at (707) 526-5370, Fax to (707) 544-6123 or through California Relay Service by dialing 711.

Please indicate County where your project is located here:

Sonoma / Mendo.

MAIL FORM AND ATTACHMENTS TO:
State Water Resources Control Board
DIVISION OF WATER RIGHTS
P.O. Box 2000, Sacramento, CA 95812-2000
Tel: (916) 341-5300 Fax: (916) 341-5400
http://www.waterboards.ca.gov/waterrights

A012919A

STATE WATER RESOURCES CONTROL BOARD

2016 APR 15 PM 1:23

DIV OF WATER RIGHTS SACRAMENTO

PETITION FOR CHANGE

Separate petitions are required for each water right. Mark all areas that apply to your proposed change(s). Incomplete forms may not be accepted. Location and area information must be provided on maps in accordance with established requirements. (Cal. Code Regs., tit. 23, § 715 et seq.) Provide attachments if necessary.

☐ **Point of Diversion** Wat. Code, § 1701
☐ **Point of Rediversion** Cal. Code Regs., tit. 23, § 791(e)
☐ **Place of Use** Wat. Code, § 1701
☐ **Purpose of Use** Wat. Code, § 1701

☐ **Distribution of Storage** Cal. Code Regs., tit. 23, § 791(e)
☒ **Temporary Urgency** Wat. Code, § 1435
☐ **Instream Flow Dedication** Wat. Code, § 1707
☐ **Waste Water** Wat. Code, § 1211

☐ **Split** Cal. Code Regs., tit. 23, § 836
☐ **Terms or Conditions** Cal. Code Regs., tit. 23, § 791(e)
☐ **Other**

Application 12919A Permit 12947A License _____ Statement _____

I (we) hereby petition for change(s) noted above and described as follows:

Point of Diversion or Rediversion – Provide source name and identify points using both Public Land Survey System descriptions to ¼-¼ level and California Coordinate System (NAD 83).

Present:

Proposed:

Place of Use – Identify area using Public Land Survey System descriptions to ¼-¼ level; for irrigation, list number of acres irrigated.

Present:

Proposed:

Purpose of Use

Present:

Proposed:

Split

Provide the names, addresses, and phone numbers for all proposed water right holders.

In addition, provide a separate sheet with a table describing how the water right will be split between the water right holders: for each party list amount by direct diversion and/or storage, season of diversion, maximum annual amount, maximum diversion to offstream storage, point(s) of diversion, place(s) of use, and purpose(s) of use. Maps showing the point(s) of diversion and place of use for each party should be provided.

Distribution of Storage

Present:

Proposed:

GC

REC'D 4-15-2016
CHECK #1545832 - $24,132.80
CHECK #1544990 - $850.00

Temporary Urgency
This temporary urgency change will be effective from May 1, 2016 to October 27, 2016 .

Include an attachment that describes the urgent need that is the basis of the temporary urgency change and whether the change will result in injury to any lawful user of water or have unreasonable effects on fish, wildlife or instream uses.

Instream Flow Dedication – Provide source name and identify points using both Public Land Survey System descriptions to ¼-¼ level and California Coordinate System (NAD 83).

Upstream Location:

Downstream Location:

List the quantities dedicated to instream flow in either: ☐ cubic feet per second or ☐ gallons per day:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Will the dedicated flow be diverted for consumptive use at a downstream location? ◯ Yes ◯ No
If yes, provide the source name, location coordinates, and the quantities of flow that will be diverted from the stream.

Waste Water
If applicable, provide the reduction in amount of treated waste water discharged in cubic feet per second.

Will this change involve water provided by a water service contract which prohibits your exclusive right to this treated waste water? ◯ Yes ◯ No

Will any legal user of the treated waste water discharged be affected? ◯ Yes ◯ No

General Information – For all Petitions, provide the following information, if applicable to your proposed change(s).

Will any current Point of Diversion, Point of Storage, or Place of Use be abandoned? ◯ Yes ◉ No

I (we) have access to the proposed point of diversion or control the proposed place of use by virtue of:
☐ ownership ☐ lease ☐ verbal agreement ☐ written agreement

If by lease or agreement, state name and address of person(s) from whom access has been obtained.

Give name and address of any person(s) taking water from the stream between the present point of diversion or rediversion and the proposed point of diversion or rediversion, as well as any other person(s) known to you who may be affected by the proposed change.

All Right Holders Must Sign This Form: I (we) declare under penalty of perjury that this change does not involve an increase in the amount of the appropriation or the season of diversion, and that the above is true and correct to the best of my (our) knowledge and belief. Dated April 13, 2016 at Santa Rosa, CA .

[redacted]

Right Holder or Authorized Agent Signature

Right Holder or Authorized Agent Signature

NOTE: All petitions must be accompanied by:
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(2) Division of Water Rights fee, per the Water Rights Fee Schedule, available at: http://www.waterboards.ca.gov/waterrights/water_issues/programs/fees/
(3) Department of Fish and Wildlife fee of $850 (Pub. Resources Code, § 10005)

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A015736

STATE WATER RESOURCES CONTROL BOARD

2016 APR 15 PM 1:23

DIV OF WATER RIGHTS SACRAMENTO

PETITION FOR CHANGE

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☐ **Point of Rediversion** Cal. Code Regs., tit. 23, § 791(e)
☐ **Place of Use** Wat. Code, § 1701
☐ **Purpose of Use** Wat. Code, § 1701

☐ **Distribution of Storage** Cal. Code Regs., tit. 23, § 791(e)
☒ **Temporary Urgency** Wat. Code, § 1435
☐ **Instream Flow Dedication** Wat. Code, § 1707
☐ **Waste Water** Wat. Code, § 1211

☐ **Split** Cal. Code Regs., tit. 23, § 836
☐ **Terms or Conditions** Cal. Code Regs., tit. 23, § 791(e)
☐ **Other**

Application 15736 Permit 12949 License _____ Statement _____

I (we) hereby petition for change(s) noted above and described as follows:

Point of Diversion or Rediversion – Provide source name and identify points using both Public Land Survey System descriptions to ¼-¼ level and California Coordinate System (NAD 83).

Present:

Proposed:

Place of Use – Identify area using Public Land Survey System descriptions to ¼-¼ level; for irrigation, list number of acres irrigated.

Present:

Proposed:

Purpose of Use

Present:

Proposed:

Split

Provide the names, addresses, and phone numbers for all proposed water right holders.

In addition, provide a separate sheet with a table describing how the water right will be split between the water right holders: for each party list amount by direct diversion and/or storage, season of diversion, maximum annual amount, maximum diversion to offstream storage, point(s) of diversion, place(s) of use, and purpose(s) of use. Maps showing the point(s) of diversion and place of use for each party should be provided.

Distribution of Storage

Present:

Proposed:

GC

REC'D 4-15-2016
CHECK #1545832 - $24,132.80
CHECK #1544990 - $850.00

Temporary Urgency
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Instream Flow Dedication – Provide source name and identify points using both Public Land Survey System descriptions to ¼-¼ level and California Coordinate System (NAD 83).

Upstream Location:

Downstream Location:

List the quantities dedicated to instream flow in either: ☐ cubic feet per second or ☐ gallons per day:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Will the dedicated flow be diverted for consumptive use at a downstream location? ◯ Yes ◯ No
If yes, provide the source name, location coordinates, and the quantities of flow that will be diverted from the stream.

Waste Water
If applicable, provide the reduction in amount of treated waste water discharged in cubic feet per second.

Will this change involve water provided by a water service contract which prohibits your exclusive right to this treated waste water? ◯ Yes ◯ No

Will any legal user of the treated waste water discharged be affected? ◯ Yes ◯ No

General Information – For all Petitions, provide the following information, if applicable to your proposed change(s).

Will any current Point of Diversion, Point of Storage, or Place of Use be abandoned? ◯ Yes ◉ No

I (we) have access to the proposed point of diversion or control the proposed place of use by virtue of:
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If by lease or agreement, state name and address of person(s) from whom access has been obtained.

Give name and address of any person(s) taking water from the stream between the present point of diversion or rediversion and the proposed point of diversion or rediversion, as well as any other person(s) known to you who may be affected by the proposed change.

All Right Holders Must Sign This Form: I (we) declare under penalty of perjury that this change does not involve an increase in the amount of the appropriation or the season of diversion, and that the above is true and correct to the best of my (our) knowledge and belief. Dated April 13, 2016 at Santa Rosa, CA .

[redacted]

Right Holder or Authorized Agent Signature

Right Holder or Authorized Agent Signature

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(2) Division of Water Rights fee, per the Water Rights Fee Schedule, available at: http://www.waterboards.ca.gov/waterrights/water_issues/programs/fees/
(3) Department of Fish and Wildlife fee of $850 (Pub. Resources Code, § 10005)

A015737

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Sonoma / Mendo.

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STATE WATER RESOURCES CONTROL BOARD
2016 APR 15 PM 1:23
DIV OF WATER RIGHTS SACRAMENTO

PETITION FOR CHANGE

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☐ **Place of Use** Wat. Code, § 1701
☐ **Purpose of Use** Wat. Code, § 1701
☐ **Distribution of Storage** Cal. Code Regs., tit. 23, § 791(e)
☒ **Temporary Urgency** Wat. Code, § 1435
☐ **Instream Flow Dedication** Wat. Code, § 1707
☐ **Waste Water** Wat. Code, § 1211
☐ **Split** Cal. Code Regs., tit. 23, § 836
☐ **Terms or Conditions** Cal. Code Regs., tit. 23, § 791(e)
☐ **Other**

Application 15737 Permit 12950 License _____ Statement _____

I (we) hereby petition for change(s) noted above and described as follows:

Point of Diversion or Rediversion – Provide source name and identify points using both Public Land Survey System descriptions to ¼-¼ level and California Coordinate System (NAD 83).

Present:

Proposed:

Place of Use – Identify area using Public Land Survey System descriptions to ¼-¼ level; for irrigation, list number of acres irrigated.

Present:

Proposed:

Purpose of Use

Present:

Proposed:

Split

Provide the names, addresses, and phone numbers for all proposed water right holders.

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Distribution of Storage

Present:

Proposed:

GC

REC'D 4-15-2016
CHECK #1545832 - $24,132.80
CHECK #1544990 - $850.00

Temporary Urgency
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Instream Flow Dedication – Provide source name and identify points using both Public Land Survey System descriptions to ¼-¼ level and California Coordinate System (NAD 83).

Upstream Location:

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List the quantities dedicated to instream flow in either: ☐ cubic feet per second or ☐ gallons per day:

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Will the dedicated flow be diverted for consumptive use at a downstream location? ◯ Yes ◯ No
If yes, provide the source name, location coordinates, and the quantities of flow that will be diverted from the stream.

Waste Water
If applicable, provide the reduction in amount of treated waste water discharged in cubic feet per second.

Will this change involve water provided by a water service contract which prohibits your exclusive right to this treated waste water? ◯ Yes ◯ No

Will any legal user of the treated waste water discharged be affected? ◯ Yes ◯ No

General Information – For all Petitions, provide the following information, if applicable to your proposed change(s).

Will any current Point of Diversion, Point of Storage, or Place of Use be abandoned? ◯ Yes ◉ No

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[redacted]

Right Holder or Authorized Agent Signature

Right Holder or Authorized Agent Signature

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http://www.waterboards.ca.gov/waterrights

A019351

STATE WATER RESOURCES CONTROL BOARD

2016 APR 15 PM 1:23

DIV OF WATER RIGHTS SACRAMENTO

PETITION FOR CHANGE

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☒ **Temporary Urgency** Wat. Code, § 1435
☐ **Instream Flow Dedication** Wat. Code, § 1707
☐ **Waste Water** Wat. Code, § 1211
☐ **Split** Cal. Code Regs., tit. 23, § 836
☐ **Terms or Conditions** Cal. Code Regs., tit. 23, § 791(e)
☐ **Other**

Application 19351 Permit 16596 License _____ Statement _____

I (we) hereby petition for change(s) noted above and described as follows:

Point of Diversion or Rediversion – Provide source name and identify points using both Public Land Survey System descriptions to ¼-¼ level and California Coordinate System (NAD 83).

Present:

Proposed:

Place of Use – Identify area using Public Land Survey System descriptions to ¼-¼ level; for irrigation, list number of acres irrigated.

Present:

Proposed:

Purpose of Use

Present:

Proposed:

Split

Provide the names, addresses, and phone numbers for all proposed water right holders.

In addition, provide a separate sheet with a table describing how the water right will be split between the water right holders: for each party list amount by direct diversion and/or storage, season of diversion, maximum annual amount, maximum diversion to offstream storage, point(s) of diversion, place(s) of use, and purpose(s) of use. Maps showing the point(s) of diversion and place of use for each party should be provided.

Distribution of Storage

Present:

Proposed:

(GC)

REC'D 4-15-2016
CHECK #1545832 - $24,132.80
CHECK #1544990 - $850.00

Temporary Urgency
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Will this change involve water provided by a water service contract which prohibits your exclusive right to this treated waste water? ◯ Yes ◯ No

Will any legal user of the treated waste water discharged be affected? ◯ Yes ◯ No

General Information – For all Petitions, provide the following information, if applicable to your proposed change(s).

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[redacted]
Right Holder or Authorized Agent Signature

Right Holder or Authorized Agent Signature

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State of California
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http://www.waterboards.ca.gov/waterrights

ENVIRONMENTAL INFORMATION FOR PETITIONS

This form is required for all petitions.

Before the State Water Resources Control Board (State Water Board) can approve a petition, the State Water Board must consider the information contained in an environmental document prepared in compliance with the California Environmental Quality Act (CEQA). This form is not a CEQA document. If a CEQA document has not yet been prepared, a determination must be made of who is responsible for its preparation. As the petitioner, you are responsible for all costs associated with the environmental evaluation and preparation of the required CEQA documents. Please answer the following questions to the best of your ability and submit any studies that have been conducted regarding the environmental evaluation of your project. If you need more space to completely answer the questions, please number and attach additional sheets.

DESCRIPTION OF PROPOSED CHANGES OR WORK REMAINING TO BE COMPLETED

For a petition for change, provide a description of the proposed changes to your project including, but not limited to, type of construction activity, structures existing or to be built, area to be graded or excavated, increase in water diversion and use (up to the amount authorized by the permit), changes in land use, and project operational changes, including changes in how the water will be used. For a petition for extension of time, provide a description of what work has been completed and what remains to be done. Include in your description any of the above elements that will occur during the requested extension period.

See 'Supplement to the April 2016 Temporary Urgency Change Petition' for a summary of the requested changes.

Insert the attachment number here, if applicable: [ ]

Coordination with Regional Water Quality Control Board

For change petitions only, you must request consultation with the Regional Water Quality Control Board regarding the potential effects of your proposed change on water quality and other instream beneficial uses. (Cal. Code Regs., tit. 23, § 794.) In order to determine the appropriate office for consultation, see: http://www.waterboards.ca.gov/waterboards_map.shtml. Provide the date you submitted your request for consultation here, then provide the following information.

Date of Request: 2/25/2016

Will your project, during construction or operation, (1) generate waste or wastewater containing such things as sewage, industrial chemicals, metals, or agricultural chemicals, or (2) cause erosion, turbidity or sedimentation? ○ Yes ◉ No

Will a waste discharge permit be required for the project? ○ Yes ◉ No

If necessary, provide additional information below:

Request for consultation sent to Matt St. John, the Executive Director of the North Coast Regional Water Quality Control Board. Conference call meeting with Regional Board staff and Division of Water Rights staff was held on April 12, 2016.

Insert the attachment number here, if applicable:

Local Permits

For temporary transfers only, you must contact the board of supervisors for the county(ies) both for where you currently store or use water and where you propose to transfer the water. (Wat. Code § 1726.) Provide the date you submitted your request for consultation here.

Date of Contact:

For change petitions only, you should contact your local planning or public works department and provide the information below.

Person Contacted: Date of Contact:

Department: Phone Number:

County Zoning Designation:

Are any county permits required for your project? If yes, indicate type below. ○ Yes ◉ No

☐ Grading Permit ☐ Use Permit ☐ Watercourse ☐ Obstruction Permit

☐ Change of Zoning ☐ General Plan Change ☐ Other (explain below)

If applicable, have you obtained any of the permits listed above? If yes, provide copies. ○ Yes ○ No

If necessary, provide additional information below:

Insert the attachment number here, if applicable:

Federal and State Permits

Check any additional agencies that may require permits or other approvals for your project:

- ☐ Regional Water Quality Control Board
- ☐ Department of Fish and Game
- ☐ Dept of Water Resources, Division of Safety of Dams
- ☐ California Coastal Commission
- ☐ State Reclamation Board
- ☐ U.S. Army Corps of Engineers
- ☐ U.S. Forest Service
- ☐ Bureau of Land Management
- ☐ Federal Energy Regulatory Commission
- ☐ Natural Resources Conservation Service

Have you obtained any of the permits listed above? If yes, provide copies. ○ Yes ◉ No

For each agency from which a permit is required, provide the following information:

Agency	Permit Type	Person(s) Contacted	Contact Date	Phone Number

If necessary, provide additional information below:

Insert the attachment number here, if applicable: ☐

Construction or Grading Activity

Does the project involve any construction or grading-related activity that has significantly altered or would significantly alter the bed, bank or riparian habitat of any stream or lake? ○ Yes ◉ No

If necessary, provide additional information below:

Insert the attachment number here, if applicable: ☐

Archeology

Has an archeological report been prepared for this project? If yes, provide a copy. ◯ Yes ◉ No

Will another public agency be preparing an archeological report? ◯ Yes ◉ No

Do you know of any archeological or historic sites in the area? If yes, explain below. ◯ Yes ◉ No

If necessary, provide additional information below:

Insert the attachment number here, if applicable: ☐

Photographs

For all petitions other than time extensions, attach complete sets of color photographs, clearly dated and labeled, showing the vegetation that exists at the following three locations:

☒ Along the stream channel immediately downstream from each point of diversion

☒ Along the stream channel immediately upstream from each point of diversion

☐ At the place where water subject to this water right will be used

Maps

For all petitions other than time extensions, attach maps labeled in accordance with the regulations showing all applicable features, both present and proposed, including but not limited to: point of diversion, point of rediversion, distribution of storage reservoirs, point of discharge of treated wastewater, place of use, and location of instream flow dedication reach. (Cal. Code Regs., tit. 23, §§ 715 et seq., 794.)

Pursuant to California Code of Regulations, title 23, section 794, petitions for change submitted without maps may not be accepted.

All Water Right Holders Must Sign This Form:

I (we) hereby certify that the statements I (we) have furnished above and in the attachments are complete to the best of my (our) ability and that the facts, statements, and information presented are true and correct to the best of my (our) knowledge. Dated April 13, 2016 at Santa Rosa, CA.

[redacted]

Water Right Holder or Authorized Agent Signature

Water Right Holder or Authorized Agent Signature

NOTE:

- **Petitions for Change may not be accepted unless you include proof that a copy of the petition was served on the Department of Fish and Game. (Cal. Code Regs., tit. 23, § 794.)**
- **Petitions for Temporary Transfer may not be accepted unless you include proof that a copy of the petition was served on the Department of Fish and Game and the board of supervisors for the county(ies) where you currently store or use water and the county(ies) where you propose to transfer the water. (Wat. Code § 1726.)**

April 2016

April 2016

Sonoma County Water Agency

Supplement to the April 2016 Temporary Urgency Change Petition

1.0 BACKGROUND

The Sonoma County Water Agency (Water Agency) controls and coordinates water supply releases from Lake Mendocino and Lake Sonoma to implement the minimum instream flow requirements in water rights Decision 1610, which the State Water Resources Control Board (State Water Board) adopted on April 17, 1986. Decision 1610 specifies minimum flow requirements for the Upper Russian River, Dry Creek and the Lower Russian River. These minimum flow requirements vary based on water supply conditions, which are also specified in Decision 1610. The Decision 1610 requirements for the Upper Russian River and Lower Russian River are contained in term 20 of the Water Agency's water-right Permit 12947A (Application 12919A). The Decision 1610 requirements for the Lower Russian River are contained in term 17 of the Water Agency's water-right Permit 12949 (Application 15736) and term 17 of the Water Agency's water-right Permit 12950 (Application 15737). The Decision 1610 requirements for Dry Creek and the Lower Russian River are contained in term 13 of the Water Agency's water-right Permit 16596 (Application 19351).

The Water Agency's operations are also subject to the Russian River Biological Opinion issued by the National Marine Fisheries Service on September 24, 2008.

1.1 Minimum Flow Requirements

Decision 1610 requires a minimum flow of 25 cubic feet per second (cfs) in the East Fork of the Russian River from Coyote Valley Dam to the confluence with the West Fork of the Russian River under all water supply conditions. From this point to Dry Creek, the

Decision 1610 required minimum Russian River flows are 185 cfs from April through August and 150 cfs from September through March during *Normal* water supply conditions, 75 cfs during *Dry* conditions and 25 cfs during *Critical* conditions. Decision 1610 further specifies two variations of the *Normal* water supply condition, commonly known as *Dry Spring 1* and *Dry Spring 2*. These conditions provide for lower required minimum flows in the Upper Russian River during times when the combined storage in Lake Pillsbury (owned and operated by the Pacific Gas and Electric Company) and Lake Mendocino on May 31 is unusually low. *Dry Spring 1* conditions exist if the combined storage in Lake Pillsbury and Lake Mendocino is less than 150,000 acre-feet on May 31. Under *Dry Spring 1* conditions, the required minimum flow in the Upper Russian River between the confluence of the East Fork and West Fork and Healdsburg is 150 cfs from June through March, with a reduction to 75 cfs during October through December if Lake Mendocino storage is less than 30,000 acre-feet during those months. *Dry Spring 2* conditions exist if the combined storage in Lake Pillsbury and Lake Mendocino is less than 130,000 acre-feet on May 31. Under *Dry Spring 2* conditions, the required minimum flows in the Upper Russian River are 75 cfs from June through December and 150 cfs from January through March.

From Dry Creek to the Pacific Ocean, the required minimum flows in the Lower Russian River are 125 cfs during *Normal* water supply conditions, 85 cfs during *Dry* conditions and 35 cfs during *Critical* conditions.

In Dry Creek below Warm Springs Dam, the required minimum flows are 75 cfs from January through April, 80 cfs from May through October and 105 cfs in November and December during *Normal* water supply conditions. During *Dry* and *Critical* conditions, these required minimum flows are 25 cfs from April through October and 75 cfs from November through March.

Figure 1 shows all of the required minimum instream flows specified in Decision 1610 by river reach, the gauging stations used to monitor compliance, and the definitions of the various water supply conditions.

1.2 Water Supply Conditions

There are three main water supply conditions that are defined in Decision 1610, which set the minimum instream flow requirements based on the hydrologic conditions for the Russian River system. These water supply conditions are determined based on criteria for the calculated cumulative inflow into Lake Pillsbury from October 1 to the first day of each month from January to June. Decision 1610 defines cumulative inflow for Lake

Pillsbury as the algebraic sum of releases from Lake Pillsbury, change in storage and lake evaporation.

Dry water supply conditions exist when cumulative inflow to Lake Pillsbury from October 1 to the date specified below is less than:

- 8,000 acre-feet as of January 1;
- 39,200 acre-feet as of February 1;
- 65,700 acre-feet as of March 1;
- 114,500 acre-feet as of April 1;
- 145,600 acre-feet as of May 1; and
- 160,000 acre-feet as of June 1.

Critical water supply conditions exist when cumulative inflow to Lake Pillsbury from October 1 to the date specified below is less than:

- 4,000 acre-feet as of January 1:
- 20,000 acre-feet as of February 1;
- 45,000 acre-feet as of March 1;
- 50,000 acre-feet as of April 1;
- 70,000 acre-feet as of May 1; and
- 75,000 acre-feet as of June 1.

Normal water supply conditions exist whenever a *Dry* or *Critical* water supply condition is not present. As indicated above, Decision 1610 further specifies three variations of the *Normal* water supply condition based on the combined storage in Lake Pillsbury and Lake Mendocino on May 31. These three variations of the *Normal* water supply condition determine the required minimum instream flows for the Upper Russian River from the confluence of the East Fork and the West Fork to the Russian River's confluence with Dry Creek. This provision of Decision 1610 does not provide for any changes in the required minimum instream flows in Dry Creek or the Lower Russian River (the Russian River between its confluence with Dry Creek and the Pacific Ocean). A summary of the required

minimum flows in the Russian River for *Normal*, *Normal — Dry Spring 1* and *Normal — Dry Spring 2* water supply conditions is provided here:

1. Normal: When the combined water in storage in Lake Pillsbury and Lake Mendocino on May 31 of any year exceeds 150,000 acre-feet or 90 percent of the estimated water supply storage capacity of the reservoirs, whichever is less:

From June 1 through August 31	185 cfs
From September 1 through March 31	150 cfs
From April 1 through May 31	185 cfs

2. Normal-Dry Spring 1: When the combined water in storage in Lake Pillsbury and Lake Mendocino on May 31 of any year is between 150,000 acre-feet or 90 percent of the estimated water supply storage capacity of the reservoirs, whichever is less, and 130,000 acre-feet or 80 percent or the estimated water supply storage capacity of the reservoirs, whichever is less:

From June 1 through March 31	150 cfs
From April 1 through May 31	185 cfs
If from October 1 through December 31, storage in Lake Mendocino is less than 30,000 acre-feet	75 cfs

3. Normal-Dry Spring 2: When the combined water in storage in Lake Pillsbury and Lake Mendocino on May 31 of any year is less than 130,000 acre-feet or 80 percent of the estimated water supply storage capacity of the reservoirs, whichever is less:

From June 1 through December 31	75 cfs
From January 1 through March 31	150 cfs
From April 1 through May 31	185 cfs

2.0 PROJECTED WATER SUPPLY CONDITIONS

From October 1, 2015 to April12, 2016, the cumulative inflow into Lake Pillsbury was 423,966 acre-feet. Consequently, the water supply condition will be categorized as *Normal* for the remainder of the year. Based on these criteria, the Decision 1610 required minimum instream flows in the Upper Russian River (from the East Fork Russian River to the Russian River's confluence of Dry Creek) will be 185 cfs between April 1 and May 31. The required minimum in-stream flows starting June 1 will be determined based on the combined storage of Lake Pillsbury and Lake Mendocino on May 31. At this time, the projected combined storage amount is difficult to predict because it is heavily dependent on late spring precipitation. However, based on the current hydrologic trends, the Water Agency anticipates either *Normal* or *Normal-Dry Spring 1* water supply conditions starting June 1. Consequently, the Decision 1610 required minimum instream flows in the Upper Russian River will likely be either 185 cfs or 150 cfs until August 31 and then 150 cfs for the remainder of the year. In the Lower Russian River, the required minimum instream flow will be 125 cfs.

2.1 Lake Mendocino

As of April 12, 2016 the water supply storage level in Lake Mendocino was 86,615 acre-feet (AF). This storage level is 93 percent of the seasonal water conservation pool. Figure 2 shows the storage level in Lake Mendocino compared to the 25-year average between 1991 and 2015. As shown in the figure, the storage level is well above the 25-year average for this time of year.

2.2 Lake Sonoma

As of April 12, 2016 the water supply storage level in Lake Sonoma was 245,226 AF. This storage level is slightly greater than 100 percent of the available water conservation pool. Figure 3 shows the storage level in Lake Sonoma compared to the 25 year average between 1991 and 2015. As shown in the figure, the storage level is well above the 25-year average for this time of year.

3.0 RUSSIAN RIVER BIOLOGICAL OPINION

Under the federal Endangered Species Act (ESA), coho salmon in the Russian River watershed are listed as an endangered species, and steelhead and Chinook salmon are listed as threatened species. Additionally, coho salmon are listed as an endangered species under the California Endangered Species Act (CESA). In September 2008, the National Marine Fisheries Service (NMFS) issued the Russian River Biological Opinion (Biological Opinion). This Biological Opinion was the culmination of more than a decade

of consultation under Section 7 of the ESA by the Water Agency and U.S. Army Corps of Engineers (Corps) with NMFS regarding the effects of the Water Agency's and Corps' water supply and flood control operations in the Russian River watershed on the survival of these listed fish species.

Studies conducted during the consultation period led NMFS to conclude in the Biological Opinion that the summer flows in the Upper Russian River and Dry Creek required by Decision 1610 create velocities that are too high for optimal juvenile salmonid habitat. NMFS also concluded in the Biological Opinion that the historical practice of breaching the sandbar that closes the mouth of the Russian River to minimize flood risk during the summer and fall may adversely affect the listed species. NMFS concluded in the Biological Opinion that it might be better for juvenile steelhead if the estuary was managed as seasonal freshwater lagoon in the summer months. Minimum instream flows lower than those required by Decision 1610 may result in flows into the estuary that improve opportunities to maintain a freshwater lagoon while minimizing risk of flooding low-lying properties.

To address these issues, NMFS's Biological Opinion requires the Water Agency and Corps to implement a series of actions to modify existing water supply and flood control activities that, in concert with habitat enhancement measures, are intended to minimize impacts to listed salmon species and enhance their habitats in the Russian River and its tributaries. The Water Agency is responsible for the following actions under the Biological Opinion:

- Petitioning the State Water Board to modify permanently the requirements for minimum instream flows in the Russian River and Dry Creek (Petition filed June 23, 2009);
- Enhancing salmonid habitat in Dry Creek and its tributaries;
- Developing a bypass pipeline around Dry Creek, if habitat enhancement measures are unsuccessful;
- Changing Russian River estuary management;
- Improving water diversion infrastructure at the Water Agency's Wohler and Mirabel facilities;
- Modifying flood control maintenance activities on the main stem Russian River and its tributaries; and
- Continuing to participate in the Coho Brood stock program.

The Biological Opinion acknowledges that implementing permanent changes to the minimum instream flow requirements for the Russian River and Dry Creek will take several

years, including the time needed for review under the California Environmental Quality Act (CEQA) and compliance with state and federal regulations. Consequently, the Biological Opinion requires that, beginning in 2010, the Water Agency file annual petitions with the State Water Board for temporary changes to the Decision 1610 minimum instream flow requirements in the main stem Russian River until the State Water Board has issued an order on the Agency's petition for permanent changes to the Decision 1610 minimum instream flow requirements. The Biological Opinion requires the Water Agency to request that the main stem minimum instream flow requirements be temporarily changed to the following values during *Normal* water supply conditions:

- 70 cfs between May 1 and October 15 at the U.S. Geological Survey (USGS) gage located at Hacienda Bridge (with the understanding that an operational buffer typically will result in flows of approximately 85 cfs)
- 125 cfs between May 1 and October 15 at the USGS gage located at Healdsburg

The temporary changes to Decision 1610 minimum instream flows specified in the Biological Opinion are summarized in Figure 4. (The Biological Opinion does not require the Water Agency to seek any temporary changes to the minimum instream flow requirements for Dry Creek.)

4.0 CRITERIA FOR APPROVING TEMPORARY URGENCY CHANGE TO PERMITS 12947A, 12949, 12950, 16596

As required by Water Code section 1435, subdivision (b), the State Water Board must make the following findings before issuing a temporary change order:

1. The permittee or licensee has an urgent need to make the proposed change;
2. The proposed change may be made without injury to any other lawful user of water;
3. The proposed change may be made without unreasonable effect upon fish, wildlife, or other instream beneficial uses; and
4. The proposed change is in the public interest.

4.1 Urgency of the Proposed Change

Decision 1610 set the minimum instream flow requirements that the State Water Board concluded, in 1986, would benefit both fishery and recreation uses, and would "preserve the fishery and recreation in the river and in Lake Mendocino to the greatest extent possible while serving the needs of the agricultural, municipal, domestic, and industrial uses which are dependent upon the water" (D 1610, § 13.2, page 21). The State Water Board also concluded in Decision 1610 that additional fishery studies should be done (D 1610, § 14.3.1, pages 26-27).

Thirty years later, it appears that the flows set by Decision 1610 no longer benefit fishery uses. To the contrary, the Biological Opinion concludes that summertime flows in the Russian River during Normal water supply conditions, at the levels required by Decision 1610, are higher than the optimal levels for the listed fish species. The Biological Opinion contains an extensive analysis of the impacts of these required minimum instream flows on listed fish species. The Biological Opinion requires the Water Agency to file a petition with the State Water Board to improve conditions for listed species by seeking permanent reductions in the minimum instream flow requirements contained in Water Agency's existing water rights permits. The Biological Opinion also contains the following requirement:

> "To help restore freshwater habitats for listed salmon and steelhead in the Russian River estuary, SCWA will pursue interim relief from D1610 minimum flow requirements by petitioning the SWRCB for changes to D1610 beginning in 2010 and for each year prior to the permanent change to D1610. These petitions will request that minimum bypass flows of 70 cfs be implemented at the USGS gage at the Hacienda Bridge between May 1 and October 15, with the understanding that for compliance purposes SCWA will typically maintain about 85 cfs at the Hacienda gage. For purposes of enhancing steelhead rearing habitats between the East Fork and Hopland, these petitions will request a minimum bypass flow of 125 cfs at the Healdsburg gage between May 1 and October 15. NMFS will support SCWA's petitions for these changes to D1610 in presentations before the SWRCB."
> (Biological Opinion, page 247.)

One of the species listed under the federal ESA (coho salmon) is also listed under the California Endangered Species Act (CESA). The California Department of Fish and Wildlife (DFW) has issued a consistency determination in which it determined that the incidental take statement issued to Water Agency by NMFS in connection with the Biological Opinion is consistent with the provisions and requirements of CESA.

In light of this background, an urgent need exists for the proposed change. As discussed in the Biological Opinion, the temporary changes that are requested in this petition will improve habitat for the listed species by reducing instream flows and by increasing storage for later fishery use, without unreasonably impairing other beneficial uses, thus maximizing the use of Russian River water resources. Moreover, given the listings of Chinook salmon, coho salmon, and steelhead under the federal ESA, there is a need for prompt action. As demonstrated by the Biological Opinion, there has been an extensive analysis of the needs of the fishery, and fishery experts agree that the Decision 1610 minimum instream flows appear to be too high.

4.2 No Injury to Any Other Lawful User of Water

If this petition is granted, the Water Agency still will be required to maintain specified minimum flows in the Russian River. Because these minimum flows will be present, all other legal users of water still will be able to divert and use the amounts of water that they legally may divert and use. Accordingly, granting this petition will not result in any injury to any other lawful user of water.

4.3 No Unreasonable Effect upon Fish, Wildlife, or Other Instream Beneficial Uses

This petition is based upon the analysis contained in the 2008 Biological Opinion, which was issued primarily to improve conditions for fish resources in the Russian River system. Two types of improved conditions will result from an order approving this petition. First, the Biological Opinion concludes that stream flows that are required by Decision 1610 are too high for optimum fish habitat. If this petition is granted, then lower stream flows, which will result in better fish habitat, will occur. Second, lowering the required minimum instream flows will result in higher fall storage levels in Lake Mendocino. The resulting conservation of water in Lake Mendocino will allow enhanced management of Russian River flows in early fall for the benefit of fish migration.

It is possible that reduced flows in the Russian River may impair some instream beneficial uses, principally recreation uses. However, although some recreation uses may be affected by these reduced flows, any such impacts on recreation this summer will be reasonable in light of the impacts to fish that could occur if the petition were not approved.

4.4 The Proposed Change is in the Public Interest

As discussed above, the sole purpose of this petition is to improve conditions for listed Russian River salmonid species, as determined by NMFS and DFW. Approval of the Water Agency's petition to reduce instream flows to benefit the fishery will also result in higher fall storage levels in Lake Mendocino, which will make more water available in the

fall for fishery purposes. Under these circumstances, it is in the public interest to temporarily change the Decision 1610 minimum required instream flows.

5.0 REQUESTED TEMPORARY URGENCY CHANGE TO PERMITS 12947A, 12949, 12950, 16596

To meet the terms and conditions of the Biological Opinion and to avoid excessively high flows that could result in violations to the Biological Opinion's Incidental Take Statement, the Water Agency is filing this TUCP. It requests that the State Water Board make the following changes to the Water Agency's permits for a period of 180 days from May 1, 2016 until October 27, 2016:

> (1) reduce the required minimum instream flow in the Russian River from the confluence of the East and West Forks to the river's confluence with Dry Creek from 185 cfs to 125 cfs; and
>
> (2) reduce required minimum instream flow in the Russian River from its confluence with Dry Creek to the Pacific Ocean from 125 cfs to 70 cfs.

The sole purpose of the requested changes is to meet the terms and conditions of the Biological Opinion, as there is adequate water supply available in Lake Mendocino and Lake Sonoma to meet this year's water supply demands by legal users and minimum in-stream flows required by Decision1610.

To improve its efforts at achieving the optimal habitat conditions in the Lower Russian River and to optimally manage flows in the entire river, the Water Agency has requested in this year's TUCP (as in previous ones) that the minimum instream flow requirement be implemented on a 5-day running average of average daily streamflow measurements with the condition that instantaneous flows on the Upper Russian River be no less than 110 cfs and on the Lower Russian River be no less than 60 cfs. This adjustment will allow the Water Agency to manage stream flows with a smaller operational buffer, thereby facilitating the attainment of the low flow conditions that the Biological Opinion identifies as being conducive to the enhancement of salmonid habitat. Reducing the operational buffer will also conserve water supply in Lake Mendocino, resulting in higher storage levels in the fall for increased releases for migrating Chinook salmon and improving carry over storage for the following year.

6.0 WATER CONSERVATION ACTIVITIES

The Water Agency's water contractors are committed to eliminating non-beneficial uses of potable water. The Water Agency and its water contractors continue to implement water use efficiency programs that align with the California Urban Water Conservation Council's Best Management Practices (BMPs) and comply with SB 7x-7. While these BMPs remain the baseline for the region, the establishment of the Sonoma-Marin Water Saving Partnership (Partnership) in December 2010 memorialized the region's commitment to long-term, year-round water use efficiencies. The Partnership removes one of the most significant barriers to implementing conservation programs, funding. Each Partner has committed to a sustained level of funding that is allocated specifically to implementing conservation programs while continuously implementing water conservation programs to reduce overall regional water use.

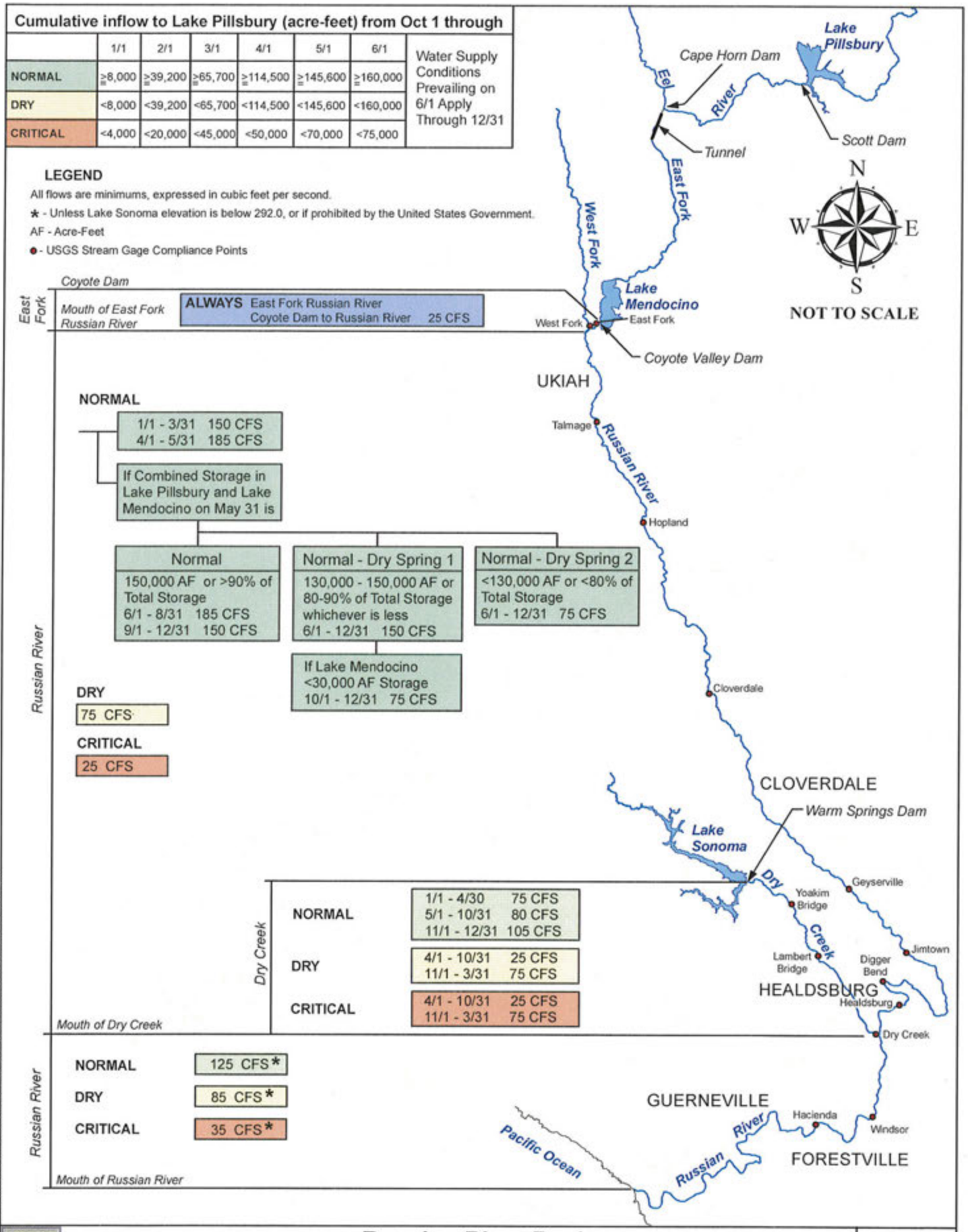
The Partnership represents ten North Bay water utilities in Sonoma and Marin counties that have joined together to provide regional solutions for water use efficiency. The utilities (Partners) are: the Cities of Santa Rosa, Rohnert Park, Petaluma, Sonoma, Cotati; North Marin Water, Valley of the Moon and Marin Municipal Water Districts; Cal American Water Company-Larkfield; the Town of Windsor and the Sonoma County Water Agency. The Partnership was formed to identify and recommend water use efficiency projects and to maximize the cost-effectiveness of water use efficiency programs in our region.

On November 13, 2015, Governor Edmund G. Brown Jr. issued Executive Order B-36-15 calling for an extension of urban water use restrictions until October 31, 2016. The Partners have collectively reduced water production by 23% from June 1, 2015 through February 29, 2016 compared to a collective water conservation standard of 19%. The Partners will continue to adhere to the State conservation target and all reporting requirements, as directed by the State Water Board.

7.0 CONCLUSION

The potential need to make changes after 1986 to the minimum instream flow requirements specified in Decision 1610 was contemplated by Decision 1610. Decision 1610 states: "Our decision will be subject to a reservation of jurisdiction to amend the minimum flow requirements if future studies show that amendments might benefit the fisheries or if operating the project under the terms and conditions herein causes unforeseen adverse impacts to the fisheries." As discussed in this petition, fisheries studies conducted during the last two decades, which ultimately led to NMFS' Biological Opinion, now indicate the need to amend the Decision 1610 minimum flow requirements. The Water Agency therefore requests that the State Water Board approve this petition.

Figures



SONOMA COUNTY WATER AGENCY

Russian River Basin Streamflow Requirements

Per State Water Resources Control Board Decision 1610, April 1986

Figure 1

Figure 2 - Lake Mendocino Storage

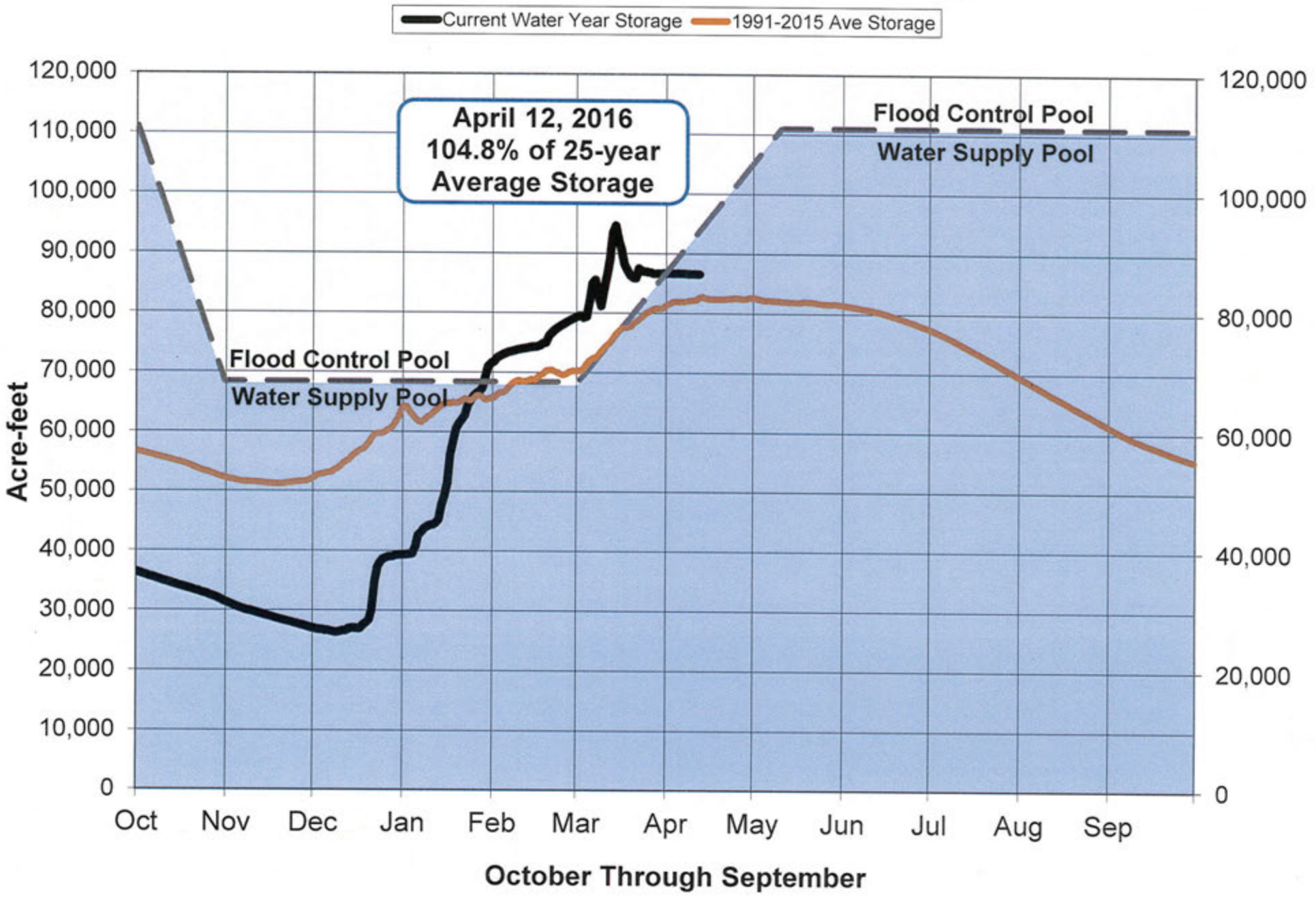
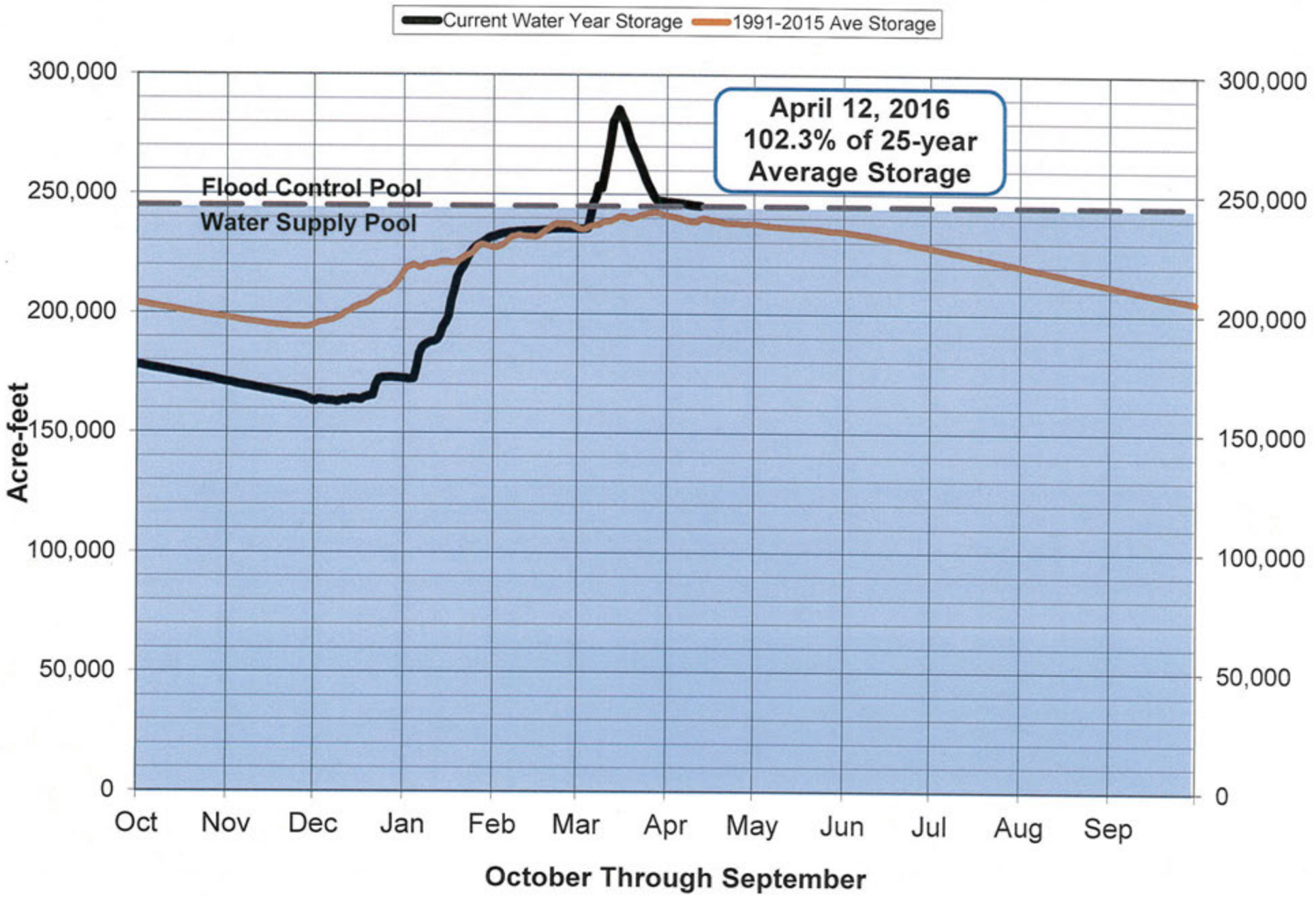
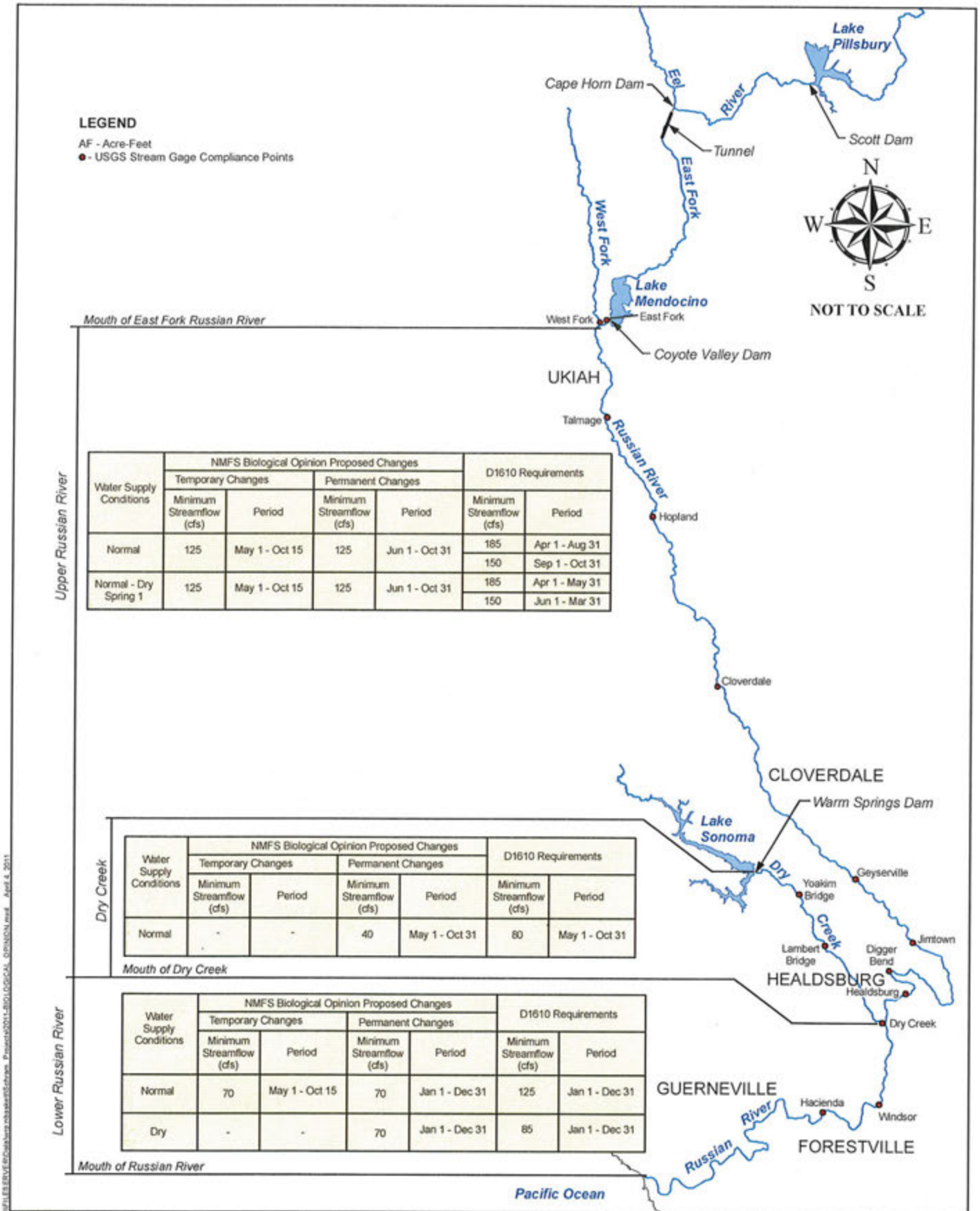


Figure 3 - Lake Sonoma Storage





Water Supply Conditions	NMFS Biological Opinion Proposed Changes				D1610 Requirements	
	Temporary Changes		Permanent Changes			
	Minimum Streamflow (cfs)	Period	Minimum Streamflow (cfs)	Period	Minimum Streamflow (cfs)	Period
Normal	125	May 1 - Oct 15	125	Jun 1 - Oct 31	185	Apr 1 - Aug 31
					150	Sep 1 - Oct 31
Normal - Dry Spring 1	125	May 1 - Oct 15	125	Jun 1 - Oct 31	185	Apr 1 - May 31
					150	Jun 1 - Mar 31

Water Supply Conditions	NMFS Biological Opinion Proposed Changes				D1610 Requirements	
	Temporary Changes		Permanent Changes			
	Minimum Streamflow (cfs)	Period	Minimum Streamflow (cfs)	Period	Minimum Streamflow (cfs)	Period
Normal	-	-	40	May 1 - Oct 31	80	May 1 - Oct 31

Water Supply Conditions	NMFS Biological Opinion Proposed Changes				D1610 Requirements	
	Temporary Changes		Permanent Changes			
	Minimum Streamflow (cfs)	Period	Minimum Streamflow (cfs)	Period	Minimum Streamflow (cfs)	Period
Normal	70	May 1 - Oct 15	70	Jan 1 - Dec 31	125	Jan 1 - Dec 31
Dry	-	-	70	Jan 1 - Dec 31	85	Jan 1 - Dec 31

SONOMA COUNTY WATER AGENCY

Russian River Biological Opinion
Proposed Minimum Instream Flow Changes

Per National Marine Fisheries Service's Biological Opinion Issued September 24, 2008

Figure 4

Sonoma County Water Agency

Photographs in Vicinity of Main Diversion Facilities at Wohler and Mirabel Park

Russian River Between at Mirabel Park on July 25, 2014

Russian River Watershed

NOTICE OF EXEMPTION

To: X State Clearinghouse
1400 Tenth Street
Sacramento, CA 95814

X County Clerk
County of Sonoma
Santa Rosa, CA 95401

X County Clerk
County of Mendocino
Ukiah, CA 95482

From: Sonoma County Water Agency
404 Aviation Boulevard
Santa Rosa, CA 95403

Project Title: Petition by Sonoma County Water Agency Requesting Approval of a Temporary Urgency Change in Permits 12947A, 12949, 12950, and 16596 in Mendocino and Sonoma Counties (Applications 12919A, 15736, 15737, and 19351): 2016 Temporary Changes to Minimum Instream Flow Requirements

Project Applicant: Sonoma County Water Agency

Project Location: The proposed action is to temporarily change the required minimum instream flows in the Russian River in Mendocino and Sonoma Counties. Figure 1 shows the minimum instream-flow requirements in the water-right permits of the Sonoma County Water Agency (Water Agency) for its Russian River Project that are in effect now and that will remain in effect if the proposed action is not approved. The proposed action is to temporarily change some of these requirements to the "Temporary Changes" shown in Figure 2, for the period from May 1, 2016, through October 27, 2016. Communities and cities along the Russian River include Ukiah, Hopland, Cloverdale, Geyserville, Healdsburg, Windsor, Forestville, Mirabel Park, Rio Nido, Guerneville, Monte Rio, Duncans Mills, and Jenner.

Project Background: The National Marine Fisheries Service (NMFS) 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 District in the Russian River Watershed* (Russian River Biological Opinion) on September 24, 2008.[1] NMFS concluded in the Russian River Biological Opinion that the continued operations of Coyote Valley Dam and Warm Springs Dam by the U.S. Army Corps of Engineers and 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 Central California Coast coho salmon and threatened Central California Coast steelhead.

The Water Agency controls and coordinates water supply releases from the Coyote Valley Dam and Warm Springs Dam projects in accordance with the minimum flow requirements that Decision 1610, adopted by the State Water Resources Control Board (SWRCB) in 1986, added to the Water Agency's water right permits. NMFS' Russian River Biological Opinion states that changes to the Decision 1610 minimum instream flow requirements will enable alternative flow management scenarios that will increase available rearing habitat in Dry Creek and the upper Russian River, and provide a lower, closer-to-natural inflow to the estuary between late spring and early fall, thereby enhancing the potential for maintaining a seasonal freshwater lagoon that will likely support increased production of juvenile steelhead and salmon.[2]

[1] NMFS' Russian River Biological Opinion may be accessed online at www.sonomacountywater.org and may be reviewed at the Water Agency's office at 404 Aviation Boulevard, Santa Rosa, CA.

[2] 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.

As required by the Russian River Biological Opinion, in September 2009 the Water Agency filed a petition with the SWRCB to make permanent changes to the Decision 1610 minimum instream flow requirements. This petition presently is pending before the SWRCB. The SWRCB will not act on this petition until the necessary environmental impact report is prepared and the water-rights issues associated with this petition are resolved.

Until the SWRCB issues an order on this petition, the Water Agency must maintain the minimum instream flows adopted in Decision 1610, with resulting impacts to listed salmonids, unless temporary changes to these requirements are authorized by the SWRCB. To help restore freshwater habitats for listed salmon and steelhead, NMFS' Russian River Biological Opinion requires that the Water Agency petition the SWRCB for temporary changes to minimum instream flow requirements beginning in 2010 and for each year thereafter until the SWRCB issues an order on the Water Agency's petition for the permanent changes to the Decision 1610 minimum instream flow requirements. The temporary changes include a reduction in the minimum instream flow to 70 cubic feet per second (cfs) in the lower Russian River between May 1 and October 15, with the understanding that, because of the need to maintain an operational buffer above this minimum requirement, the Water Agency typically will maintain a flow of about 85 cfs at this point. Additionally, for the purposes of enhancing steelhead rearing habitat between the East Fork and Hopland, the temporary changes include a reduction in the minimum instream flow to 125 cfs in the upper Russian River between May 1 and October 15.[3] NMFS' Russian River Biological Opinion only requires petitions for temporary changes to minimum streamflows on the mainstem Russian River, and not on Dry Creek. This petition therefore does not seek any changes in the Dry Creek minimum-flow requirements adopted in Decision 1610.

Description of Purpose, Nature, and Beneficiaries of Project: To comply with the requirements of the Russian River Biological Opinion, the Water Agency is filing a temporary urgency change petition with the SWRCB that asks the SWRCB to temporarily change the instream flow requirements for the Russian River mainstem that were adopted in Decision 1610 and now are in the Water Agency's water right permits between May 1 and October 27, 2016 to the following: (a) a minimum instream flow requirement of 125 cfs in the upper Russian River (upstream of the confluence with Dry Creek and downstream of the confluence of the East and West Forks), measured as a 5-day running average of average daily streamflow measurements with a provision that instantaneous flows will not be less than 110cfs. and (b) 70 cfs in the lower Russian River (downstream of its confluence with Dry Creek), measured as a 5-day running average of average daily streamflow measurements with a provision that instantaneous flows will not be less than 60 cfs.

Decision 1610 specifies the minimum instream flow requirements for Dry Creek and the Russian River (see Figure 1). These requirements vary based on defined hydrologic conditions. If approved, the requested reductions in Russian River instream flow requirements will be in effect May 1 through October 27, 2016. Under Normal water supply conditions, the Decision 1610 minimum flow requirements during this time period could be as high as 185 cfs in the upper Russian River, 125 cfs in the lower Russian River, and 80 cfs in Dry Creek. Under the proposed temporary change, the minimum flow requirements during the period of the temporary change could be as low as 110cfs in the upper Russian River and 60 cfs in the lower Russian River. No temporary change in the Dry Creek minimum flow requirements is required by the Biological Opinion or proposed and the minimum flow requirement in Dry Creek will remain at 80 cfs during the temporary change period. The proposed temporary changes in Russian River instream flow requirements will not result in any unusual circumstances, because the proposed minimum instream flow requirements are within the range of those that already occur during Dry and Critical water supply conditions under Decision 1610.

During the period that the proposed temporary flow changes are in effect, the Water Agency will also monitor water quality and fish, and collect and report information and data related to monitoring activities, as required by NMFS' Russian River Biological Opinion. This information will assist with the study and development of required future permanent minimum instream flow changes.

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[3] 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 247. September 2008.

Name of Public Agency Approving Project: State Water Resources Control Board- Division of Water Rights

Name of Person or Agency Carrying Out Project: Sonoma County Water Agency

Exempt Status: (Check one)

___ Ministerial (Sec. 21080(b)(1); 15268)

___ Declared Emergency (Sec. 21080(b)(3); 15269(a))

___ Emergency Project (Sec.21080 (b)(4); 15269(b)(c))

X Categorical Exemption. State type and section number:

State CEQA Guidelines 15307: Actions by Regulatory Agencies for Protection of Natural Resources

State CEQA Guidelines 15308: Actions by Regulatory Agencies for Protection of the Environment

State CEQA Guidelines 15301(i): Existing Facilities

___ Statutory Exemptions. State code number:

Reasons why project is exempt: The proposed action is categorically exempt from the California Environmental Quality Act (CEQA) under the State CEQA Guidelines Sections 15307, 15308, and 15301(i).

A. Actions by Regulatory Agencies for Protection of Natural Resources and the Environment

Guidelines Sections 15307 and 15308 provide that actions taken by regulatory agencies to assure the maintenance, restoration or enhancement of a natural resource and the environment are categorically exempt from CEQA. If approved, the proposed changes in Russian River minimum instream flow requirements will increase available rearing habitat in the upper Russian River and provide a lower, closer to natural inflow to the estuary between late spring and early fall, thereby enhancing the potential for maintaining a seasonal freshwater lagoon that could support increased production of juvenile steelhead. NMFS' Russian River Biological Opinion states that these changes are necessary to avoid jeopardizing the continued existence of the listed species.[4]

B. Existing Facilities

Guidelines Section 15301(i) provides, generally, that the operation of existing facilities involving negligible or no expansion of use beyond that existing at the time of the lead agency's determination is categorically exempt from CEQA. Subdivision (i) of Section 15301 specifically includes maintenance of streamflows to protect fish and wildlife resources. The Water Agency's petition to the SWRCB to change to the instream flow requirements specified in the Russian River Biological Opinion does not request and will not expand Water Agency use or increase the water supply available to the Water Agency for consumptive purposes. The proposed change in Russian River minimum instream flow requirements still will be within the existing operational parameters established by Decision 1610.

Lead Agency Contact Person: Jessica Martini-Lamb Area Code/Telephone: 707-547-1903

Signature: [redacted] Date: 04/13/2016 Title: General Manager

X Lead Agency ___ Applicant

Date Received for filing at OPR: _____

[4] 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. 247. September 2008.

Cumulative inflow to Lake Pillsbury (acre-feet) from Oct 1 through

	1/1	2/1	3/1	4/1	5/1	6/1	
NORMAL	≥8,000	≥39,200	≥65,700	≥114,500	≥145,600	≥160,000	Water Supply Conditions Prevailing on 6/1 Apply Through 12/31
DRY	<8,000	<39,200	<65,700	<114,500	<145,600	<160,000	
CRITICAL	<4,000	<20,000	<45,000	<50,000	<70,000	<75,000	

LEGEND

All flows are minimums, expressed in cubic feet per second.

★ - Unless Lake Sonoma elevation is below 292.0, or if prohibited by the United States Government.

AF - Acre-Feet

● - USGS Stream Gage Compliance Points

East Fork

Coyote Dam

Mouth of East Fork Russian River

ALWAYS East Fork Russian River Coyote Dam to Russian River 25 CFS

Russian River

NORMAL

1/1 - 3/31 150 CFS
4/1 - 5/31 185 CFS

If Combined Storage in Lake Pillsbury and Lake Mendocino on May 31 is

Normal	Normal - Dry Spring 1	Normal - Dry Spring 2
150,000 AF or >90% of Total Storage 6/1 - 8/31 185 CFS 9/1 - 12/31 150 CFS	130,000 - 150,000 AF or 80-90% of Total Storage whichever is less 6/1 - 12/31 150 CFS	<130,000 AF or <80% of Total Storage 6/1 - 12/31 75 CFS

If Lake Mendocino <30,000 AF Storage
10/1 - 12/31 75 CFS

DRY

75 CFS

CRITICAL

25 CFS

Dry Creek

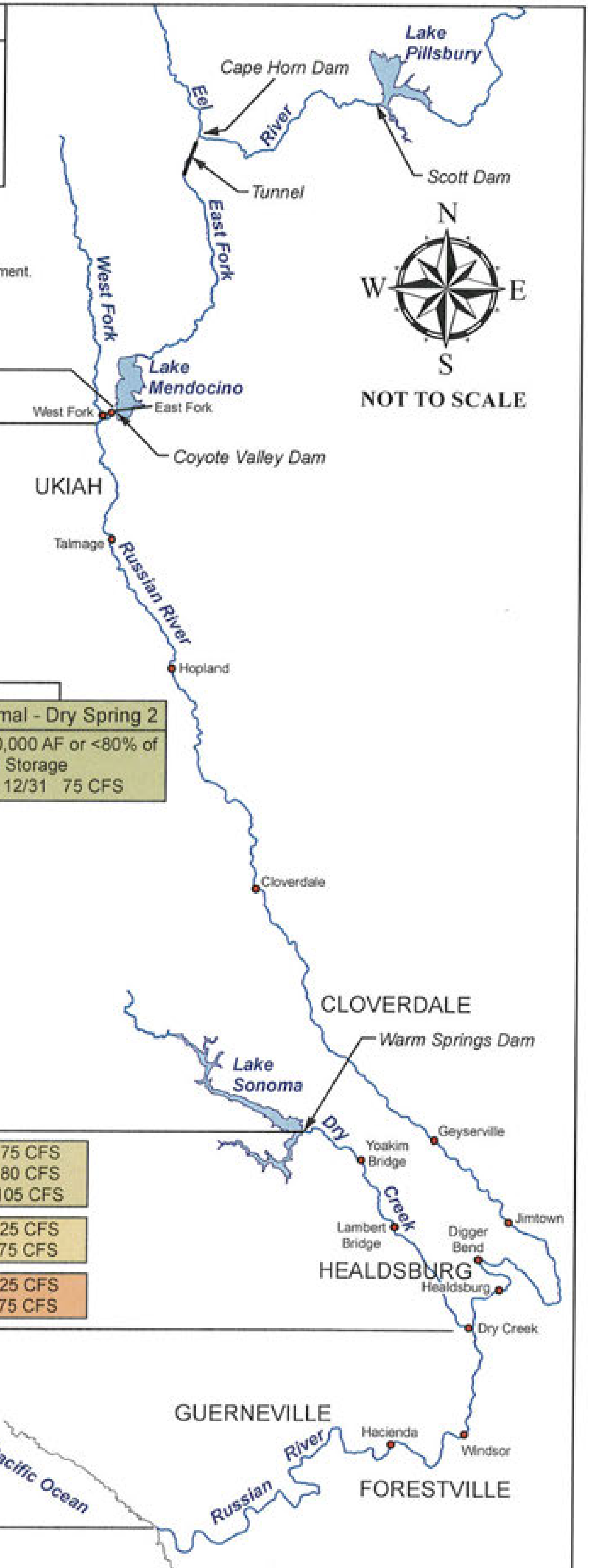
NORMAL	1/1 - 4/30 75 CFS 5/1 - 10/31 80 CFS 11/1 - 12/31 105 CFS
DRY	4/1 - 10/31 25 CFS 11/1 - 3/31 75 CFS
CRITICAL	4/1 - 10/31 25 CFS 11/1 - 3/31 75 CFS

Mouth of Dry Creek

Russian River

NORMAL	125 CFS★
DRY	85 CFS★
CRITICAL	35 CFS★

Mouth of Russian River



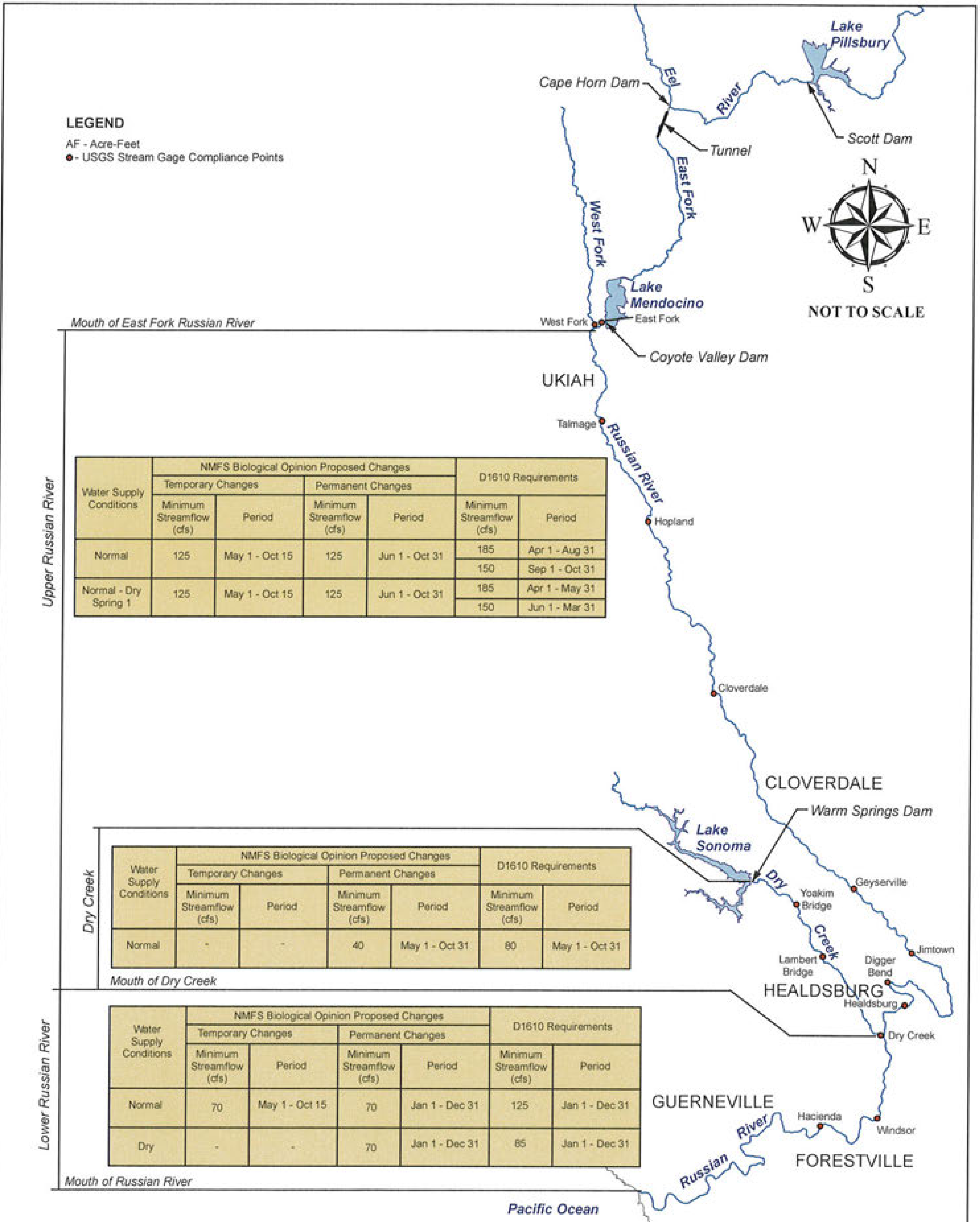
\\FILESERVER\Data\wrp.nbaskett\Schram_Projects\2011-USGS-Gage-Streamflow.mxd April 4, 2011

SONOMA COUNTY WATER AGENCY

Russian River Basin
Streamflow Requirements

Per State Water Resources Control Board Decision 1610, April 1986

Figure 1



Upper Russian River

Water Supply Conditions	NMFS Biological Opinion Proposed Changes				D1610 Requirements	
	Temporary Changes		Permanent Changes			
	Minimum Streamflow (cfs)	Period	Minimum Streamflow (cfs)	Period	Minimum Streamflow (cfs)	Period
Normal	125	May 1 - Oct 15	125	Jun 1 - Oct 31	185	Apr 1 - Aug 31
					150	Sep 1 - Oct 31
Normal - Dry Spring 1	125	May 1 - Oct 15	125	Jun 1 - Oct 31	185	Apr 1 - May 31
					150	Jun 1 - Mar 31

Dry Creek

Water Supply Conditions	NMFS Biological Opinion Proposed Changes				D1610 Requirements	
	Temporary Changes		Permanent Changes			
	Minimum Streamflow (cfs)	Period	Minimum Streamflow (cfs)	Period	Minimum Streamflow (cfs)	Period
Normal	-	-	40	May 1 - Oct 31	80	May 1 - Oct 31

Lower Russian River

Water Supply Conditions	NMFS Biological Opinion Proposed Changes				D1610 Requirements	
	Temporary Changes		Permanent Changes			
	Minimum Streamflow (cfs)	Period	Minimum Streamflow (cfs)	Period	Minimum Streamflow (cfs)	Period
Normal	70	May 1 - Oct 15	70	Jan 1 - Dec 31	125	Jan 1 - Dec 31
Dry	-	-	70	Jan 1 - Dec 31	85	Jan 1 - Dec 31

SONOMA COUNTY WATER AGENCY

Russian River Biological Opinion
Proposed Minimum Instream Flow Changes

Per National Marine Fisheries Service's Biological Opinion Issued September 24, 2008

Figure 2

Appendix 3.2

STATE OF CALIFORNIA
CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

In the Matter of Permits 12947A, 12949, 12950, and 16596
(Applications 12919A, 15736, 15737, 19351)

Sonoma County Water Agency

ORDER APPROVING PETITIONS FOR TEMPORARY URGENCY CHANGES TO PERMIT TERMS AND CONDITIONS

SOURCES: (1) East Fork Russian River tributary to Russian River
(2) Dry Creek tributary to Russian River
(3) Russian River thence the Pacific Ocean

COUNTIES: Sonoma and Mendocino

BY THE DEPUTY DIRECTOR FOR WATER RIGHTS:

1.0 SUBSTANCE OF TEMPORARY URGENCY CHANGES

On April 15, 2016, Sonoma County Water Agency (SCWA) filed Temporary Urgency Change Petitions (TUCPs) with the State Water Resources Control Board (State Water Board), Division of Water Rights (Division) requesting approval of changes to the subject permits pursuant to Water Code section 1435. The TUCPs request modification to State Water Board Decision 1610 (D1610) Russian River minimum instream flow requirements due to operational constraints placed on SCWA pursuant to the September 24, 2008, 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 (Corps), SCWA, and the Mendocino County Russian River Flood Control and Water Conservation Improvement District in the Russian River watershed (Biological Opinion). The requested changes to D1610 minimum instream flows are as follows:[1]

- From May 1 through October 27, 2016, reduce instream flow requirements for the upper Russian River[2] from 185 cubic feet per second (cfs) to 125 cfs.
- From May 1 through October 27, 2016, reduce instream flow requirements for the lower Russian River[3] from 125 cfs to 70 cfs.

The minimum instream flow requirement for the upper Russian River will be implemented as a 5-day running average of average daily stream flow measurements, with the stipulation that instantaneous stream flows on the upper Russian River will be no less than 110 cfs and on the lower Russian River no less than 60 cfs.

[1] No changes to the instream flow requirements for Dry Creek are requested pursuant to the TUCPs.
[2] The upper Russian River refers to the river from the confluence with the East Fork of the Russian River to its confluence with Dry Creek.
[3] The lower Russian River refers to the river downstream of its confluence with Dry Creek to the Pacific Ocean.

This will allow SCWA to manage stream flows with a smaller operational buffer, thereby facilitating the attainment of the flow conditions that the Biological Opinion has concluded are conducive to the enhancement of salmonid habitat. The TUCPs also request changes to specific terms in SCWA's permits, which are described in the next section.

2.0 BACKGROUND

2.1 WATER RIGHT PERMITS

The TUCPs involve the following water right permits held by SCWA:

- Permit 12947A (Application 12919A), which authorizes direct diversion of 92 cfs from the East Fork Russian River and storage of 122,500 acre-feet (af) per year in Lake Mendocino from January 1 through December 31 of each year;
- Permit 12949 (Application 15736), which authorizes direct diversion of 20 cfs from the Russian River at the Wohler and Mirabel Park Intakes near Forestville from January 1 through December 31 of each year;
- Permit 12950 (Application 15737), which authorizes direct diversion of 60 cfs from the Russian River at the Wohler and Mirabel Park Intakes from April 1 through September 30 of each year; and
- Permit 16596 (Application 19351), which authorizes direct diversion of 180 cfs from the Russian River from January 1 to December 31 of each year and storage of 245,000 afa in Lake Sonoma from October 1 of each year to May 1 of the succeeding year.

2.2 REQUIREMENTS OF D1610

The State Water Board adopted D1610 in 1986. D1610 set minimum instream flows in the Russian River to "preserve the fishery and recreation in the river and in Lake Mendocino to the greatest extent possible while serving the needs of the agricultural, municipal, domestic, and industrial uses which are dependent upon the water." (Decision 1610 at p. 21.) The State Water Board also concluded in D1610 that additional fishery studies should be done. (D1610 at pp. 26-27.)

D1610 established water year classifications of *Normal*, *Dry*, and *Critically Dry*, which are based on cumulative inflow into Lake Pillsbury (in the Eel River Watershed) beginning October 1 of each year.[4] D1610 further specifies two variations of *Normal*, known as *Dry Spring 1* and *Dry Spring 2*, which provide lower minimum flows in the upper Russian River during times when combined storage in Lake Pillsbury and Lake Mendocino is unusually low. The Cumulative inflow into Lake Pillsbury from October 1, 2015 to April 12, 2016 was 423,966 af. Based on current hydrological conditions, it is anticipated that the water year will be classified as either *Normal* or *Dry Spring 1* beginning June 1. As such, the following conditions are required pursuant to D1610:

- Term 20 of Permit 12947A requires SCWA to pass through or release from storage at Lake Mendocino sufficient water to maintain specified instream flows for the protection of fish and wildlife, and for the maintenance of recreation in the Russian River. The flows vary depending on river reach and water supply conditions. For *Normal* water supply conditions, the minimum flow requirements are 185 cfs for the upper Russian River and 125 cfs for the lower Russian River.
- Term 17 of both Permits 12949 and 12950 requires SCWA to allow sufficient water to bypass the points of diversion at the Wohler and Mirabel Park Intakes on the Russian River to maintain 125 cfs to the Pacific Ocean during *Normal* water supply conditions.

[4] Permits 12947A, 12949, 12950, and 16596 use the same water-year classification definitions.

- Similarly, Term 13 of Permit 16596 requires SCWA to maintain 125 cfs in the lower Russian River during *Normal* water supply conditions, unless the water level in Lake Sonoma is below elevation 292.0 feet with reference to the National Geodetic Vertical Datum of 1929, or unless federally prohibited.

2.3 BIOLOGICAL OPINION

Under the federal Endangered Species Act, Central California Coast (CCC) steelhead *(Oncorhynchus mykiss)*, CCC coho salmon *(O. kisutch)*, and Central Coast (CC) Chinook salmon *(O. tshawytscha)* in the Russian River watershed are listed as threatened or endangered species. In accordance with the requirements of section 7 of the Endangered Species Act, NMFS, SCWA, and the Corps participated in a consultation process involving studies to determine whether the water supply and flood control operations of the Russian River (including the operations authorized under the subject permits) are likely to harm the survival and recovery of these listed fish species. The Biological Opinion includes summaries of the studies, analyses of the project impacts, and a determination that the flows set by D1610 no longer benefit both fishery and recreational uses. More specifically, the Biological Opinion indicated that summer flows in the upper Russian River and Dry Creek as required by D1610 are too high for optimal juvenile salmonid habitat within the Russian River system. According to the Biological Opinion, two types of issues are associated with the summer flows required by D1610: (1) the flows create current velocities that limit the amount of freshwater rearing habitat available to salmonids; and (2) the flow release requirements deplete the cold water pool in Lake Mendocino, contributing to relatively high water temperatures, which reduce the quality of available rearing habitat.

The Biological Opinion also concluded that the historical practice of breaching the sandbar at the mouth of the Russian River during the summer and fall adversely affects the estuarine rearing habitat for listed species. NMFS concluded that management of the estuary as a seasonal freshwater lagoon could improve conditions for juvenile salmon and steelhead and required SCWA to adopt adaptive management practices in the estuary. Additionally, the minimum instream flows required by D1610 were found to result in flows into the estuary that make it difficult to maintain a freshwater lagoon while preventing flooding of adjacent properties.

The Biological Opinion states that the D1610 minimum instream flow requirements in the Russian River will continue to jeopardize the recovery of CCC coho salmon and CCC steelhead unless the flows are modified. The Biological Opinion requires SCWA to file a petition for change with the State Water Board to improve conditions for listed species by seeking long-term, permanent reductions in the Russian River minimum instream flow requirements contained in SCWA's existing water rights permits.[5] The Biological Opinion also contains the following requirement:

> "To help restore freshwater habitats for listed salmon and steelhead in the Russian River estuary, SCWA will pursue interim relief from D1610 minimum flow requirements by petitioning the State Water Board for changes to D1610 beginning in 2010 and for each year prior to the permanent change to D1610. These petitions for change will request that minimum bypass flows of 70 cfs be implemented at the US Geological Survey (USGS) gage at the Hacienda Bridge between May 1 and October 15, with the understanding that for compliance purposes SCWA will typically maintain about 85 cfs at the Hacienda gage. For purposes of enhancing steelhead rearing habitats between the East Branch [Fork] and Hopland, these petitions for change will request a minimum bypass flow of 125 cfs at the Healdsburg gage between May 1 and October 15. NMFS will support SCWA's petitions for these changes to Decision 1610 in presentations before the State Water Board."

[5] On September 23, 2009, SCWA filed a petition for change with the State Water Board and the petition for change is pending.

Coho salmon are also listed under the California Endangered Species Act (CESA). The California Department of Fish and Wildlife (CDFW) has issued a consistency determination, in which it determined that the incidental take statement issued to SCWA by NMFS in connection with the Biological Opinion was consistent with the provisions and requirements of CESA.

3.0 COMPLIANCE WITH THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

The State Water Board must comply with any applicable requirements of the California Environmental Quality Act (CEQA) prior to issuance of any order approving a TUCP. (Cal. Code Regs., tit. 23, § 805.) SCWA determined that the requested change is categorically exempt under CEQA as the change meets the Class 1, 7, and 8 exemption criteria. SCWA filed a Notice of Exemption on April 15, 2016. The State Water Board has reviewed the information submitted by SCWA and has made its own independent finding that the requested changes are categorically exempt from CEQA.

The changes sought by the TUCPs are consistent with the following Categorical CEQA exemptions for the following reasons:

1) The proposed action consists of the operation of existing facilities involving negligible or no expansion of use beyond that existing, and accordingly is categorically exempt from CEQA under a Class 1 exemption. (Cal. Code Regs., tit. 14, § 15301.) The proposed action will be within the range of minimum instream flows established by D1610.

2) A Class 6 exemption "consists of basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource. These [activities] may be . . . part of a study leading to an action which a public agency has not yet approved, adopted or funded." (*Id*., § 15306.) The water quality and fishery information and data collected during the period that the proposed action is in effect will assist with the study and development of future long-term changes to D1610 instream flow requirements, for which a separate petition for change is pending.

3) A Class 7 exemption "consists of actions taken by regulatory agencies as authorized by state law or local ordinance to assure the maintenance, restoration, or enhancement of a natural resource where the regulatory process involves procedures for protection of the environment." (*Id*., § 15307.) The proposed action will ensure the maintenance of a natural resource (i.e., the instream resources of the Russian River) by increasing availability and improving the quality of salmonid rearing habitat in the upper Russian River and more closely mimicking natural inflow to the estuary, thereby enhancing the potential for maintaining a seasonal freshwater lagoon that could support increased production of juvenile steelhead. Accordingly, these changes are categorically exempt from CEQA pursuant to a Class 7 exemption.

4) A Class 8 exemption "consists of actions taken by regulatory agencies, as authorized by state or local ordinance, to assure the maintenance, restoration, enhancement, or protection of the environment where the regulatory process involves procedures for protection of the environment." (*Id*., § 15308.) The proposed action will ensure the maintenance of the environment (i.e., the instream environment of the Russian River) in the same way as stated for the Class 7 exemption.

4.0 PROCEDURAL REQUIREMENTS CONCERNING THE TUCPS

Pursuant to Water Code section 1438, the State Water Board may issue a temporary urgency change order in advance of the required notice. The State Water Board will issue and deliver to SCWA, as soon as practicable, a notice of the temporary urgency change order pursuant to Water Code section 1438(a). Pursuant to Water Code section 1438(b)(1), SCWA is required to publish the notice in a newspaper having a general circulation, and that is published within the counties where the points of diversion are located. In addition, the State Water Board will post the notice of the temporary urgency change order on its website, along with the TUCPs and accompanying materials. The State Water Board will also distribute the notice through an electronic notification system.

Any interested person may file an objection to a temporary urgency change. (*Id*., subd. (d).) State Water Board Resolution 2012-0029 delegates to the Deputy Director for Water Rights the authority to act on a TUCP if there are no objections. (Resolution 2012-0029, ¶ 4.4.1.)

The State Water Board exercises continuing supervision over temporary urgency change orders and may modify or revoke temporary urgency change orders at any time. (Wat. Code, §§ 1439, 1440.) Temporary urgency change orders automatically expire 180 days from the date the authorization takes effect, unless revoked or an earlier expiration date is specified. (*Id*., § 1440.) The State Water Board may renew temporary urgency change orders for a period not to exceed 180 days. (*Id*., § 1441.)

5.0 CRITERIA FOR APPROVING THE PROPOSED TEMPORARY URGENCY CHANGES

Water Code section 1435 provides that a right holder who has an urgent need to change the point of diversion, place of use, or purpose of use from that specified in the water right may petition for a conditional temporary change order. The State Water Board's regulations set forth the filing and other procedural requirements applicable to TUCPs. (Cal. Code Regs., tit. 23, §§ 805, 806.) The State Water Board's regulations also clarify that requests for changes to permits or licenses other than changes in point of diversion, place of use, or purpose of use may be filed, subject to the same filing and procedural requirements that apply to changes in point of diversion, place of use, or purpose of use. (*Id*., § 791, subd. (e).)

Before approving a TUCP, the State Water Board must make the following findings (Wat. Code, § 1435, subd. (b)(1-4).): (1) the right holder has an urgent need to make the proposed change; (2) the proposed change may be made without injury to any other lawful user of water; (3) the proposed change may be made without unreasonable effect upon fish, wildlife, or other instream beneficial uses; and (4) the proposed change is in the public interest.

5.1 URGENCY OF THE PROPOSED CHANGES

Under Water Code section 1435(c), an "urgent need" means "the existence of circumstances from which the board may in its judgment conclude that the proposed temporary change is necessary to further the constitutional policy that the water resources of the state be put to beneficial use to the fullest extent of which they are capable and that waste of water be prevented . . . ." The changes requested by SCWA for conformance with the Biological Opinion would improve habitat for listed salmonids by reducing flows and enabling increased storage for later fishery use, without unreasonable effects on other beneficial uses. Moreover, given the status of salmonids under the federal Endangered Species Act, there is a need for prompt action. In this case, there has been an extensive analysis of the needs of the fishery and experts have agreed that instream flows appear to be too high. The change will not affect the ability of SCWA to deliver water for approved beneficial uses in its service area.

5.2 NO INJURY TO ANY OTHER LAWFUL USER OF WATER

SCWA will be required by this temporary urgency change order to maintain specified flows in the Russian River from its most upstream point of diversion to the river's confluence with the Pacific Ocean. Therefore, because minimum flows will be present, it is anticipated that all other lawful users of water will still be able to divert and use the amounts of water that they are legally entitled to during the period specified in this temporary urgency change order. As a general rule, appropriative water right holders below Lake Mendocino and Lake Sonoma are only entitled to divert natural and abandoned flows, and riparian water right holders are only entitled to divert natural flows; appropriative and riparian right holders are not entitled to divert water previously stored by SCWA that is released for use downstream, including stored water that is released for purposes of meeting instream flow requirements. (*State Water Resources Control Board Cases* (2006) 136 Cal.App.4th 674, 738-743.) Accordingly, SCWA is not obligated to supply water stored in Lake Mendocino to other users of water, except to the extent the users hold permits issued under the Sonoma County reservation established in Decision 1030 and Order WR 74-30. However, the reservation only

applies to the use of water within the Russian River Valley, as defined by a map prepared by the Corps (Decision 1030, pp. 9, 46-47), and SCWA is not obligated to release stored water to satisfy demand under the reservation (to the extent that retention of stored water is necessary to ensure satisfaction of the minimum instream flows required under Permit 12947A (Order WR 74-30, p. 13)). For these reasons, other legal users of water will not be injured to the extent that SCWA releases less previously stored water as a result of the changes.

Based on the information available, granting the TUCPs will not result in injury to any other lawful user of water. Pursuant to Water Code section 1439, the State Water Board will supervise diversion and use of water under this temporary urgency change order for the protection of all other lawful users of water and instream beneficial uses.

5.3 No Unreasonable Effect upon Fish, Wildlife, or Other Instream Beneficial Uses

The TUCPs are based upon the analysis contained in the Biological Opinion, which was issued primarily for improving conditions for fishery resources in the Russian River. Improved conditions that result from the temporary urgency changes are threefold. First, the reduction in minimum instream flows will result in improved salmonid rearing habitat in the Russian River. Secondly, reducing instream flows will result in conservation of a cold water pool in Lake Mendocino which would allow for cooler water temperatures in the upper Russian River, improved freshwater rearing habitat quality, and enhanced management of the flows in early fall for the benefit of fish migration. Thirdly, the reduction in minimum flow requirements may encourage formation of a closed or perched lagoon at the mouth of the Russian River and therefore enhance estuarine rearing habitat for salmonids.

SCWA will continue to be required to report on consultations with CDFW, NMFS, and the North Coast Regional Water Quality Control Board (Regional Water Board). In addition, to ensure beneficial use of water resources to the fullest extent possible and to prevent waste of water, SCWA will also be required to provide weekly updates to the State Water Board, CDFW, NMFS, and the Regional Water Board regarding the current hydrologic and environmental (water quality and fishery) conditions of the Russian River. This information will assist the State Water Board in determining whether additional actions are necessary.

5.3.1 Recreation

It is possible that reduced flows in the Russian River could impair some instream beneficial uses, principally recreational uses. However, since 2004, Russian River flows have frequently been managed at decreased levels, both under D1610 and under other temporary urgency change orders. Recreation has continued even with the past reductions in flows. Accordingly, although recreational uses may be affected, given the analysis in the Biological Opinion and the potential impacts to fisheries that could occur if the temporary changes are not approved, any impact on recreation for this summer would be reasonable under the circumstances.

5.3.2 Water Quality and Availability of Aquatic Habitat

During the period that the flow reductions will be in effect, SCWA will collect water quality and fishery information data. The monitoring activities will be summarized in annual reports intended to evaluate whether and to what extent the reduced flows may have caused any impacts to water quality and availability of aquatic habitat for salmonids. This information will serve to inform the the State Water Board's continuing supervision of the diversion and use of water under this temporary urgency change order pursuant to Water Code section 1439. In addition, this information will assist with the study and development of future long-term changes in D1610 instream flow requirements for which a separate petition is pending.

5.3.3 Cyanobacteria

Cyanobacteria are present in most freshwater and marine aquatic environments. When conditions are favorable, including abundant light, elevated water temperature, elevated levels of nutrients, and lack of water turbulence and velocity, cyanobacteria can quickly multiply into a bloom. Not every bloom is toxic; however, harmful algal blooms (cyanoHABs) are a concern as some species of cyanobacteria produce toxins that have the potential to impact drinking water, recreation, and fish and wildlife. Cyanotoxins were

present in the Russian River in 2015, which led to Sonoma County Department of Health Services posting warning signs.

There are currently no federal water quality criteria, or regulations for cyanobacteria or cyanotoxins. However, some toxins (microcystins and clyindrospermopsin) have been added to the contaminant candidate list under the Safe Drinking Water Act, under the Regulatory Determination Process. In addition, the Clean Water Act sets ambient water quality standards and requires that the Environmental Protection Agency develop management strategies for assessing and managing algal toxins.

As of 2016, there is no regulation in the State of California regarding cyanobacteria or cyanotoxins. However, there has been an increase in cyanoHABs in California and a need for a statewide strategy. As a response, the Surface Water Ambient Monitoring Program (SWAMP) has developed a freshwater cyanoHAB assessment and a support strategy in coordination with other agencies to address assessment, response, and management of freshwater cyanoHABs.

The Regional Water Board, Sonoma County Department of Health Services, SCWA, and Sonoma County Department of Parks and Recreation have formed a workgroup to coordinate a monitoring approach for assessing cyanobacteria in the Russian River during the summer of 2016. SCWA has consulted with the Regional Water Board regarding monitoring activities related to the workgroup. As a result of the consultation, SCWA will make modifications to their existing Water Quality Monitoring Plan for the Russian River Estuary Management Project to modify the monitoring that is occurring in the estuary and to include freshwater monitoring for the purpose of assisting in the evaluation of cyanoHAB conditions and the risk co-factors contributing to nuisance blooms (e.g., flow, temperature, nutrient, etc.).

5.3.4 CONSULTATION

SCWA and the State Water Board consulted with CDFW, NMFS, and the Regional Water Board regarding the request to reduce minimum instream flow requirements in the Russian River. The Regional Water Board did not object to the proposed request and provided comments on the draft terms to the State Water Board which address monitoring in the Russian River for evaluation of cyanoHAB conditions and the risk co-factors contributing to nuisance blooms. With the inclusion of the suggested comments, the Regional Board believes the terms and conditions included in this order are appropriate. CDFW and NMFS did not object the proposed request and are an agreement with the terms and conditions.

5.4 THE PROPOSED CHANGE IS IN THE PUBLIC INTEREST

As discussed above, the sole purpose of the TUCPs is to improve conditions for listed salmonids in the Russian River. Approval of the request to temporarily reduce minimum instream flows to benefit the fishery will also maintain storage levels in Lake Mendocino for a longer period of time so that water is available in the fall for fisheries purposes.

6.0 CONCLUSIONS

The State Water Board has adequate information in its files to make the findings required by Water Code section 1435(b).

I conclude that, based on the available evidence: (1) the right holder has an urgent need to make the proposed changes; (2) the proposed changes will not operate to the injury of any other lawful user of water; (3) the proposed changes will not have an unreasonable effect upon fish, wildlife, or other instream beneficial uses; and (4) the proposed changes are in the public interest.

ORDER

NOW, THEREFORE, IT IS ORDERED THAT: the TUCPs filed by SCWA for temporary urgency changes in Permits 12947A, 12949, 12950 and 16596 are approved and effective until October 27, 2016.

All existing terms and conditions of the subject permits remain in effect, except as temporarily amended by the following terms:

1. The minimum instream flow requirements in the Russian River, as specified in Term 20 of Permit 12947A, Term 17 of Permits 12949 and 12950, and Term 13 of Permit 16596, shall be modified as follows:

   a. Minimum instream flow in the upper Russian River shall remain at or above 125 cfs;

   b. Minimum instream flow in the lower Russian River shall remain at or above 70 cfs.

   For purposes of compliance with this term, the minimum instream flow requirements shall be measured based on a 5-day running average of average daily stream flow measurements, provided that instantaneous flows in the upper Russian River shall be no less than 110 cfs and in the lower Russian River shall be no less than 60 cfs.

2. SCWA shall conduct the following fisheries monitoring tasks and associated recording and reporting requirements. A summary report of the fisheries monitoring tasks described below shall be submitted to the Deputy Director for Water Rights by April 1, 2017 in accordance with the NMFS and CDFW annual reporting requirements as more fully described in the Biological Opinion.

   a. Beginning no later than September 1, 2016 and continuing through the duration of this Order, SCWA shall monitor and record daily numbers of adult salmon and steelhead moving upstream past the life cycle monitoring station in Dry Creek and at the Healdsburg fish ladder (when operable). These numbers shall be included in bi-weekly reports required in Term 7.

   b. Beginning October 1, 2016, if adult salmon and steelhead can enter the Russian River estuary and suitable water clarity allows snorkel surveys, SCWA shall monitor numbers of adult salmon and steelhead in representative deep pools in the lower Russian River downstream of the Mirabel inflatable dam. Monitoring shall occur on a weekly basis continuing through the duration of this Order or until sustained flows at the USGS gage at Hacienda (No.11467000) are above 135 cfs.

   c. Prior to October 27, 2016, or after a cumulative seasonal total of 100 adult salmon and steelhead move upstream past the counting stations at Dry Creek and the Healdsburg fish ladder, whichever is earlier, SCWA shall consult with NMFS and CDFW regarding the possibility of increasing the instream flow at the gage at Hacienda to a level not to exceed 135 cfs. Consultations shall occur every two weeks and a summary report of consultation details and any increases to the minimum flows shall be submitted to the Deputy Director for Water Rights within one week of each consultation meeting.

   SCWA shall consult with NMFS and CDFW regarding any necessary revisions to this term. A summary report of consultation details shall be submitted to the Deputy Director for Water Rights within one week of any consultation meeting. Upon consultation with NMFS and CDFW, any necessary revisions to this term shall be made upon approval by the Deputy Director for Water Rights.

3. Monitoring shall be conducted to determine the effects on water quality and availability of aquatic habitat for salmonids. Monitoring in the Russian River shall include continuous monitoring of temperature, dissolved oxygen, pH, and specific conductivity at multiple stations from Ukiah to Jenner as described below for the duration of this Order.

   a. Monitoring on the East Fork Russian River shall occur at a seasonal water quality data sonde with real-time telemetry located approximately 1/3 mile (0.33 mi) downstream from Lake Mendocino, and SCWA shall record hourly measurements of water temperature, dissolved oxygen, specific conductivity, pH, and turbidity.

   b. Monitoring on the Russian River shall occur at three, multi-parameter "permanent" water quality data sondes at USGS stream gages located at Hopland, Diggers Bend near Healdsburg, and Hacienda Bridge. These three data sondes are referred to as "permanent" as they are maintained as part of SCWA's early warning detection system in coordination with USGS on its "Real-time Data for California" website. As of March 2014, the data sonde at SCWA's river diversion facility at Mirabel was removed due to several construction projects; therefore it will not be included in the 2016 monitoring effort.

   c. Monitoring on the Russian River shall occur at three seasonal data sondes with real-time telemetry in cooporation with USGS at USGS gages at Cloverdale station (north of Cloverdale at Commisky Station Road), Jimtown (at the Alexander Valley Road bridge), and at Johnson's Beach (Guerneville). The data sonde at the Cloverdale gage collects dissolved oxygen and temperature, the data sonde at the Jimtown gage collects pH, temperature, dissolved oxygen, specific conductivity and turbidity, and the data sonde at Johnson's Beach collects pH, temperature, dissolved oxygen, specific conductivity and turbidity. Data from these locations is available on the USGS "Real-time Data for California" website.

   SCWA shall consult with the Regional Water Board regarding any necessary revisions to this term. A summary report of consultation details shall be submitted to the Deputy Director for Water Rights and the Executive Officer of the Regional Water Board within one week of any consultation. Any necessary revisions to the terms and conditions shall be made upon approval by the Deputy Director for Water Rights.

4. Monitoring in the Russian River and its estuary shall include monitoring to contribute to the assessment of water quality indicators and water column conditions for the purpose of assisting in the evaluation of cyanoHAB conditions and the risk co-factors contributing to nuisance blooms (e.g., flow, temperature, nutrients, etc.). The monitoring shall be conducted in accordance with the "Water Quality Monitoring Plan for the Russian River Estuary Management Project" to be developed by June 30, 2016 in consultation with the Regional Water Board. Right holder shall submit a copy of the final plan to the Deputy Director for Water Rights and the Executive Officer of the Regional Water Board within two weeks of its completion.

   SCWA shall consult with the Regional Water Board regarding any necessary revisions to this term by June 15, 2016. A summary report of consultation details shall be submitted to the Deputy Director for Water Rights within one week of any consultation. Any necessary revisions to this term shall be made upon approval by the Deputy Director for Water Rights.

5. Before June 15, 2016, SCWA shall consult with the Regional Water Board to discuss possible water quality impacts of the reduced flows and water quality monitoring activities that will be required to document water quality conditions in the Russian River. SCWA shall submit a summary report of consultation details and a description of any modifications to the monitoring activities to the Deputy Director for Water Rights within one week of the consultation. Any necessary revisions to Terms 3 and 4 shall be made upon approval by the Deputy Director for Water Rights.

6. SCWA shall provide reports of the water quality monitoring tasks as detailed in Terms 3 through 5 as described below.

   a. Summary data from the permanent water quality data sondes required in Term 3 and the nutrient/bacterial/algal sampling data obtained in accordance with Term 4 (as data becomes available) shall be submitted to the Deputy Director for Water Rights and the Executive Officer of the Regional Water Board in the weekly hydrologic status report required in Term 7.

   b. All water quality data collected pursuant to Terms 3 and 4 during the term of this Order shall be summarized. The summary report shall include an evaluation of whether, and to what extent, the reduced flows authorized by the Order caused any impacts to water quality, including any water quality impacts affecting recreation or the availability of aquatic habitat for salmonids. The report shall be submitted to the Deputy Director for Water Rights and the Executive Officer of the Regional Water Board by April 1, 2017.

   c. If any water quality issues of concern are observed from the continuous monitoring or water sampling after June 15, 2016, SCWA or the Regional Water Board may initiate additional consultation. SCWA shall submit a summary report of consultation details to the Deputy Director for Water Rights within one week of each consultation meeting. If no additional consultation is necessary; SCWA shall submit an explanation to the Deputy Director for Water Rights within one week after the conclusion of the effective period of this Order. Upon consultation with the Regional Water Board, any necessary revisions to Terms 3, 4, and 5 shall be made upon approval by the Deputy Director for Water Rights.

7. SCWA shall report to the Deputy Director for Water Rights, the Executive Officer of the Regional Water Board, the Environmental Program Manager of CDFW, and the Supervisory Fish Biologist of NMFS on a weekly basis regarding the current hydrologic condition of the Russian River system, including current Lake Mendocino reservoir level, the rate of decline for Lake Mendocino, a 16-day cumulative rainfall forecast, current inflow from the Potter Valley Project, and a summary of the available water quality data, including bacteria indicators. Fish counts shall be reported every two weeks.

8. This Order does not authorize any act that results in the taking of a candidate, threatened or endangered species, or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 et seq.) or the federal Endangered Species Act (16 U.S.C.A. sections 1531 et seq.). If a “take” will result from any act authorized under this Order, SCWA shall obtain authorization for an incidental take permit prior to operation of the project. SCWA shall be responsible for meeting all requirements of the applicable Endangered Species Act for the temporary urgency changes authorized under this Order.

9. The State Water Board reserves jurisdiction to supervise the temporary urgency changes under this Order, and to coordinate or modify terms and conditions, for the protection of vested rights, fish, wildlife, instream beneficial uses and the public interest as future conditions may warrant.

10. SCWA shall immediately notify the Deputy Director for Water Rights if any significant change in storage conditions in Lake Mendocino occurs that warrant reconsideration of this Order.

11. By April 1, 2017, SCWA shall provide a written update to the Deputy Director for Water Rights regarding activities and programs being implemented by SCWA and its water contractors to assess and reduce water loss, promote increased water use efficiency and conservation, and improve regional water supply reliability.

12. To facilitate releases of Lake Mendocino stored water with minimal operational buffers, SCWA shall coordinate with the Mendocino County Russian River Flood Control and Water Conservation Improvement District (District) regarding implementation of a program for real-time 3 day advance forecasts of hourly diversions by all of the District's irrigation and municipal customers under all bases of right. SCWA shall provide an update to the Deputy Director for Water Rights regarding the outcome of consultation and the effectiveness of reporting by April 1, 2017.

STATE WATER RESOURCES CONTROL BOARD

ORIGINAL SIGNED BY:

Barbara Evoy, Deputy Director
Division of Water Rights

Dated: MAY 04 2016

Appendix 3.3

Russian River Water Quality Summary for the 2016 Temporary Urgency Change

SONOMA COUNTY WATER AGENCY

March 2017

Contents

1.0 Introduction

On 13 April, 2016, the Sonoma County Water Agency (Water Agency) filed a Temporary Urgency Change Petition (TUCP) with the State Water Resources Control Board (SWRCB) to temporarily reduce minimum instream flows in the Russian River to meet the terms and conditions of the Russian River Biological Opinion (NMFS 2008).

In summary, the Water Agency requested that the SWRCB make the following temporary changes to the Decision 1610 (D1610) instream flow requirements from 1 May, 2016, until 27 October, 2016:

(1) Reduce the required minimum instream flow requirements for the upper Russian River (from its confluence of the East and West Forks of the Russian River to its confluence with Dry Creek) from 185 cubic feet per second (cfs) to 125 cfs.

(2) Reduce the required minimum instream flow requirements for the lower Russian River (from its confluence with Dry Creek to the Pacific Ocean) from 125 cfs to 70 cfs.

The TUCP also requested that the minimum instream flow requirements be implemented on a 5-day running average of average daily stream flow measurements, with the condition that instantaneous flows on the upper Russian River be no less than 110 cfs and on the lower Russian River be no less than 60 cfs. This would allow the Water Agency to manage stream flows with a smaller operational buffer, thereby facilitating the attainment of the flow conditions that the Biological Opinion has identified as being conducive to the enhancement of salmonid habitat. Approval of the request to temporarily reduce minimum instream flows to benefit the fishery would also maintain storage levels in Lake Mendocino for a longer period of time so that water would be available in the fall for fisheries purposes. The SWRCB issued an Order (Order) approving the Water Agency's TUCP on 4 May, 2016.

2.0 2016 Russian River Flow Summary

In early January 2016, water storage in Lake Mendocino was below conditions experienced in 2015. However, storage quickly increased to levels above those observed in prior years (2009-2015) by 1 February. January 2016 storms increased storage from just under 40,000 acre-feet to over 71,000 acre-feet by 31 January (Figure 2-1). Storage in Lake Mendocino peaked in mid-March at over 94,000 acre-feet and remained above 80,000 acre-feet through mid-July. In addition, 2016 storage remained above conditions experienced in 2013 through 2015 for the remaining calendar year. Finally, late-season storms in November and December 2016 increased storage from just under 50,000 acre-feet in mid-November to over 72,000 acre-feet by 31 December 2016 (Figure 2-1).

Figure 2-2 shows 2016 average daily flows at the Talmage, Hopland, Cloverdale, Jimtown, Digger Bend, and Hacienda USGS gaging stations.

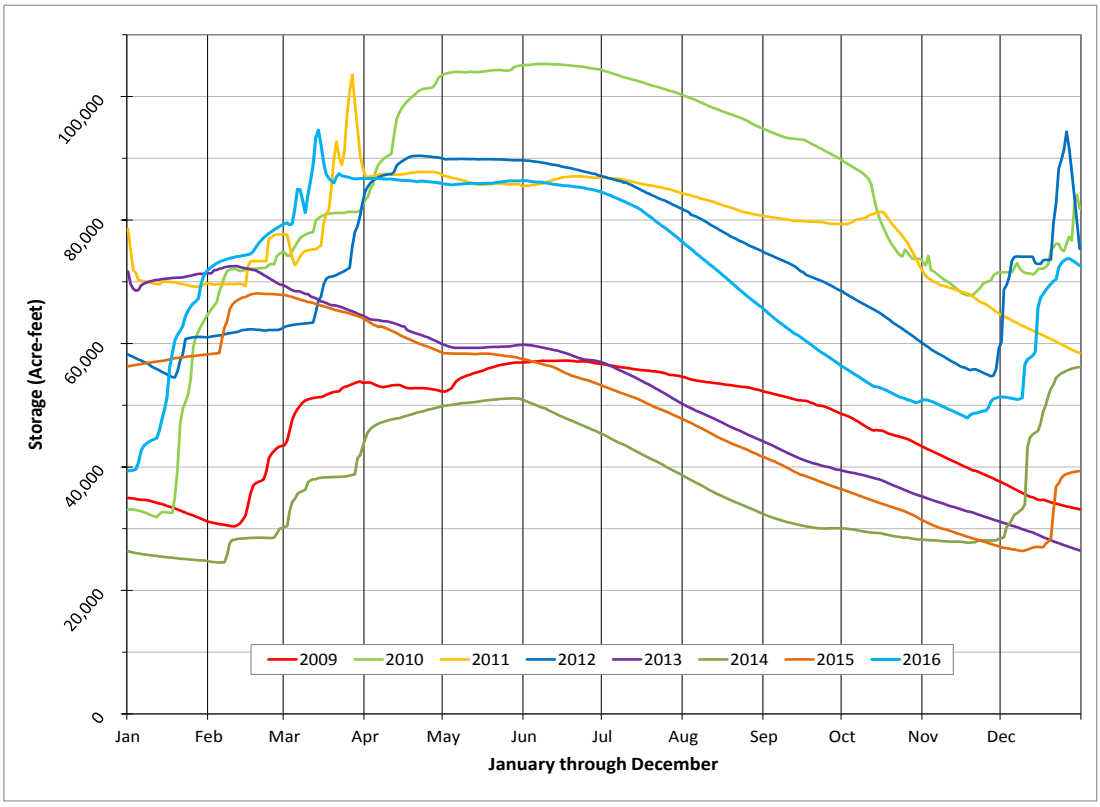


Figure 2-1. Lake Mendocino water storage levels, in acre-feet, from 2009 through 2016.

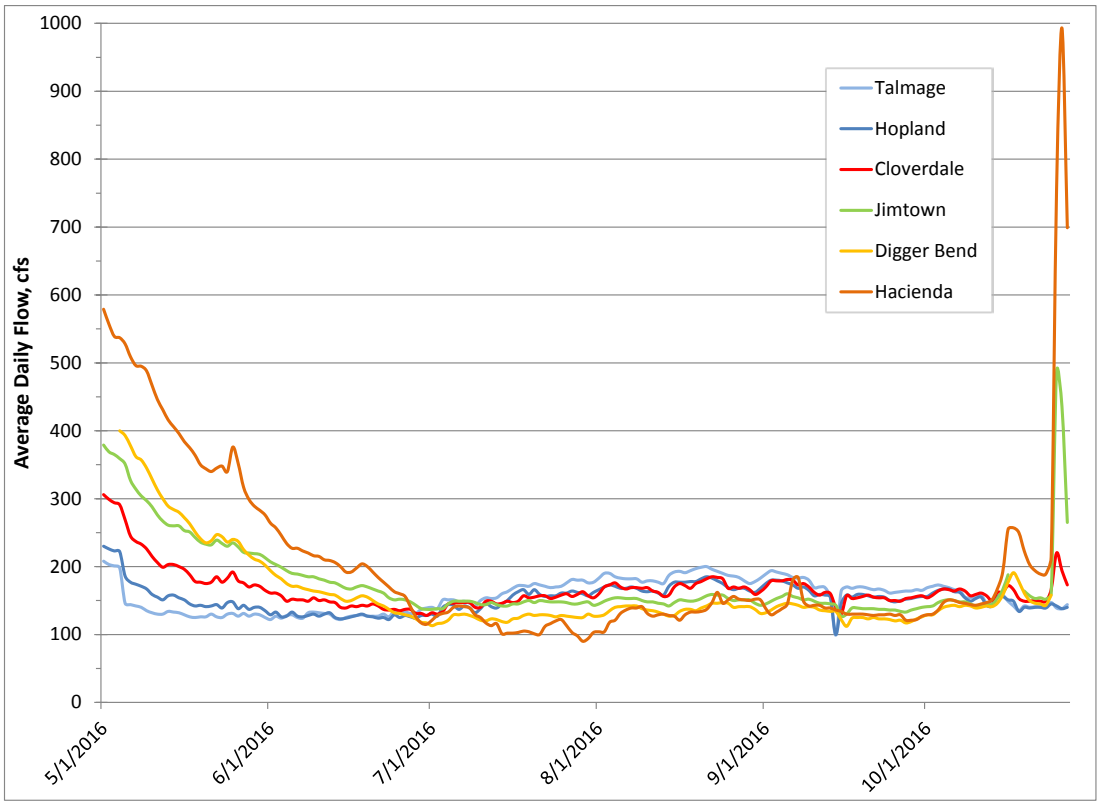


Figure 2-2. 2016 average daily flows in the Russian River as measured at U.S. Geological Survey (USGS) gages in cubic feet per second (cfs). Flow rates are preliminary and subject to final revision by USGS.

The changes in upper Russian River minimum instream flow requirements authorized by the Order allowed flows to decline below D1610 minimum instream flows of 185 cfs during the month of May, and D1610 dry water supply condition minimum flows of 150 cfs after 1 June in most reaches of the upper Russian River (Figure 2-3). However, flows in the lower Russian River at Hacienda were only below the D1610 minimum flows of 125 cfs for a portion of the month of July (Figure 2-4).

While the Order was in effect, upper Russian River flows declined below the 125 cfs five-day running average TUC flow three times at Digger Bend in late June/early July, mid-July, and late September. Five-day running average flows during those periods were as low as 116 cfs (Figure 2-3). Upper Russian River flows declined below the instantaneous flow of 110 cfs authorized by the Order for one day on 14 September at Talmage and Hopland after releases from Lake Mendocino were reduced to allow the U.S. Army Corps of Engineers to perform maintenance on the reservoir outlet (Figure 2-3). Flows on 14 September were 99 cfs at Talmage and 100 cfs at Hopland.

While the Order was in effect, lower Russian River flows at Hacienda (downstream of the confluence with Dry Creek) did not drop below the five-day running average TUC flow of 70 cfs or the instantaneous minimum flow of 60 cfs (Figure 2-4).

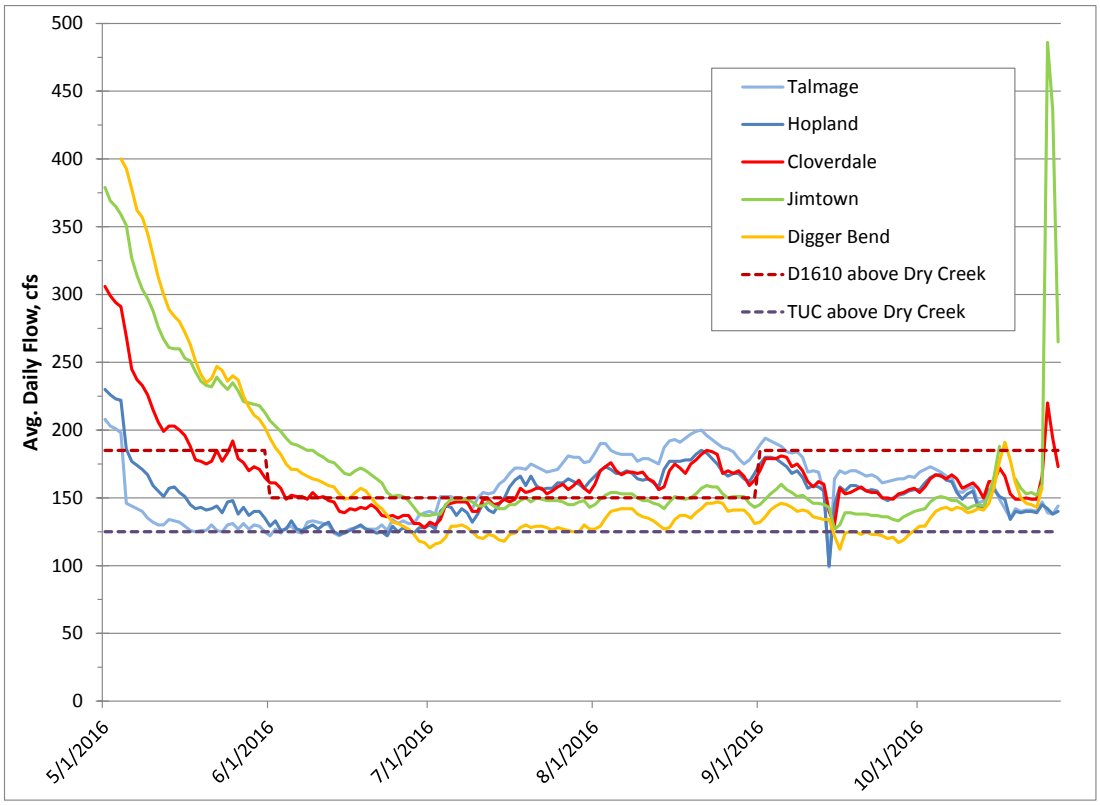


Figure 2-3. 2016 average daily flows in the Upper Russian River as measured at USGS gages above the Dry Creek confluence in cubic feet per second. Flow rates are preliminary and subject to final revision by USGS.

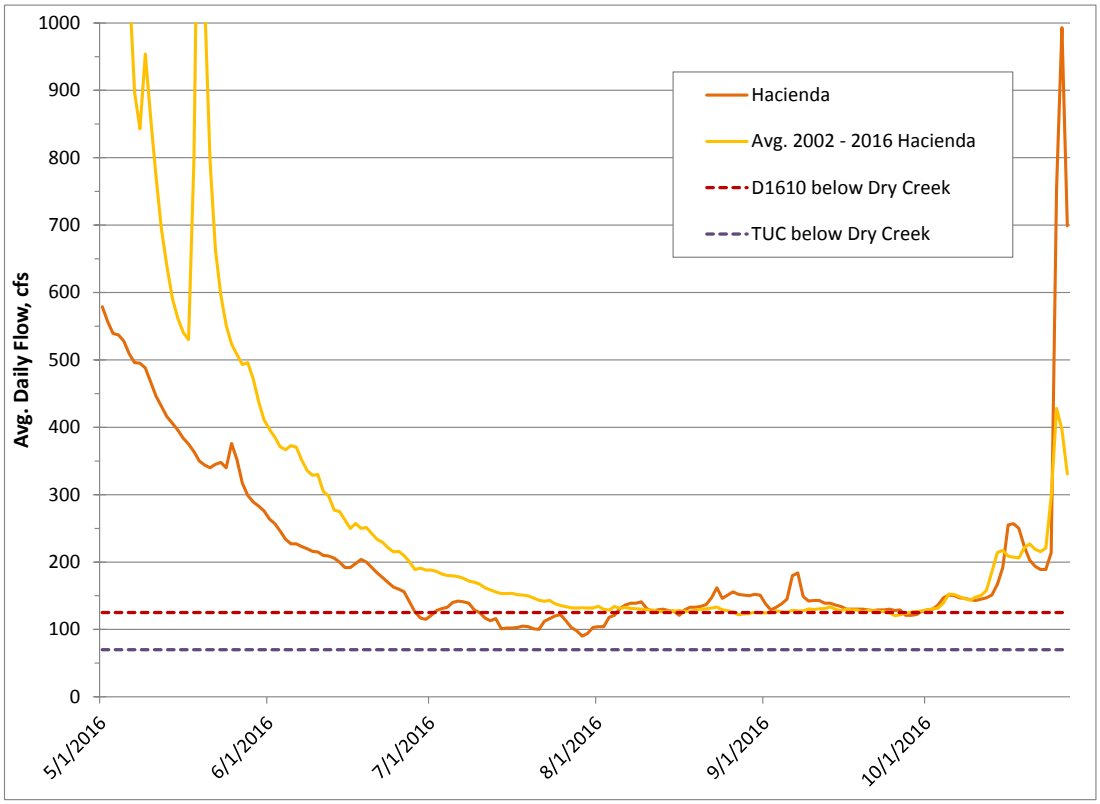


Figure 2-4. 2016 average daily flows in the Lower Russian River as measured at USGS gages below the Dry Creek confluence in cubic feet per second. Flow rates are preliminary and subject to final revision by USGS.

3.0 Water Quality Monitoring

Water quality data was collected to monitor TUC flows for potential effects to recreation and available aquatic habitat for salmonids. The data was used to supplement existing data to provide a more complete basis for analyzing spatial and temporal water quality trends due to Biological Opinion-stipulated changes in river flow and estuary management.

3.1 Mainstem Russian River Water Quality Monitoring

The North Coast Regional Water Quality Control Board (NCRWQCB), Sonoma County Department of Health Services (DHS), Water Agency, and Sonoma County Department of Parks and Recreation (Regional Parks) formed a workgroup to coordinate a monitoring approach for assessing cyanobacteria in the Russian River during the summer of 2016. Water Agency staff consulted with NCRWQCB staff regarding monitoring activities related to the workgroup. As a result of the consultation, the Water Agency made modifications to their existing Water Quality Monitoring Plan for the Russian River Estuary Management Project to modify the monitoring that is occurring in the estuary and to include freshwater monitoring for the purpose of assisting in the evaluation of cyanobacteria harmful algal bloom (cyanoHAB) conditions and the risk co-factors contributing to nuisance blooms (e.g., flow, temperature, nutrient, etc.).

The Sonoma County DHS conducted weekly bacteriological and cyanotoxin sampling at ten (10) beaches with recreational activities involving the greatest body contact on the Russian River between Cloverdale

and Patterson Point. The Water Agency conducted mainstem sampling for nutrients, algae, and cyanobacteria at four sites along the Russian River between Hopland and Patterson Point to support NCRWQCB analysis and evaluation of water quality data relating to biostimulatory conditions and cyanotoxins. In addition, the Water Agency continued to conduct long-term water quality monitoring and weekly grab sampling for nutrients, bacteria, and algae in the lower, middle, and upper reaches of the Russian River Estuary and the upper extent of inundation and backwatering during lagoon formation, between the mouth of the river at Jenner and Vacation Beach, including in two tributaries.

The California Department of Public Health (CDPH) developed the "Draft Guidance for Fresh Water Beaches," which describes bacteria levels that, if exceeded, may require posted warning signs in order to protect public health (CDPH 2011). The CDPH draft guideline for single sample maximum concentrations is: 10,000 most probable numbers (MPN) per 100 milliliters (mL) for Total Coliform; 235 MPN per 100 mL for *E. coli*; and 61 MPN per 100 mL for *Enterococcus*. In 2012, the United States Environmental Protection Agency (EPA) issued Clean Water Act (CWA) §304(a) Recreational Water Quality Criteria (RWQC) for States (EPA 2012). The RWQC recommends using two criteria for assessing water quality relating to fecal indicator bacteria: the geometric mean (GM) of the dataset, and changing the single sample maximum (SSM) to a Statistical Threshold Value (STV) representing the 75th percentile of an acceptable water-quality distribution. However, the EPA recommends using STV values as SSM values for potential recreational beach posting and those values are provided in this report for comparative purposes. Exceedances of the STV values are highlighted in Table 3-1. It must be emphasized that these are draft guidelines and criteria, not adopted standards, and are therefore both subject to change (if it is determined that the guidelines and/or criteria are not accurate indicators) and are not currently enforceable.

Cyanobacteria are present in most freshwater and marine environments. When conditions are favorable, including abundant light, elevated water temperature, elevated levels of nutrients, and lack of water turbulence and velocity, cyanobacteria can quickly multiply into a bloom. Not every bloom is toxic; however, cyanoHABs are a concern as some species of cyanobacteria produce toxins that have the potential to impact drinking water, recreation, and fish and wildlife. Cyanotoxins were present in the Russian River in 2015, which led to Sonoma County DHS posting warning signs.

Currently, there are no federal or state standards for cyanotoxins in drinking water and recreational waters. Agencies participating in the California Water Quality Monitoring Council's (CWQMC) California Cyanobacteria and Harmful Algal Bloom (CCHAB) Network, including the SWRCB, California Office of Environmental Health Hazard Assessment (OEHHA), and CDPH, have developed and are further refining suggested guidelines for addressing health concerns for cyanotoxins in recreation waters (CWQMC 2017). The CDPH, county health departments, and water body managers are encouraged to use this guidance for posting of water bodies when cyanoHABs pose a health threat. Three primary trigger levels have been developed for posting and closing beaches for Total Microcystins, Anatoxin-a, and Cylindrospermopsin. Caution signs are recommended when Total Microcystins exceed 0.8 micrograms per liter (µg/L), any detection is made of Anatoxin-a, and when Cylindrospermopsin exceeds 1 µg/L. Warning signs (Tier I) are recommended when Total Microcystins exceed 6 µg/L, Anatoxin-a exceeds 20 µg/L, and cylindrospermopsin exceeds 4 µg/L. Danger signs (Tier II) are recommended when Total Microcystins exceed 20 µg/L, Anatoxin-a exceeds 90 µg/L, and cylindrospermopsin exceeds 17 µg/L.

Secondary triggers have also been developed for the posting of caution signs when cell densities of toxin producers exceed 4,000 cells/mL or if there are site specific indicators of cyanobacteria including blooms, scums, and mats.

3.1.1 Sonoma County DHS Seasonal Mainstem Bacterial Sampling (Beach Sampling)

The Sonoma County DHS conducts seasonal bacteriological sampling to monitor levels of pathogens at ten (10) Russian River beaches with recreational activities involving the greatest body contact. Results are used by the Sonoma County DHS to determine whether or not bacteria levels fall within State guidelines. The 2016 Sonoma County DHS seasonal beach sampling locations consisted of: Cloverdale River Park; Del Rio Woods Beach; Camp Rose Beach; Healdsburg Veterans Memorial Beach; Steelhead Beach; Forestville Access Beach; Sunset Beach; Johnson's Beach; Monte Rio Beach; and Patterson Point. Bacteriological samples were collected weekly beginning 31 May and continued until 19 September. The samples were analyzed using the Colilert quantitray MPN method for Total Coliform and *E. coli*. Results from the sampling program were reported by the Sonoma County DHS at their website and on the Sonoma County DHS Beach Sampling Hotline. The 2016 seasonal results are shown in Table 3-1 and in Figures 3-1 and 3-2.

Table 3-1. Sonoma County DHS 2016 Seasonal Mainstem Bacteria Sampling Results (Sonoma County DHS, 2016a).

Date Sampled	Cloverdale River Park		Del Rio Woods Beach		Camp Rose Beach		Healdsburg Veterans		Steelhead Beach		Forestville Access Beach		Sunset Beach		Johnson's Beach		Monte Rio Beach		Patterson Point	
	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC	TC	EC
31-May-16	2,909	52	1,658	10	1,178	20	<10	<10	388	10	1,296	10	1,100	52	631	<10	1,607	175	2,359	20
6-Jun-16	4,106	31	2,481	30	2,755	20	1,376	98	1,172	63	1,076	20	1,210	52	836	10	1,187	63	1,842	20
13-Jun-16	3,654	20	1,720	10	1,401	<10	1,450	109	1,296	31	855	52	1,500	20	1,050	10	1,354	480	383	<10
20-Jun-16	2,359	41	1,793	20	1,872	10	1,956	109	1,296	20	884	<10	1,354	10	1,274	30	2,613	*	2,755	52
21-Jun-16																	3,654	122		
27-Jun-16	4,352	97	2,481	31	1,720	<10	2,247	75	1,624	31	16,279	20	1,722	10	2,489	20	2,481	63	4,106	*
29-Jun-16																			4,106	41
5-Jul-16	5,173	63	2,014	10	2,247	20	4,611	20	1,616	10	2,098	20	2,359	10	2,489	31	2,909	20	5,794	41
11-Jul-16	4,106	31	1,785	<10	2,851	41	1,616	10	1,187	10	1,850	10	1,723	30	1,918	10	*	*	3,255	74
12-Jul-16																	5,475	52		
18-Jul-16	6,488	20	1,376	<10	3,676	30	1,100	31	1,565	10	2,481	20	1,553	<10	4,884	31	*	10	1,500	<10
20-Jul-16																	2,098	20		
25-Jul-16	2,481	20	3,256	41	2,359	31	1,187	20	2,909	63	2,046	10	1,860	10	2,098	<10	2,282	20	4,352	30
1-Aug-16	3,076	10	1,850	10	2,755	10	1,396	20	1,439	<10	3,448	31	2,046	10	1,989	20	1,017	10	4,352	<10
8-Aug-16	2,481	41	3,076	<10	2,909	<10	1,674	<10	1,541	<10	932	10	1,169	20	1,515	<10	1,334	<10	2,098	31
15-Aug-16	3,076	52	1,989	<10	2,481	<10	1,860	31	1,106	10	1,334	<10	1,112	<10	1,376	31	1,723	<10	1,354	31
22-Aug-16	2,755	52	1,281	20	2,755	20	1,904	20	2,014	52	809	<10	1,178	<10	1,153	<10	1,223	110	1,722	30
29-Aug-16	2,481	52	1,354	20	2,613	10	1,017	75	1,198	10	1,210	10	882	<10	959	10	1,725	52	1,223	52
6-Sep-16	1,850	52	1,314	<10	1,782	10	1,515	20	602	10	816	<10	1,050	10	1,467	10	1,658	<10	1,723	10
12-Sep-16	2,723	63	1,145	10	1,396	10	1,333	10	776	20	1,354	10	1,314	20	2,098	10	1,017	20	1,017	41
19-Sep-16	3,488	52	1,500	20	2,359	20	1,483	160	960	10	987	10	627	31	11,187	10	4,611	132	1,664	52

*Resample conducted.

GREEN indicates the beach is open - bacterial level results are within State guidelines.

YELLOW indicates the beach is open, but swimming is not advised - bacterial level results exceed State guidelines, but are not associated with a known or suspected human sewage release.

RED indicates the beach is closed - bacterial level results exceed State guidelines and are associated with a known or suspected human sewage release.

Recommended California Department of Public Health (CDPH) Draft Guidance and Environmental Protection Agency (EPA) Recreational Water Quality Criteria - Statistical Threshold Values (STV):

(Beach posting is recommended when indicator organisms exceed the STV) - Indicated by red text

Total Coliforms (STV): 10,000 per 100ml

E. coli (STV): 235 per 100 ml

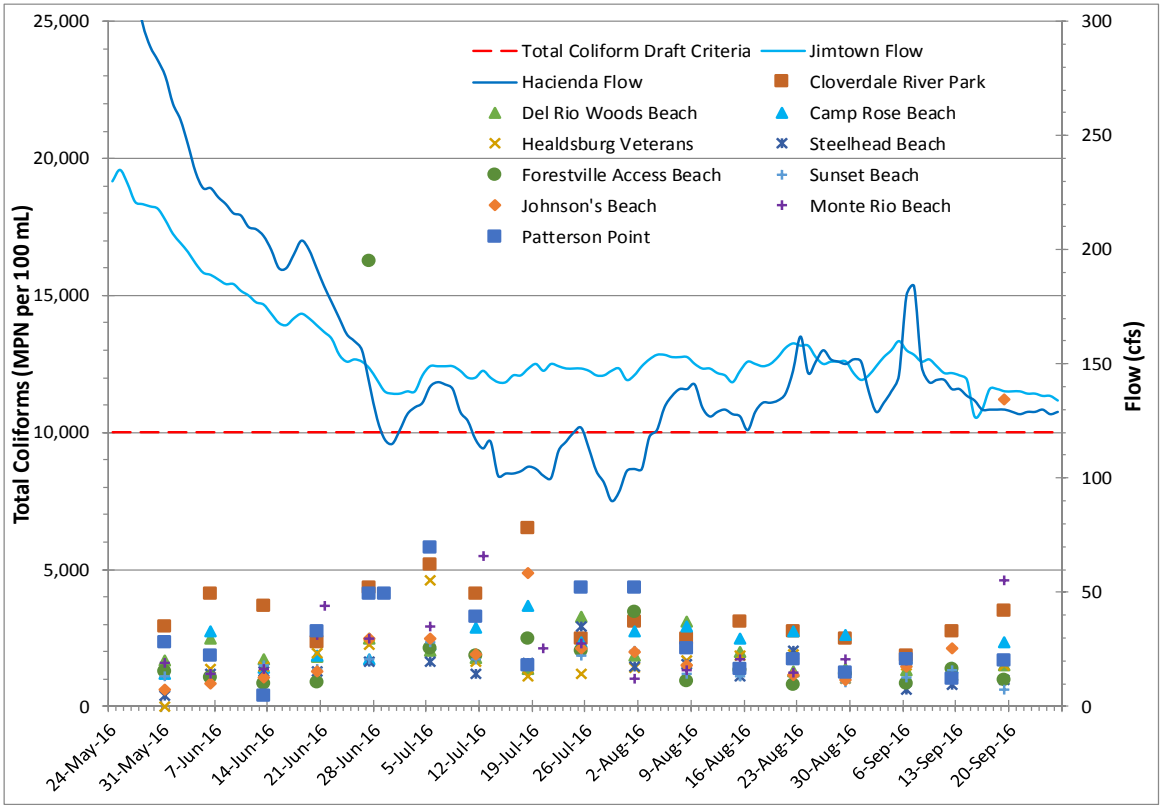


Figure 3-1. Sonoma County DHS 2016 Seasonal Mainstem Russian River Bacteria Sample Results for Total Coliform. Flow rates are preliminary and subject to final revision by USGS.

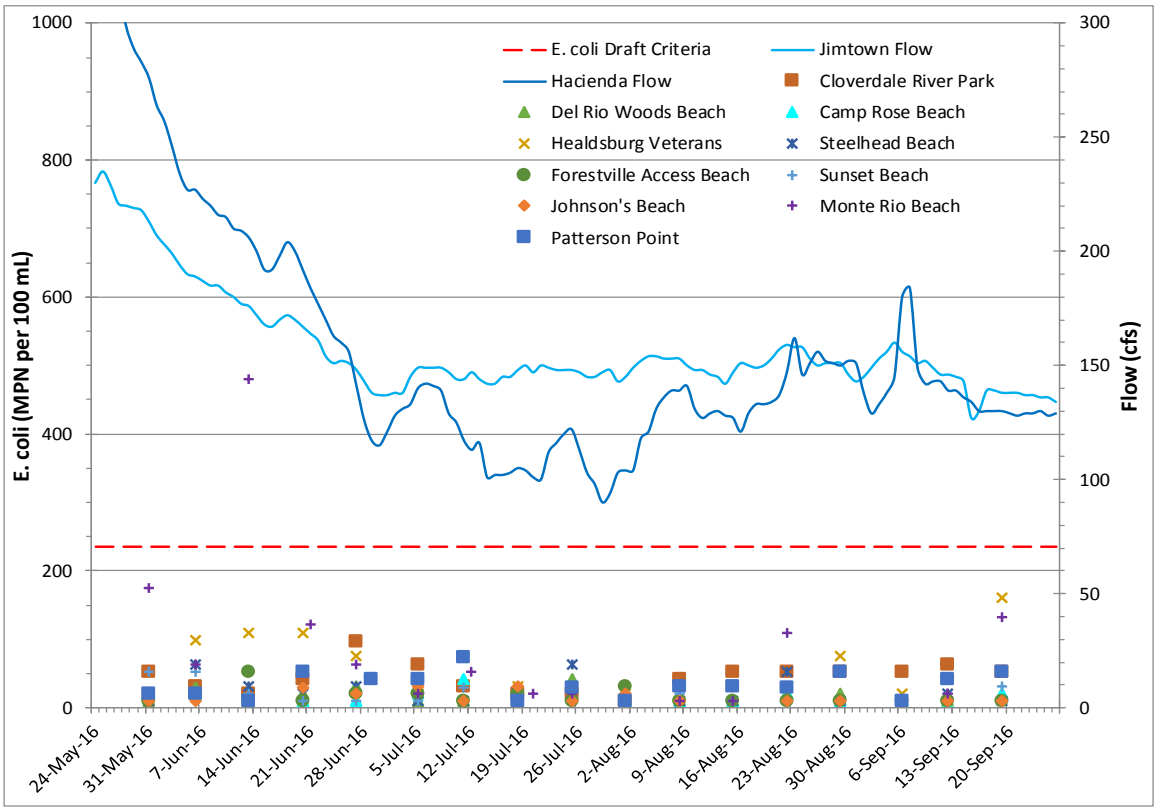


Figure 3-2. Sonoma County DHS 2016 Seasonal Mainstem Russian River Bacteria Sample Results for *E. coli*. Flow rates are preliminary and subject to final revision by USGS.

3.1.2 Sonoma County DHS Seasonal Mainstem Cyanotoxin Sampling (Beach Sampling)

In 2016, the Sonoma County DHS conducted seasonal cyanotoxin sampling at ten (10) Russian River beaches with recreational activities involving the greatest body contact including Cloverdale River Park; Del Rio Woods Beach; Camp Rose Beach; Healdsburg Veterans Memorial Beach; Steelhead Beach; Forestville Access Beach; Sunset Beach; Johnson's Beach; Monte Rio Beach; and Patterson Point. Cyanotoxin samples were collected weekly beginning 1 August and continued until 19 September. Results from the sampling program were reported by the Sonoma County DHS at their website and on the Sonoma County DHS Beach Sampling Hotline. The 2016 seasonal results are shown in Table 3-2.

Table 3-2. Sonoma County DHS 2016 Seasonal Mainstem Russian River Cyanotoxin Sampling Results (Sonoma County DHS, 2016b).

Anatoxin

	Cloverdale River Park	Del Rio Woods Beach	Camp Rose Beach	Healdsburg Veterans	Steelhead Beach	Forestville Access Beach	Sunset Beach	Johnson's Beach	Monte Rio Beach	Patterson Point
1-Aug-16	ND	ND	ND	ND	0.167	0.153	ND	ND	0.237	0.193
8-Aug-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
15-Aug-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
22-Aug-16	ND	ND	ND	ND	ND	ND	0.35	ND	ND	ND
29-Aug-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6-Sep-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	.17*
12-Sep-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
19-Sep-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Microcystin

	Cloverdale River Park	Del Rio Woods Beach	Camp Rose Beach	Healdsburg Veterans	Steelhead Beach	Forestville Access Beach	Sunset Beach	Johnson's Beach	Monte Rio Beach	Patterson Point
1-Aug-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8-Aug-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
15-Aug-16	ND	ND	ND	ND	ND	ND	ND	0.68	ND	ND
22-Aug-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
29-Aug-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6-Sep-16	ND	ND	ND	>5*	ND	>5*	>5*	>5*	3*	>5*
12-Sep-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
19-Sep-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Cylindrospermopsin

	Cloverdale River Park	Del Rio Woods Beach	Camp Rose Beach	Healdsburg Veterans	Steelhead Beach	Forestville Access Beach	Sunset Beach	Johnson's Beach	Monte Rio Beach	Patterson Point
1-Aug-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8-Aug-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
15-Aug-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
22-Aug-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
29-Aug-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6-Sep-16	ND	ND	ND	>2*	ND	ND	ND	>2*	ND	>2*
12-Sep-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
19-Sep-16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

All results are in µg/L. ND indicates that no toxins were detected.
*Final results were inconclusive.

State Trigger Levels

	Caution	Warning (Tier I)	Danger (Tier II)
Microcystin	0.8 µg/L	6 µg/L	20 µg/L
Anatoxin	Any Detected	20 µg/L	90 µg/L
Cylindrospermopsin	1 µg/L	4 µg/L	17 µg/L

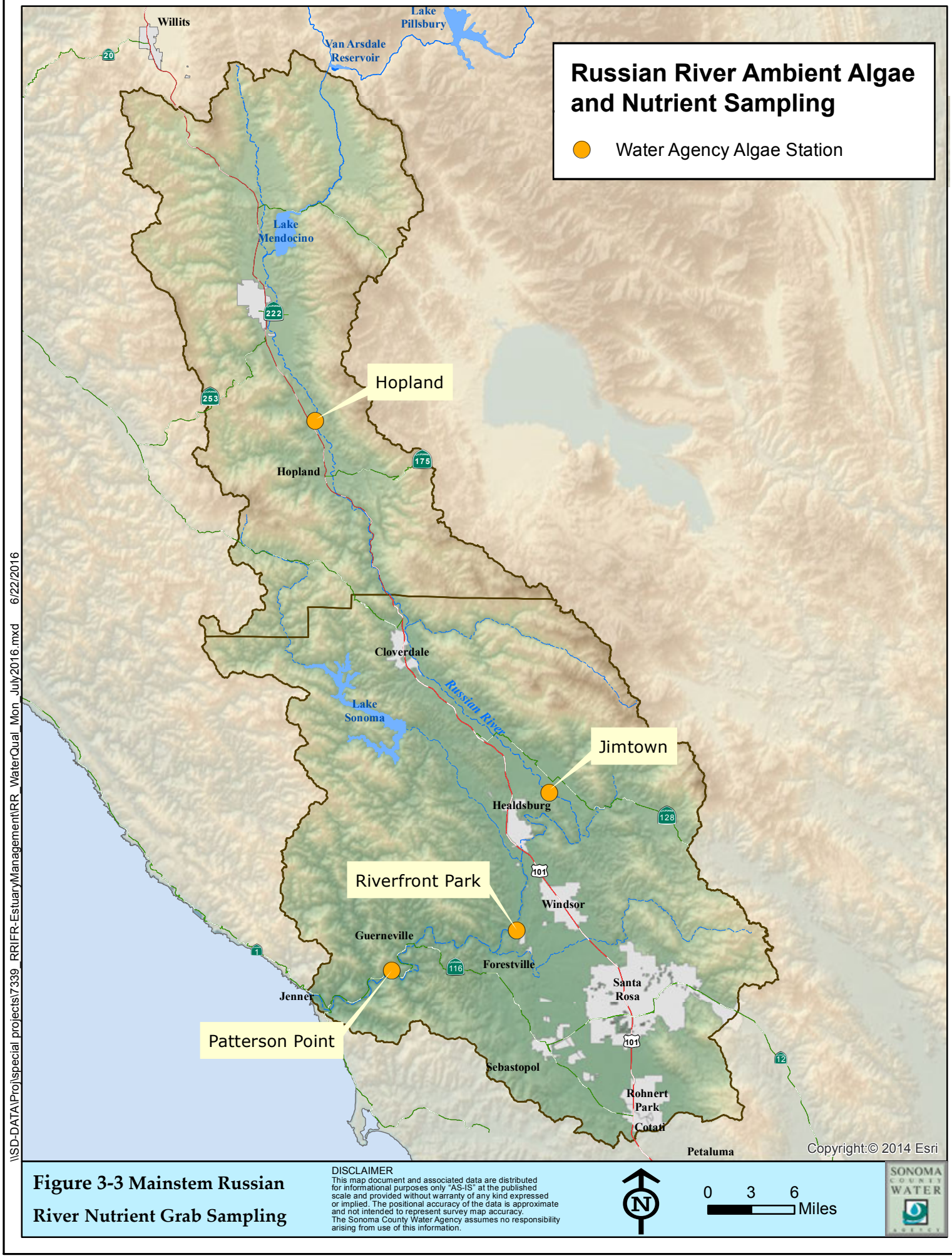
Source: State Water Resources Control Board.

3.1.3 Water Agency Seasonal Mainstem Russian River Nutrient Grab Sampling

In 2016, Water Agency staff conducted biweekly nutrient grab sampling and ambient algae monitoring from 16 June through 6 October at four stations in the mainstem Russian River including: the Hopland USGS gaging station north of Hopland, the Jimtown USGS gaging station in Alexander Valley, Riverfront Park upstream of the Windsor USGS gaging station, and at Patterson Point in Villa Grande. Grab sampling involves the collection of water from the water column for laboratory analysis. The grab sample sites are shown in Figure 3-3, and results are summarized in Tables 3-3 and 3-4 and Figures 3-4 through 3-7.

All grab samples were analyzed for nutrients, *chlorophyll a*, total dissolved solids, and turbidity. Grab samples were submitted to Alpha Analytical Labs in Ukiah for analysis. Grab sample data was collected during the Water Agency's ambient algae and cyanobacteria monitoring and sample collection effort. This effort is being conducted to identify algal and cyanobacterial genera and species in the Russian River, as well as to estimate algal cover, density, and seasonal growth patterns. Ambient algae and cyanobacterial monitoring and sampling was conducted to support NCRWQCB and Sonoma County DHS cyanotoxin monitoring and assessment of the potential for cyanoHABs in the Russian River. Ambient algae, cyanobacteria, and associated grab sampling data for 2016 is currently being compiled and will be discussed in the "Russian River Biological Opinion Status and Data Report Year 2016-17" due to be released in June 2017. The annual report will be available on the Water Agency's website: http://www.scwa.ca.gov/bo-annual-report/.

Highlighted values indicate those values exceeding EPA recommended criteria for "Nutrients, *Chlorophyll a*, and Turbidity in Rivers and Streams in Aggregate Ecoregion III" (EPA 2000). However, it must be emphasized that the EPA criteria are not adopted standards, and are therefore both subject to change (if it is determined that the guidelines or criteria are not accurate indicators) and are not currently enforceable.


Russian River Ambient Algae and Nutrient Sampling
Water Agency Algae Station
Willits
Lake Pillsbury
Van Arsdale Reservoir
Lake Mendocino
Hopland
Cloverdale
Lake Sonoma
Russian River
Jimtown
Healdsburg
Riverfront Park
Windsor
Guerneville
Forestville
Jenner
Patterson Point
Santa Rosa
Sebastopol
Rohnert Park
Cotati
Petaluma
Copyright:© 2014 Esri
\SD-DATA\Proj\special projects\7339_RRIFR-EstuaryManagement\RR_WaterQual_Mon_July2016.mxd 6/22/2016
Figure 3-3 Mainstem Russian River Nutrient Grab Sampling
DISCLAIMER
This map document and associated data are distributed for informational purposes only "AS-IS" at the published scale and provided without warranty of any kind expressed or implied. The positional accuracy of the data is approximate and not intended to represent survey map accuracy. The Sonoma County Water Agency assumes no responsibility arising from use of this information.
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SONOMA COUNTY WATER AGENCY

Hopland was the only station that exceeded the EPA criteria for Total Nitrogen during the ambient algae monitoring effort (Table 3-3 and Figure 3-4a). Two exceedances occurred at the beginning of the season and one at the end of the season with flows ranging from 129 cfs to 163 cfs at the Hopland gage.

By contrast, all four monitoring stations were observed to have exceedances of the EPA criteria for Total Phosphorous during the monitoring season (Tables 3-3 and 3-4). The station at Hopland was observed to have the highest concentrations of the four stations, including a maximum value of 0.11 mg/L, and exceeded the EPA criteria during the entire term of the Order under flows that ranged from 129 cfs to 170 cfs (Table 3-3 and Figure 3-4b). The Jimtown station had exceedances during July and in the latter half of the season; however, concentrations were significantly lower than those at Hopland (Table 3-3 and Figure 3-5b). Riverfront Park had three exceedances early in the season with flows over 178 cfs at the Windsor gage, and one exceedance at the end of the season with a flow of 220 cfs (Table 3-4 and Figure 3-6b). Patterson Point had three exceedances at the beginning of the season with flows ranging from 104 cfs to 134 cfs at the Hacienda gage, and one exceedance at the end of the season with a flow of 148 cfs (Table 3-4 and Figure 3-7b). While Total Phosphorus concentrations generally decreased through the season at Riverfront Park and Patterson Point, they increased early in the season at Hopland and Jimtown and then leveled off through the remainder of the season. Interestingly, Total Phosphorus concentrations at Hopland increased with increasing flows (Figure 3-4b).

Hopland station turbidity levels exceeded the Turbidity EPA criteria during the entire monitoring season, with values increasing to 20.6 NTU by 25 August before declining through the rest of the season (Table 3-3 and Figure 3-4c). It is possible that the increasing turbidity values may have contributed to increasing Total Phosphorus values early in the season at Hopland, and possibly Jimtown (Figures 3-4b and 3-5b). However, additional data is needed to determine if there is a positive correlation. The Jimtown and Riverfront Park stations each exceeded the Turbidity criteria on 22 September, with flows of 138 cfs at Jimtown and 214 cfs at Windsor (Table 3-3 and 3-4). Patterson Point did not exceed turbidity criteria during the ambient algae monitoring effort (Table 3-4).

Algal (*chlorophyll a*) results predominantly exceeded the EPA criteria at the Hopland and Jimtown stations throughout the season, with flows that ranged from 130 cfs to 170 cfs at Hopland and 138 cfs to 159 cfs at Jimtown (Table 3-3 and Figures 3-4d and 3-5d). Riverfront Park had one *chlorophyll a* exceedance early in the season with flows of 178 cfs at Windsor (Table 3-4 and Figure 3-6d). Patterson Point had two *chlorophyll a* exceedances early in the season with flows of 104 cfs and 132 cfs at Hacienda (Table 3-4 and Figure 3-7d).

Table 3-3. Water Agency 2016 Seasonal Mainstem Russian River Grab Sampling Results at Hopland and Jimtown.

Hopland	Time	Temperature	pH	Total Organic Nitrogen	Ammonia as N	Ammonia as N Unionized	Nitrate as N	Nitrite as N	Total Kjeldahl Nitrogen	Total Nitrogen**	Phosphorus, Total	Total Orthophosphate	Total Dissolved Solids	Turbidity***	Chlorophyll-a	USGS 11462500 RR near Hopland****
MDL*				0.200	0.10	0.00010	0.030	0.030	0.10		0.020	0.020	4.2	0.020	0.000050	Flow Rate*****
Date		°C		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	mg/L	(cfs)
6/16/2016	14:30	15.5	7.6	0.24	ND	ND	0.22	ND	0.24	**0.46**	**0.065**	0.13	130	**6.4**	**0.0021**	130
6/30/2016	16:30	18.2	7.7	0.37	ND	ND	0.13		0.37	**0.50**	**0.069**	-----	-----	**3.7**	0.00084	129
7/13/2016	13:30	16.7	7.4	ND	ND	ND	0.10	ND	ND	0.20	**0.071**	0.19	110	**4.2**	0.0017	137
7/28/2016	8:30	15.6	7.7	0.28	ND	ND	0.079	ND	0.28	0.36	**0.084**	-----	120	**12.2**	**0.0041**	163
8/10/2016	14:20	16.5	7.5	0.28	ND	ND	0.067	ND	0.28	0.35	**0.093**	-----	120	**19.2**	**0.0018**	162
8/25/2016	12:30	15.0	7.4	0.21	ND	ND	0.091	0.049	0.21	0.35	**0.11**	-----	120	**20.6**	**0.0024**	165
9/8/2016	15:00	16.9	7.4	0.2	ND	ND	0.070	ND	0.24	0.32	**0.095**	-----	130	**10.2**	**0.0018**	170
9/22/2016	14:50	16.2	7.7	ND	ND	ND	0.11	ND	ND	0.25	**0.11**	-----	120	**7.5**	**0.0024**	157
10/6/2016	13:20	15.8	7.7	ND	ND	ND	0.19	0.043	ND	**0.40**	**0.11**	-----	140	**8.2**	**0.0020**	163

Jimtown	Time	Temperature	pH	Total Organic Nitrogen	Ammonia as N	Ammonia as N Unionized	Nitrate as N	Nitrite as N	Total Kjeldahl Nitrogen	Total Nitrogen**	Phosphorus, Total	Total Orthophosphate	Total Dissolved Solids	Turbidity***	Chlorophyll-a	USGS 11463682 RR at Jimtown****
MDL*				0.200	0.10	0.00010	0.030	0.030	0.10		0.020	0.020	4.2	0.020	0.000050	Flow Rate*****
Date		°C		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	mg/L	(cfs)
6/16/2016	13:20	19.3	7.7	ND	ND	ND	0.18	ND	ND	0.36	ND	0.032	170	0.96	**0.0029**	159
6/30/2016	15:20	23.9	7.8	ND	ND	ND	0.082		ND	0.22	ND	-----	-----	0.1	0.0013	126
7/13/2016	11:50	22.2	7.7	ND	ND	ND	0.091	ND	ND	0.23	**0.022**	0.031	160	0.5	**0.0028**	138
7/27/2016	14:20	24.5	8.1	ND	ND	ND	0.062	ND	ND	0.24	**0.022**	-----	150	0.4	**0.0049**	138
8/10/2016	13:00	22.3	8.1	ND	ND	ND	ND	ND	ND	0.14	0.036	-----	150	0.9	**0.0028**	143
8/25/2016	10:20	19.6	7.5	ND	ND	ND	ND	ND	ND	0.21	**0.029**	-----	160	1.6	**0.0050**	155
9/8/2016	14:00	21.6	8.1	ND	ND	ND	ND	ND	ND	0.20	**0.033**	-----	160	1	0.0016	153
9/22/2016	13:40	19.2	8.0	ND	0.14	0.0051	0.045	ND	ND	0.15	**0.032**	-----	150	**2.9**	0.00060	138
10/6/2016	12:20	17.2	7.8	ND	ND	ND	0.11	ND	ND	0.18	**0.031**	-----	160	1.2	**0.0023**	153

* Method Detection Limit - limits can vary for individual samples depending on matrix interference and dilution factors, all results are preliminary and subject to final revision.

** Total nitrogen is calculated through the summation of the different components of total nitrogen: organic and ammoniacal nitrogen (together referred to as Total Kjeldahl Nitrogen or TKN) and nitrate/nitrite nitrogen.

*** Turbidity results after 6/16 were recorded using a YSI 6600 datasonde.

**** United States Geological Survey (USGS) Continuous-Record Gaging Station

***** Flow rates are preliminary and subject to final revision by USGS.

Recommended EPA Criteria based on Aggregate Ecoregion III

Total Phosporus: 0.02188 mg/L (21.88 ug/L) ≈ 0.022 mg/L

Total Nitrogen: 0.38 mg/L

Chlorophyll *a*: 0.00178 mg/L (1.78 ug/L) ≈ 0.0018 mg/L

Turbidity: 2.34 FTU/NTU

Table 3-4. Water Agency 2016 Seasonal Mainstem Russian River Grab Sampling Results at Riverfront Park and Patterson Point.

Riverfront Park	Time	Temperature	pH	Total Organic Nitrogen	Ammonia as N	Ammonia as N Unionized	Nitrate as N	Nitrite as N	Total Kjeldahl Nitrogen	Total Nitrogen**	Phosphorus, Total	Total Orthophosphate	Total Dissolved Solids	Turbidity***	Chlorophyll-a	USGS 11465390 RR near Windsor***
MDL*				0.200	0.10	0.00010	0.030	0.030	0.10		0.020	0.020	4.2	0.020	0.000050	Flow Rate****
Date		°C		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	mg/L	(cfs)
6/16/2016	11:00	17.7	7.7	ND	ND	ND	0.13	ND	ND	0.30	**0.026**	0.032	160	1.4	0.0013	255
6/30/2016	13:20	21.5	8.0	ND	ND	ND	0.049		ND	0.15	**0.025**	-----	-----	0.6	**0.0020**	178
7/13/2016	10:20	20.5	7.8	ND	ND	ND	0.072	ND	ND	0.21	**0.022**	0.031	140	1.3	0.0017	220
7/27/2016	11:50	21.5	7.9	ND	ND	ND	ND	ND	ND	0.14	ND	-----	140	0.6	0.0012	226
8/10/2016	12:00	20.2	7.8	ND	ND	ND	ND	ND	ND	0.070	ND	-----	140	0.7	0.0012	169
8/30/2016	12:20	19.7	7.9	ND	ND	ND	ND	ND	ND	0.12	ND	-----	140	0.7	0.0014	282
9/8/2016	11:50	19.3	7.8	ND	ND	ND	ND	ND	ND	0.15	0.020	-----	150	0.8	0.0014	226
9/22/2016	12:20	17.1	7.5	ND	ND	ND	ND	ND	ND	0.13	ND	-----	140	**2.9**	0.00060	214
10/6/2016	11:30	15.6	7.8	ND	ND	ND	0.091	ND	ND	0.13	**0.022**	-----	140	0.9	0.0012	226

Patterson Point	Time	Temperature	pH	Total Organic Nitrogen	Ammonia as N	Ammonia as N Unionized	Nitrate as N	Nitrite as N	Total Kjeldahl Nitrogen	Total Nitrogen**	Phosphorus, Total	Total Orthophosphate	Total Dissolved Solids	Turbidity***	Chlorophyll-a	USGS 11467000 RR near Guerneville (Hacienda)****
MDL*				0.200	0.10	0.00010	0.030	0.030	0.10		0.020	0.020	4.2	0.020	0.000050	Flow Rate*****
Date		°C		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	mg/L	(cfs)
6/30/16	11:50	23.3	7.8	ND	ND	ND	ND		ND	0.070	**0.044**	-----	-----	1.0	**0.0024**	132
7/13/16	9:00	23.1	7.7	ND	ND	ND	0.0042	ND	ND	0.14	**0.042**	0.085	150	1.5	0.0015	132
7/27/16	9:20	23.5	7.7	ND	ND	ND	ND	ND	ND	0.14	**0.031**	-----	10000	2.0	**0.0019**	104
8/10/16	10:40	22.3	7.8	ND	ND	0.00096	ND	ND	ND	0.10	**0.026**	-----	150	2.0	0.0013	134
8/30/16	10:40	21.2	8.1	ND	ND	ND	ND	ND	ND	0.10	0.021	0.055	140	1.8	0.0016	148
9/8/16	10:40	21.4	7.9	ND	ND	ND	ND	ND	ND	0.14	0.021	-----	150	1.6	0.0011	146
9/22/16	10:10	20.0	7.7	ND	ND	ND	ND	ND	ND	0.070	0.020	0.042	130	2.2	0.00090	129
10/6/16	10:20	16.6	7.5	ND	ND	ND	0.072	ND	ND	0.11	**0.028**	-----	130	1.8	0.00067	148

Patterson Point data for 8/30 and 9/22 was derived from concurrent estuary grab sampling results.

* Method Detection Limit - limits can vary for individual samples depending on matrix interference and dilution factors, all results are preliminary and subject to final revision.

** Total nitrogen is calculated through the summation of the different components of total nitrogen: organic and ammoniacal nitrogen (together referred to as Total Kjeldahl Nitrogen or TKN) and nitrate/nitrite nitrogen.

*** Turbidity results after 6/16 were recorded using a YSI 6600 datasonde.

**** United States Geological Survey (USGS) Continuous-Record Gaging Station

***** Flow rates are preliminary and subject to final revision by USGS.

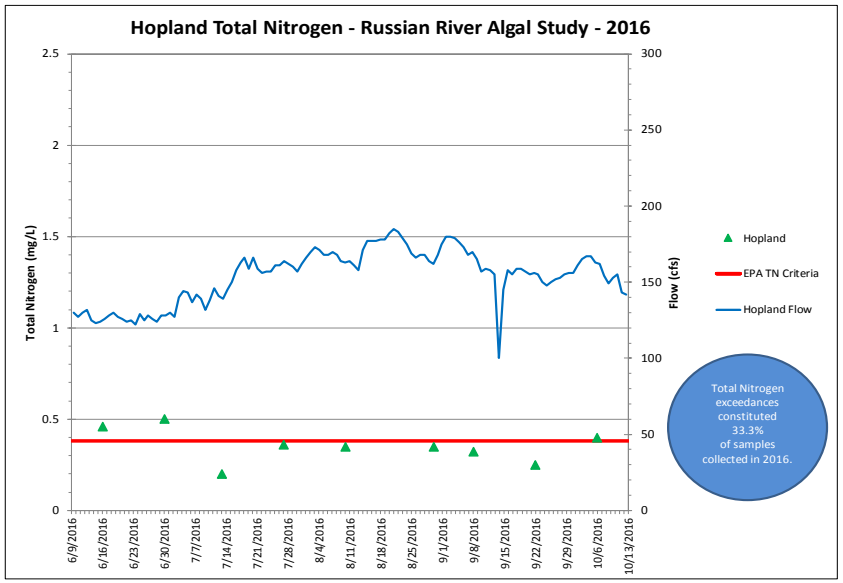
Recommended EPA Criteria based on Aggregate Ecoregion III

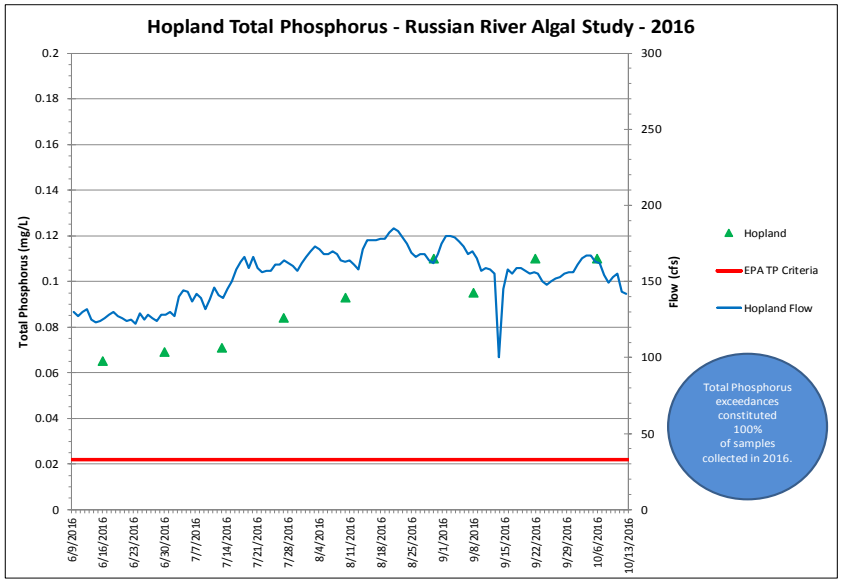
Total Phosporus: 0.02188 mg/L (21.88 ug/L) ≈ 0.022 mg/L

Chlorophyll *a*: 0.00178 mg/L (1.78 ug/L) ≈ 0.0018 mg/L

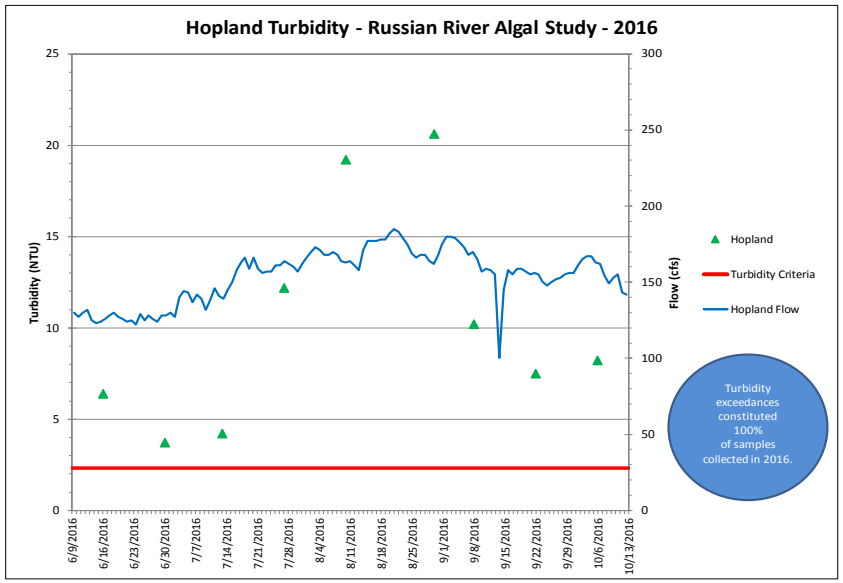
Total Nitrogen: 0.38 mg/L

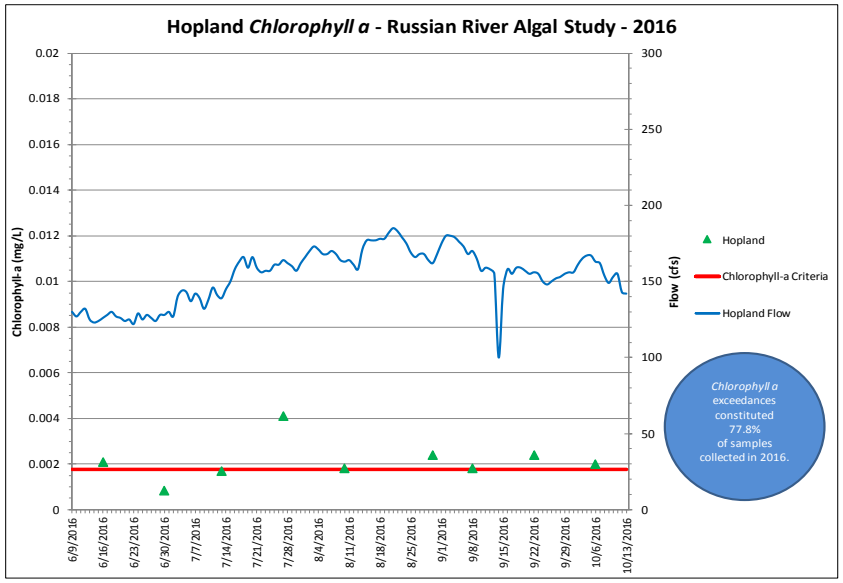
Turbidity: 2.34 FTU/NTU



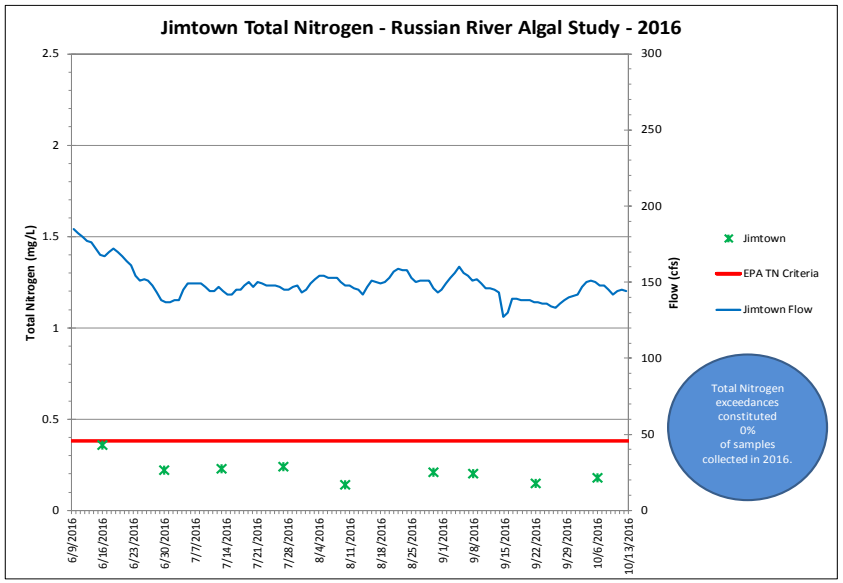


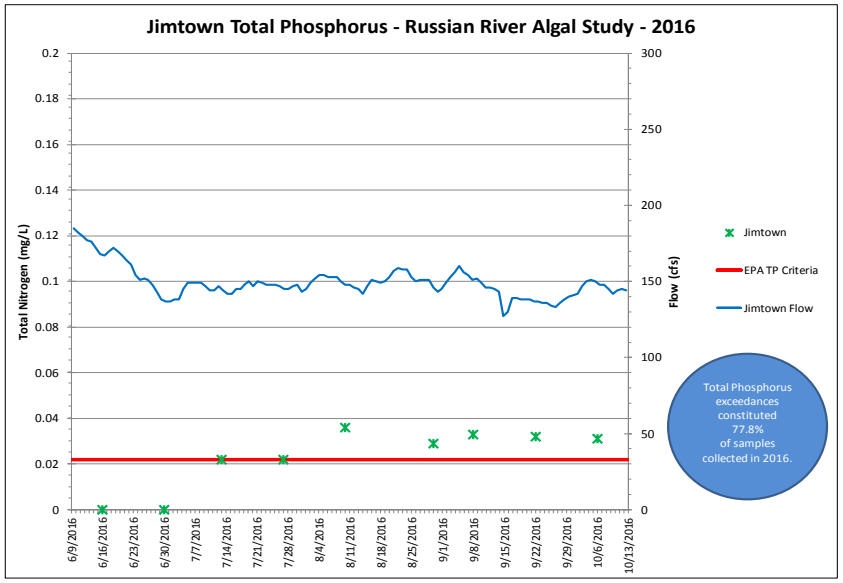
Figures 3-4 a and b. Water Agency Seasonal Mainstem Russian River Grab Sampling Total Nitrogen and Total Phosphorus Results from Hopland in 2016.



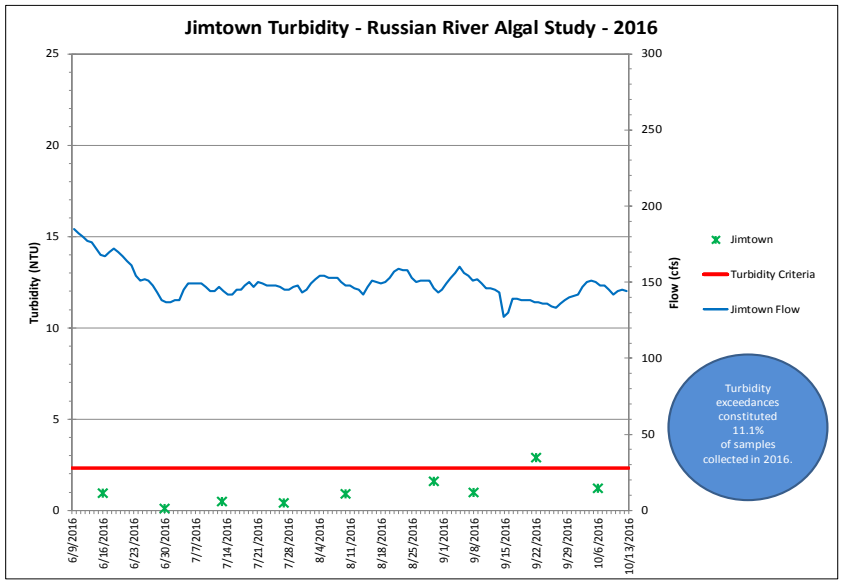


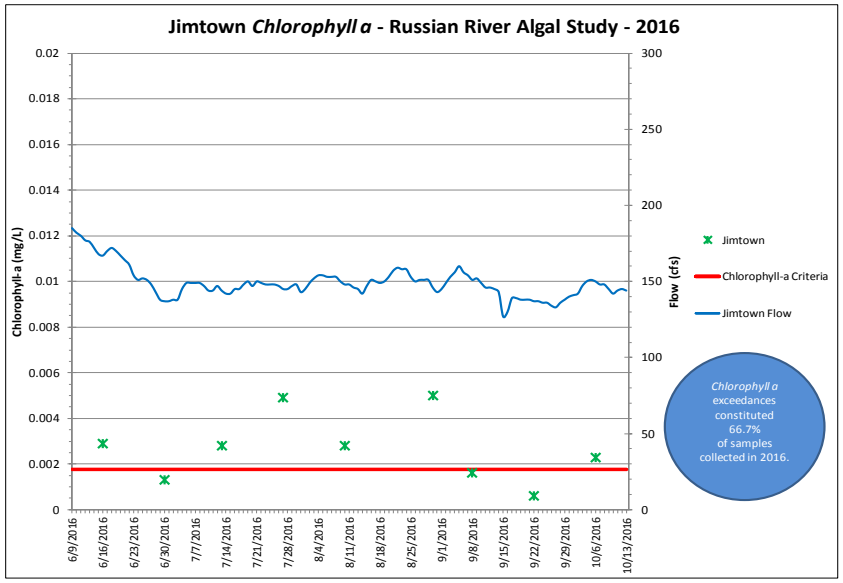
Figures 3-4 c and d. Water Agency Seasonal Mainstem Russian River Grab Sampling Turbidity and Results from Hopland in 2016.



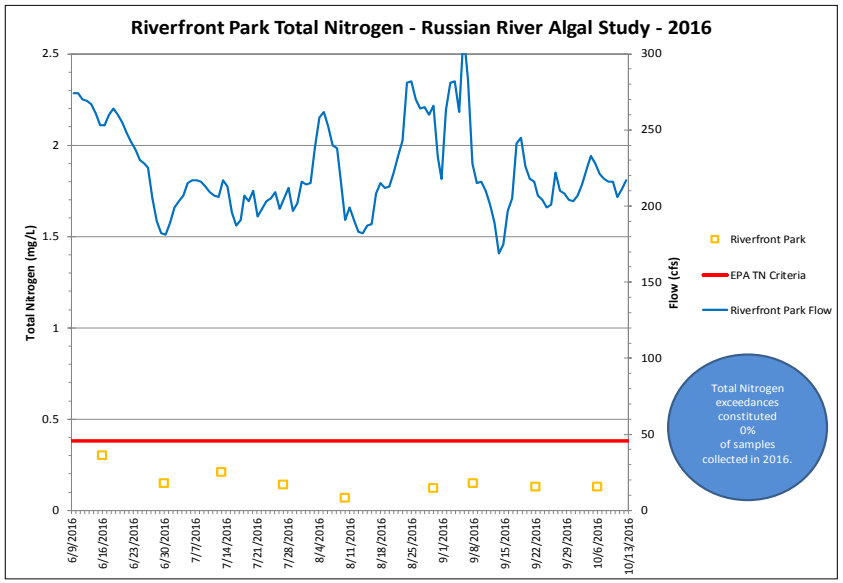


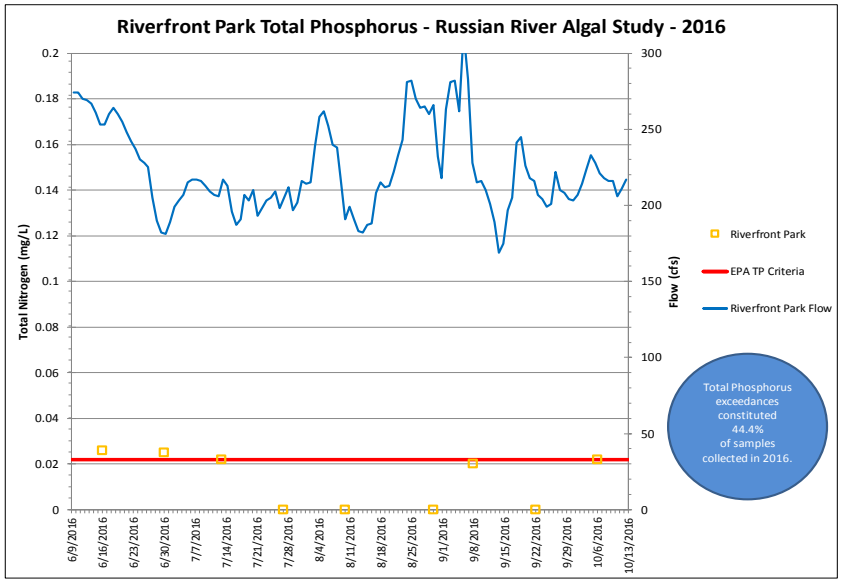
Figures 3-5 a and b. Water Agency Seasonal Mainstem Russian River Grab Sampling Total Nitrogen and Total Phosphorus Results from Jimtown in 2016.



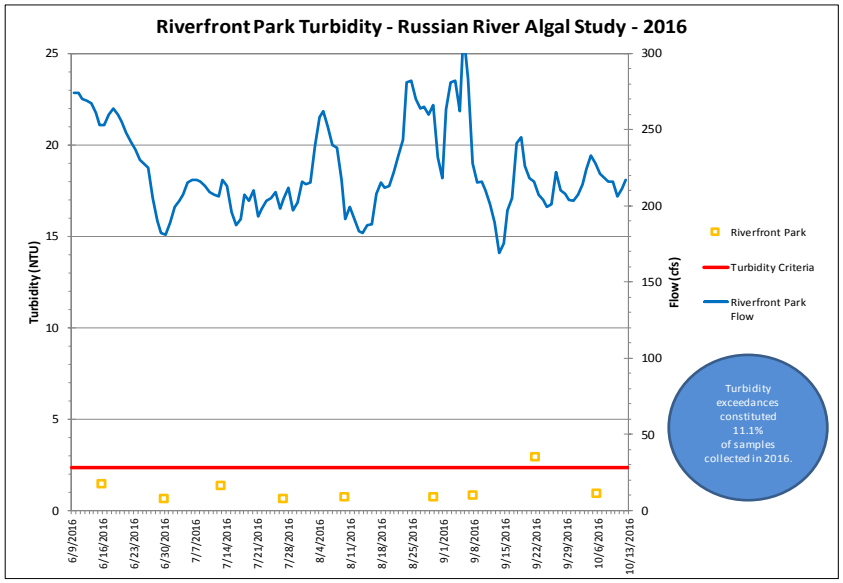


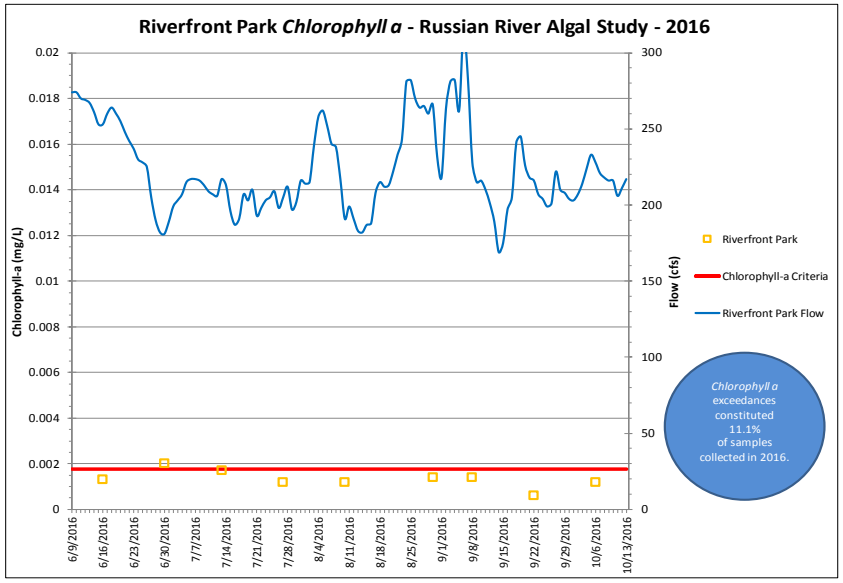
Figures 3-5 c and d. Water Agency Seasonal Mainstem Russian River Grab Sampling Turbidity and *Chlorophyll-a* Results from Jimtown in 2016.



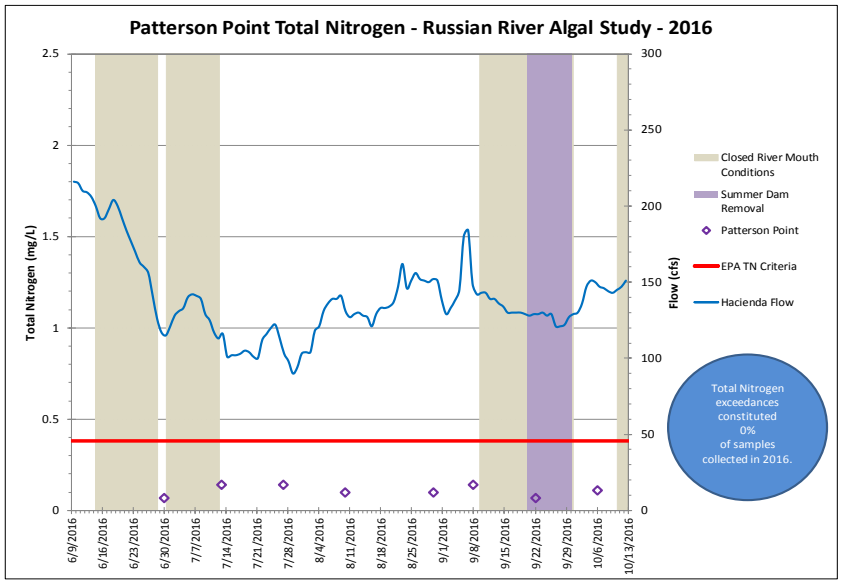


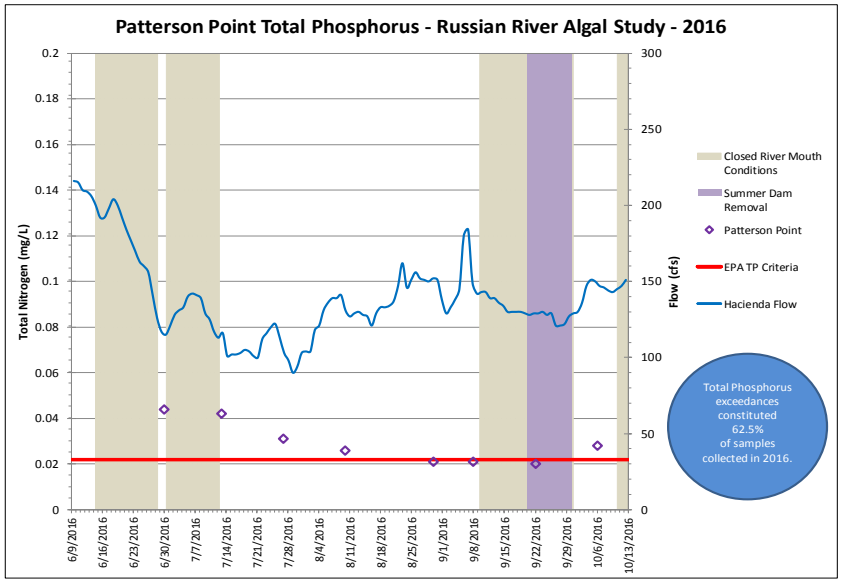
Figures 3-6 a and b. Water Agency Seasonal Mainstem Russian River Grab Sampling Total Nitrogen and Total Phosphorus Results from Riverfront Park in 2016.



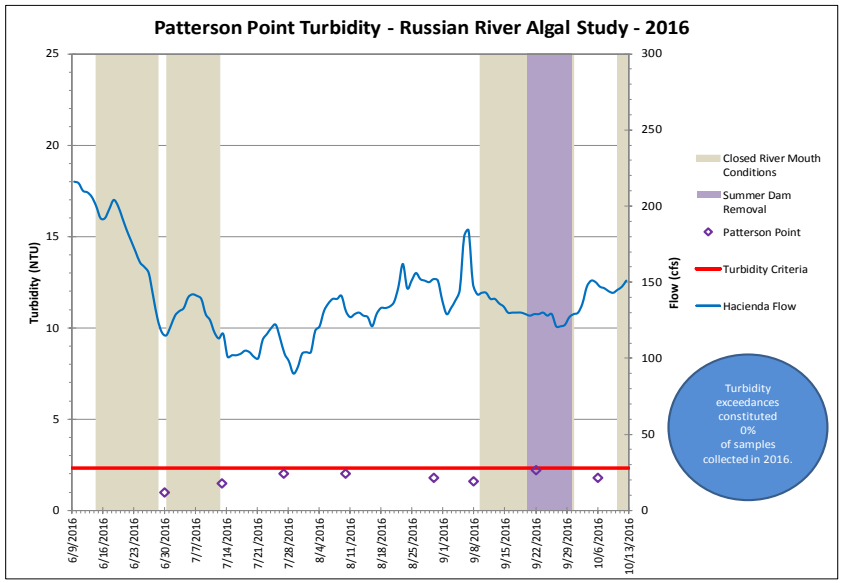


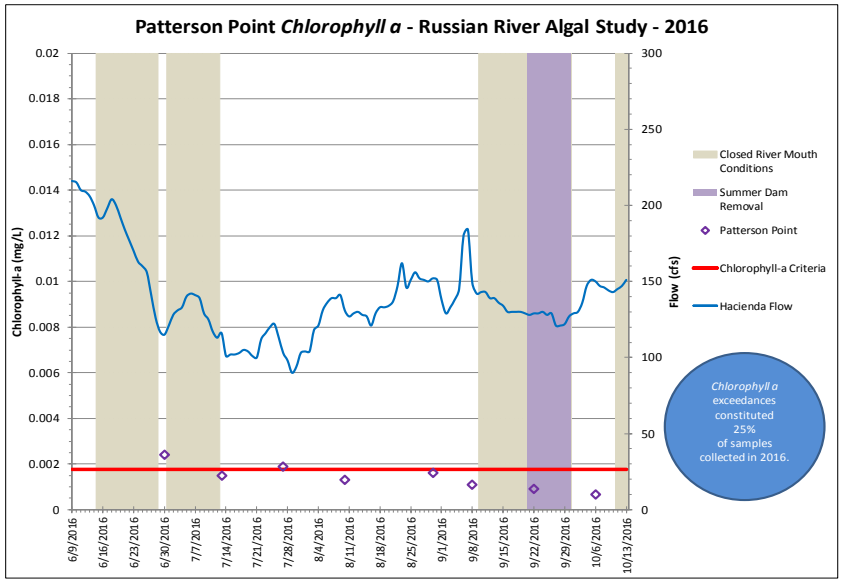
Figures 3-6 c and d. Water Agency Seasonal Mainstem Russian River Grab Sampling Turbidity and *Chlorophyll- a* Results from Riverfront Park in 2016.





Figures 3-7 a and b. Water Agency Seasonal Mainstem Russian River Grab Sampling Total Nitrogen and Total Phosphorus Results from Patterson Point in 2016.





Figures 3-7 c and d. Water Agency Seasonal Mainstem Russian River Grab Sampling Turbidity and *Chlorophyll-a* Results from Patterson Point in 2016.

3.2 Water Agency Russian River Estuary Water Quality Monitoring

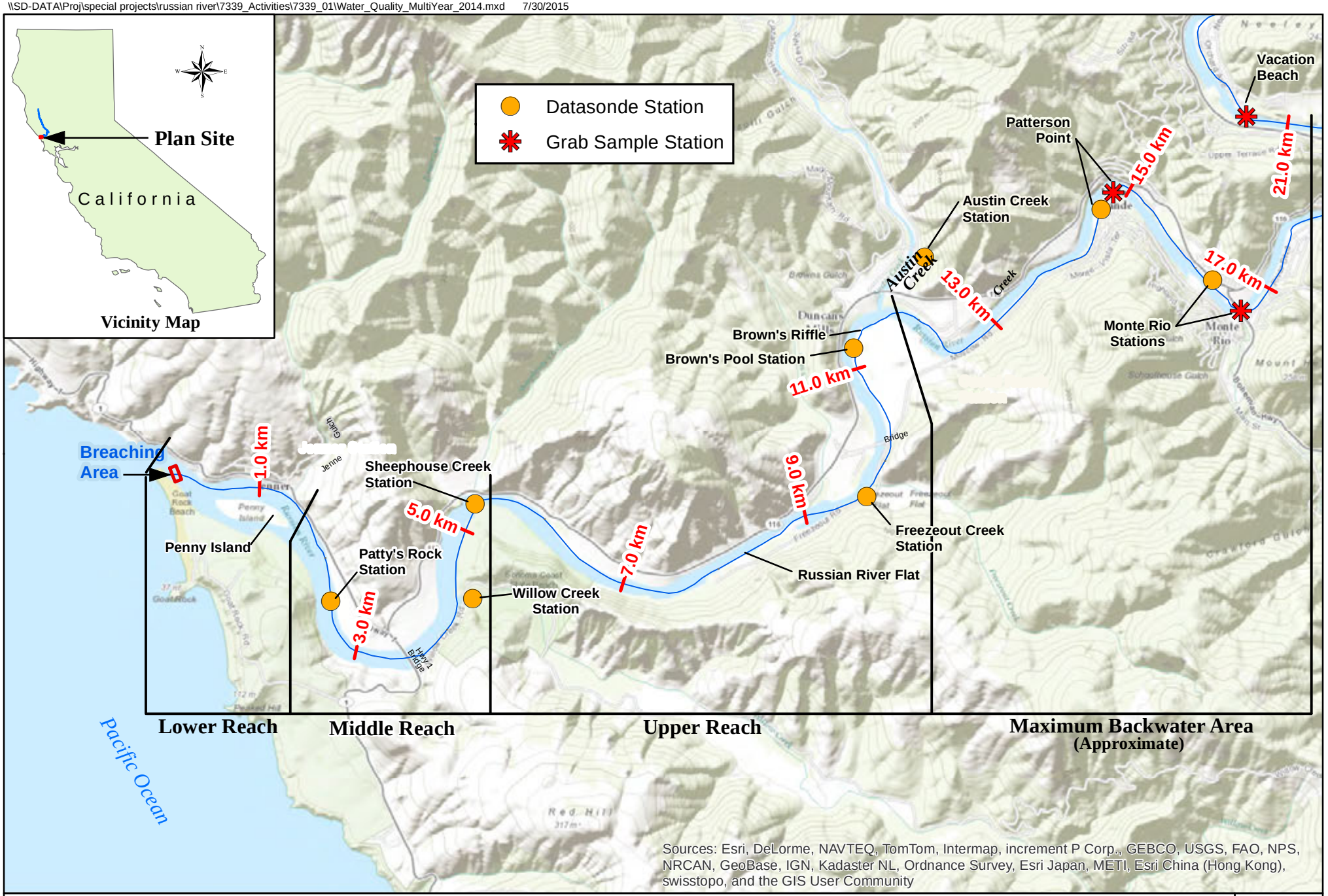
Flows in the lower Russian River at Hacienda (downstream of the confluence with Dry Creek) dropped below D1610 minimum flow requirement of 125 cfs during the month of July, but did not drop below the TUC five-day running average of 70 cfs or the instantaneous minimum flow of 60 cfs while the Order was in effect from 1 May through 27 October (Figure 2-4). Long-term water quality monitoring and weekly grab sampling was conducted in the lower, middle, and upper reaches of the Russian River Estuary and the upper extent of inundation and backwatering during lagoon formation, between the mouth of the river at Jenner and Vacation Beach, including in two tributaries.

Saline water is denser than freshwater and a salinity "wedge" forms as freshwater outflow passes over the denser tidal inflow. During the lagoon management period (15 May to 15 October), the lower and middle reaches of the Estuary up to Sheephouse Creek are predominantly saline environments with a thin freshwater layer that flows over the denser saltwater. The upper reach of the Estuary transitions to a predominantly freshwater environment, which is periodically underlain by a denser, saltwater layer that migrates upstream to Duncans Mills during low flow conditions and barrier beach closure.

Water Agency staff continued to collect long-term monitoring data to: establish baseline information on water quality in the Estuary and assess the availability of aquatic habitat in the Estuary; gain a better understanding of the longitudinal and vertical water quality profile during the ebb and flow of the tide; and track changes to the water quality profile that may occur during periods of low flow conditions, barrier beach closure, lagoon outlet channel implementation, and reopening. Long-term monitoring datasondes were deployed at seven stations in the Russian River estuary, including two tributary stations during the 2016 monitoring season (Figure 3-8). Data was not collected at the Sheephouse Creek station in 2016 due to malfunctioning equipment. The Water Agency submits an annual report to the National Marine Fisheries Service and California Department of Fish and Wildlife documenting the status updates of the Water Agency's efforts in implementing the Biological Opinion. The water quality monitoring data for 2016 is currently being compiled and will be discussed in the "Russian River Biological Opinion Status and Data Report Year 2016-17" due to be released in June 2017. The annual report will be available on the Water Agency's website: http://www.scwa.ca.gov/bo-annual-report/.

Water Agency staff conducted weekly grab sampling from 10 May to 18 October at three stations in the lower mainstem Russian River, including: Vacation Beach, Monte Rio, and Patterson Point (Figure 3-8). All samples were analyzed for nutrients, *chlorophyll a*, standard bacterial indicators (Total Coliform, *E. coli*, and *Enterococcus*), total and dissolved organic carbon, total dissolved solids, and turbidity. Samples were collected during the monitoring season for diluted and undiluted analysis of Total Coliform and *E. coli* for comparative purposes and the results are included in Tables 3-5 through 3-7 and Figures 3-9 and 3-10. Samples collected for *Enterococcus* were undiluted only and results are included in Tables 3-5 through 3-7 and Figure 3-11. The Water Agency submitted samples to the Sonoma County DHS Public Health Division Lab in Santa Rosa for bacteria analysis. Total Coliform and *E. coli* were analyzed using the Colilert method and *Enterococcus* was analyzed using the Enterolert method. Samples for all other constituents were submitted to Alpha Analytical Labs in Ukiah for analysis. Total Coliform and *E. coli* data presented in Figures 3-9 and 3-10 utilize undiluted sample results unless the reporting limit has been exceeded, at which point the diluted results are utilized.

\\SD-DATA\Proj\special projects\russian river\7339_Activities\7339_01\Water_Quality_MultiYear_2014.mxd 7/30/2015



0 0.45 0.9 1.8 Kilometers

0 0.375 0.75 1.5 Miles

Russian River Estuary
Water Quality Monitoring Stations

This Map is for general reference only.

Figure 3-8

NCRWQCB staff has indicated, based on guidance from Sonoma County DHS, that *Enterococcus* is not currently being utilized as a fecal indicator bacteria in freshwater conditions due to uncertainty in the validity of the lab analysis to produce accurate results, as well as evidence that *Enterococcus* colonies can be persistent in the water column and therefore its presence at a given site may not always be associated with a fecal source. Water Agency staff will continue to collect *Enterococcus* samples and record and report the data, however, *Enterococcus* results will not be relied upon when coordinating with the NCRWQCB and Sonoma County DHS about potentially posting warning signs at freshwater beach sites or to discuss potential adaptive management actions including mechanical breaching of the barrier beach to address potential threats to public health.

Sampling for human-host *Bacteroides* bacteria was conducted at public freshwater beaches when other bacteria samples were collected. Samples were submitted to the DHS lab where they were filtered, frozen and archived for possible future analyses of human-host *Bacteroides* bacteria by staff at the NCRWQCB. Lab analysis of *Bacteroides* bacteria will be conducted only for those sample dates and locations when operational standards for *E. coli* bacteria are exceeded. The analysis of human-host *Bacteroides* bacteria will help determine if the source of the high level of *E. coli* bacteria is from human or other sources.

The grab sample sites are shown in Figure 3-8, and the results are summarized in Tables 3-5 through 3-10 and Figures 3-9 through 3-15. Highlighted values indicate those values exceeding California Department of Public Health Draft Guidance for Fresh Water Beaches for Indicator Bacteria (CDPH 2011), EPA Recreational Water Quality Criteria (EPA 2012), and EPA recommended criteria for Nutrients, *Chlorophyll a*, and Turbidity in Rivers and Streams in Aggregate Ecoregion III (EPA 2000). However, it must be emphasized that the draft CDPH guidelines and EPA criteria are not adopted standards, and are therefore both subject to change (if it is determined that the guidelines or criteria are not accurate indicators) and are not currently enforceable.

There were no exceedances of the recommended EPA Recreational Water Quality Criteria (RWQC) for Total Coliform at the monitoring stations (Figure 3-9). However, the Monte Rio station was observed to have two exceedances of the RWQC for *E. coli*, one during estuary closure in June with Hacienda flows at 170 cfs, and the other during estuary closure and summer dam removal in September with flows at 122 cfs (Table 3-6 and Figure 3-10). Several exceedances of the *Enterococcus* RWQC were observed early in the season at all three monitoring stations during closed estuary conditions, with Hacienda flows ranging from 170 to 259 cfs (Tables 3-5 through 3-7). Later in the season, Monte Rio was observed to have two *Enterococcus* exceedances; one during estuary closure and summer dam removal with Hacienda flows of 122 cfs, and the other during estuary closure as flows increased from approximately 150 cfs to 240 cfs (Table 3-6 and Figure 3-11). Patterson Point was also observed to have an exceedance of the *Enterococcus* RWQC during an estuary closure event in July with Hacienda flows at 113 cfs (Table 3-7 and Figure 3-11). External factors including estuary closures and the removal of two summer dams in Guerneville at the end of September likely had an effect on increasing bacterial concentrations observed during the 2016 monitoring season (Figures 3-9 through 3-11).

Table 3-5. 2016 Vacation Beach bacteria concentrations for samples collected by the Water Agency. This site experiences freshwater conditions.

Vacation Beach	Time	Temperature	pH	Total Coliforms (Colilert)	Total Coliforms Diluted 1:10 (Colilert)	E. coli (Colilert)	E. coli Diluted 1:10 (Colilert)	Enterococcus (Enterolert)	USGS 11467000 RR near Guerneville (Hacienda)***
MDL*				20		20		2	Flow Rate****
Date		°C		MPN/100mL	MPN/100mL	MPN/100mL	MPN/100mL	MPN/100mL	(cfs)
5/10/2016	11:30	17.3	8.1	1299.7	1723	13.2	10	<10	468
5/17/2016	11:30	20.5	8.0	727.0	677	5.2	10	3.1	377
5/24/2016	12:20	18.6	8.1	387.3	529	8.6	<10	2.0	343
5/31/2016	11:50	21.0	8.0	686.7	816	16.6	<10	5.1	277
6/2/2016	14:20	22.9	8.2	461.1	670	9.6	<10	30	259
6/7/2016	10:40	20.9	8.1	980.4	1333	30.9	30	40.2	224
6/14/2016	11:10	20.8	8.2	1553.1	4674	17.3	20	**141**	202
6/21/2016	10:20	21.8	8.1	>2419.6	2359	95.8	75	**248.9**	186
6/23/2016	11:10	22.9	8.1	>2419.6	4106	57.1	63	**95.9**	170
6/28/2016	12:40	24.3	8.1	>2419.6	2603	16.9	<10	41.4	127
7/5/2016	10:00	21.9	8.0	>2419.6	2755	24.6	10	47.4	140
7/7/2016	12:20	23.1	8.0	1986.3	2909	13.5	10	7.4	141
7/12/2016	9:40	23.3	8.1	>2419.6	4884	5.1	20	32.0	113
7/19/2016	9:40	23.3	8.0	>2419.6	3076	4.1	<10	6.3	104
7/26/2016	9:40	23.5	7.9	1732.9	3255	22.8	31	31.3	113
8/2/2016	9:40	23.5	7.9	412.0	2382	15.8	10	44.3	104
8/9/2016	10:50	22.5	7.9	1732.9	2613	25.9	20	8.6	141
8/16/2016	11:10	22.5	7.9	>2419.6	2064	18.3	20	7.3	121
8/23/2016	11:30	21.8	7.9	1299.7	1145	9.7	<10	9.7	162
8/30/2016	11:40	21.5	7.8	920.8	932	<10	<10	10.9	152
9/6/2016	11:00	21.2	8.0	866.1	1396	5.2	10	3.0	181
9/13/2016	11:20	20.2	7.9	1119.9	860	3.1	20	5.1	140
9/15/2016	12:10	20.0	7.9	1046.2	933	20.1	41	2.0	136
9/20/2016	11:20	20.9	7.8	1119.9	1063	26.2	41	9.7	129
9/22/2016	10:50	19.6	7.7	1732.9	1291	17.5	31	12.8	130
9/27/2016	10:20	19.6	7.8	1553.1	1019	27.5	41	41.6	121
9/29/2016	12:50	20.0	7.7	980.4	1187	7.5	31	5.2	122
10/4/2016	11:10	16.9	7.7	1046.2	1112	20.3	41	14.4	147
10/11/2016	11:00	17.2	7.8	980.4	1050	32.3	31	40.4	142
10/18/2016	0:00	16.3	7.7	1732.9	934	65	85	22.8	240

* Method Detection Limit - limits can vary for individual samples depending on matrix interference and dilution factors, all results are preliminary and subject to final revision.

** United States Geological Survey (USGS) Continuous-Record Gaging Station

*** Flow rates are preliminary and subject to final revision by USGS.

Recommended EPA Recreational Water Quality Criteria - Statistical Threshold Value (STV) and Geomteric Mean (GM)

(Beach posting is recommended when indicator organisms exceed the STV) - Indicated by red text

E. coli (STV): 235 per 100 ml — Enterococcus (STV): 61 per 100 ml

E. coli (GM): 126 per 100mL — Enterococcus (GM): 33 per 100 mL

Table 3-6. 2016 Monte Rio bacteria concentrations for samples collected by the Water Agency. This site experiences freshwater conditions.

Monte Rio	Time	Temperature	pH	Total Coliforms (Colilert)	Total Coliforms Diluted 1:10 (Colilert)	E. coli (Colilert)	E. coli Diluted 1:10 (Colilert)	Enterococcus (Enterolert)	USGS 11467000 RR near Guerneville (Hacienda)***
MDL*				20		20		2	Flow Rate****
Date		°C		MPN/100mL	MPN/100mL	MPN/100mL	MPN/100mL	MPN/100mL	(cfs)
5/10/2016	11:10	15.6	7.9	908.4	1376	16.0	<10	<10	468
5/17/2016	11:10	19.8	7.8	866.4	857	4.1	20	1.0	377
5/24/2016	12:00	17.9	8.0	488.4	529	6.3	10	3.1	343
5/31/2016	11:30	21.0	7.9	770.1	1187	14.6	30	5.2	277
6/2/2016	14:00	22.4	8.0	1203.3	822	48.0	52	**228**	259
6/7/2016	10:20	21.9	8.2	>2419.6	1314	204.6	109	**387.3**	224
6/14/2016	10:50	21.4	8.1	1119.9	1178	13.4	20	**63**	202
6/21/2016	10:10	21.5	8.0	>2419.6	2909	69.7	51	**62.4**	186
6/23/2016	10:50	22.9	8.1	>2419.6	3784	**261.3**	**241**	**179.2**	170
6/28/2016	12:20	24.0	7.8	>2419.6	4106	16.9	<10	5.2	127
7/5/2016	9:40	21.9	7.9	>2419.6	4106	22.4	10	12.8	140
7/7/2016	12:00	23.3	7.9	>2419.6	3076	18.7	63	14.4	141
7/12/2016	9:20	23.4	7.8	2419.6	4106	33.2	41	26.2	113
7/19/2016	9:20	23.1	7.9	>2419.6	3255	12.1	20	7.4	104
7/26/2016	9:20	23.8	7.9	2419.6	2909	2.0	<10	14.5	113
8/2/2016	9:25	23.2	7.8	571.7	1354	4.1	<10	7.2	104
8/9/2016	10:20	22.4	7.8	1553.1	1178	13.2	20	5.2	141
8/16/2016	10:50	22.3	7.8	1299.7	1198	7.5	20	<1.0	121
8/23/2016	11:05	21.6	7.8	1732.9	1076	21.6	10	4.1	162
8/30/2016	11:20	21.1	7.8	1203.3	959	41	41	7.4	152
9/6/2016	10:50	20.8	7.9	1553.1	1187	16.7	20	6.2	181
9/13/2016	11:00	19.8	7.8	816.4	1126	8.6	10	3.1	140
9/15/2016	11:50	19.9	7.8	980.4	657	20.1	10	3.0	136
9/20/2016	10:50	21.1	7.8	1986.3	2187	104.3	121	52.0	129
9/22/2016	10:40	20.1	7.8	1956.3	1860	72.7	110	53.7	130
9/27/2016	10:00	19.8	7.7	1413.6	2187	99.0	41	43.1	121
9/29/2016	12:30	20.0	7.7	>2419.6	4611	**980.4**	**884**	**290.9**	122
10/4/2016	10:50	16.8	7.6	1203.3	933	8.5	10	13.5	147
10/11/2016	10:40	17.1	7.8	1119.9	1050	14.6	31	11.9	142
10/18/2016	10:20	16.7	7.7	1986.3	1670	77.1	97	**61.7**	240

* Method Detection Limit - limits can vary for individual samples depending on matrix interference and dilution factors, all results are preliminary and subject to final revision.

** United States Geological Survey (USGS) Continuous-Record Gaging Station

*** Flow rates are preliminary and subject to final revision by USGS.

Recommended EPA Recreational Water Quality Criteria - Statistical Threshold Value (STV) and Geomteric Mean (GM)

(Beach posting is recommended when indicator organisms exceed the STV) - Indicated by red text

E. coli (STV): 235 per 100 ml — Enterococcus (STV): 61 per 100 ml

E. coli (GM): 126 per 100mL — Enterococcus (GM): 33 per 100 mL

Table 3-7. 2016 Patterson Point bacteria concentrations for samples collected by the Water Agency. This site experiences freshwater conditions.

Patterson Point	Time	Temperature	pH	Total Coliforms (Colilert)	Total Coliforms Diluted 1:10 (Colilert)	E. coli (Colilert)	E. coli Diluted 1:10 (Colilert)	Enterococcus (Enterolert)	USGS 11467000 RR near Guerneville (Hacienda)***
MDL*				20		20		2	Flow Rate****
Date		°C		MPN/100mL	MPN/100mL	MPN/100mL	MPN/100mL	MPN/100mL	(cfs)
5/10/2016	11:00	16.6	7.9	686.7	908	12.1	<10	<10	468
5/17/2016	10:50	20.1	7.9	648.8	670	10	31	1.0	377
5/24/2016	11:40	18.1	8.0	547.5	455	8.4	<10	1.0	343
5/31/2016	10:50	21.4	8.0	1119.9	1178	18.9	<10	3.1	277
6/2/2016	13:40	22.6	8.1	866.4	744	22.8	41	10	259
6/7/2016	10:00	21.7	8.1	1553.1	2014	35.0	30	44.1	224
6/14/2016	10:30	21.3	8.1	1732.9	1119	22.3	10	**63**	202
6/21/2016	9:40	21.5	8.2	>2419.6	2282	25.6	63	47.0	186
6/23/2016	10:10	22.6	8.1	>2419.6	4611	43.2	74	28.2	170
6/28/2016	11:50	23.7	7.8	>2419.6	3873	13.4	20	7.4	127
7/5/2016	9:20	21.7	7.9	>2419.6	2098	44.3	31	15.8	140
7/7/2016	11:10	22.6	7.9	>2419.6	4352	43.2	41	21.3	141
7/12/2016	8:50	23.1	7.9	>2419.6	3448	16.9	52	**73.3**	113
7/19/2016	9:00	22.2	7.8	1986.3	2613	1.0	<10	2.0	104
7/26/2016	9:00	23.0	7.6	2419.6	4106	6.3	10	14.5	113
8/2/2016	9:00	22.7	7.8	>2419.6	1956	29.9	41	21.6	104
8/9/2016	9:50	22.1	7.8	1732.9	2481	9.7	<10	10.8	141
8/16/2016	10:30	21.9	7.8	1413.6	1450	18.5	<10	4.1	121
8/23/2016	10:10	21.7	7.9	1299.7	1250	17.1	10	2.0	162
8/30/2016	10:40	21.2	8.1	1203.3	1236	12.0	20	3.1	152
9/6/2016	10:30	20.8	8.0	1046.2	1145	16.1	20	5.2	181
9/13/2016	10:30	19.8	7.8	727.0	884	14.8	41	8.6	140
9/15/2016	11:00	20.0	7.8	816.4	1374	15.8	31	17.3	136
9/20/2016	10:30	20.8	7.8	1203.3	1723	34.5	52	16.0	129
9/22/2016	10:10	20.0	7.7	1732.9	134	67.9	109	54.4	130
9/27/2016	9:40	20.3	7.8	>2419.6	1789	66.3	41	39.9	121
9/29/2016	12:00	20.4	7.9	1986.3	1396	38.9	52	18.3	122
10/4/2016	10:20	16.8	7.5	1119.9	932	8.5	10	7.4	147
10/11/2016	10:10	17.2	7.9	547.1	399	25.0	20	6.3	142
10/18/2016	9:50	16.6	7.7	1299.7	1658	61.7	97	48.8	240

* Method Detection Limit - limits can vary for individual samples depending on matrix interference and dilution factors, all results are preliminary and subject to final revision.

** United States Geological Survey (USGS) Continuous-Record Gaging Station

*** Flow rates are preliminary and subject to final revision by USGS.

Recommended EPA Recreational Water Quality Criteria - Statistical Threshold Value (STV) and Geomteric Mean (GM)

(Beach posting is recommended when indicator organisms exceed the STV) - Indicated by red text

E. coli (STV): 235 per 100 ml — Enterococcus (STV): 61 per 100 ml

E. coli (GM): 126 per 100mL — Enterococcus (GM): 33 per 100 mL

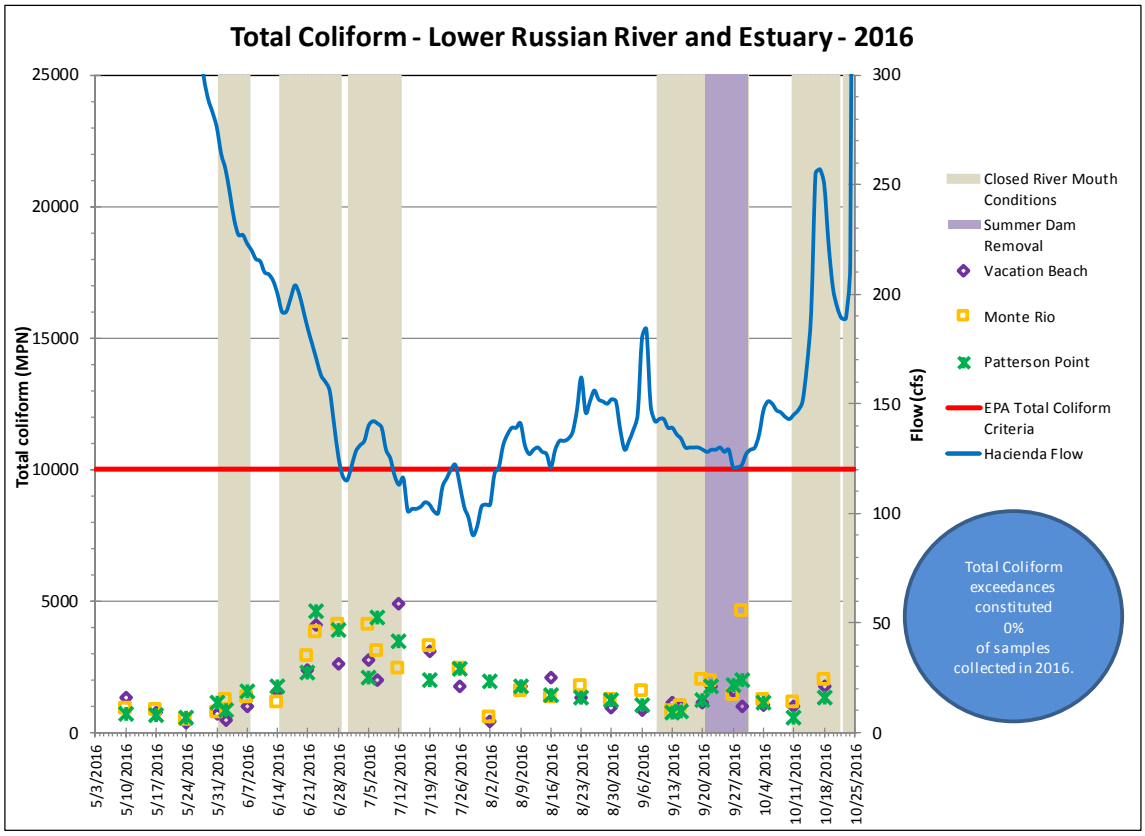


Figure 3-9. Total Coliform results for the Russian River from Vacation Beach to Patterson Point in 2016.

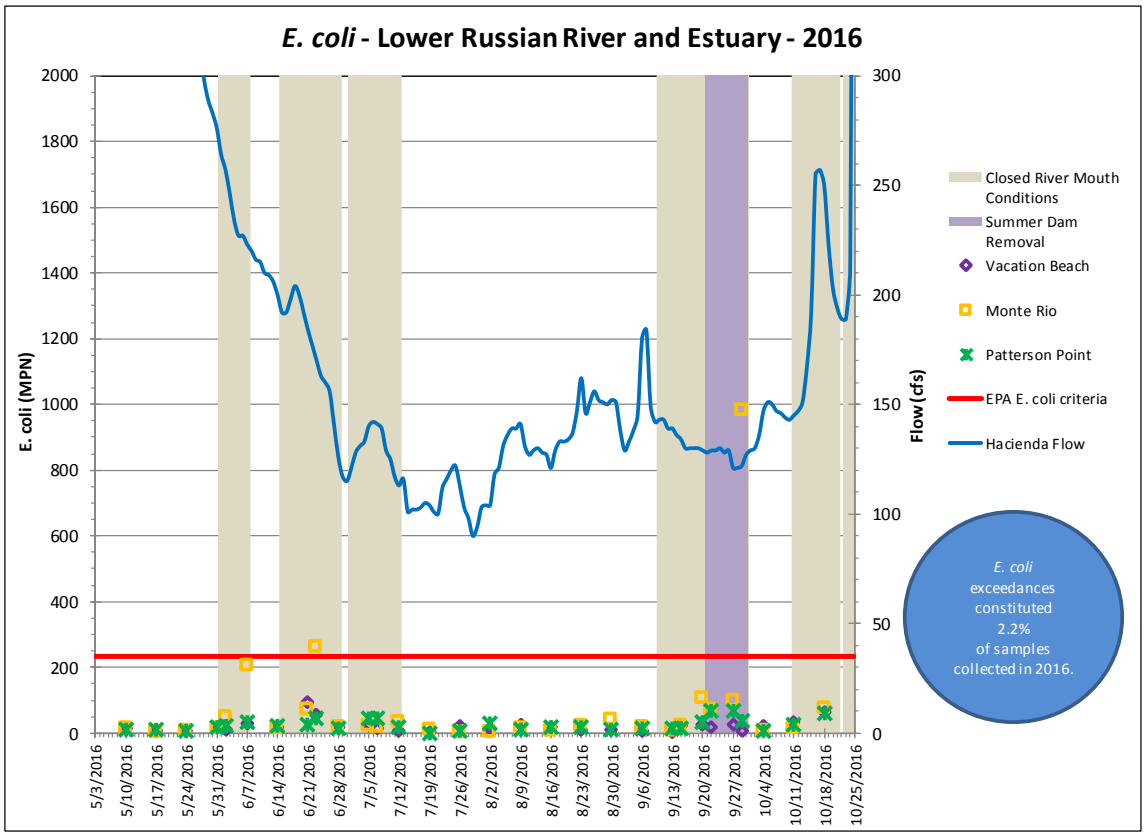


Figure 3-10. *E. coli* results for the Russian River from Vacation Beach to Patterson Point in 2016.

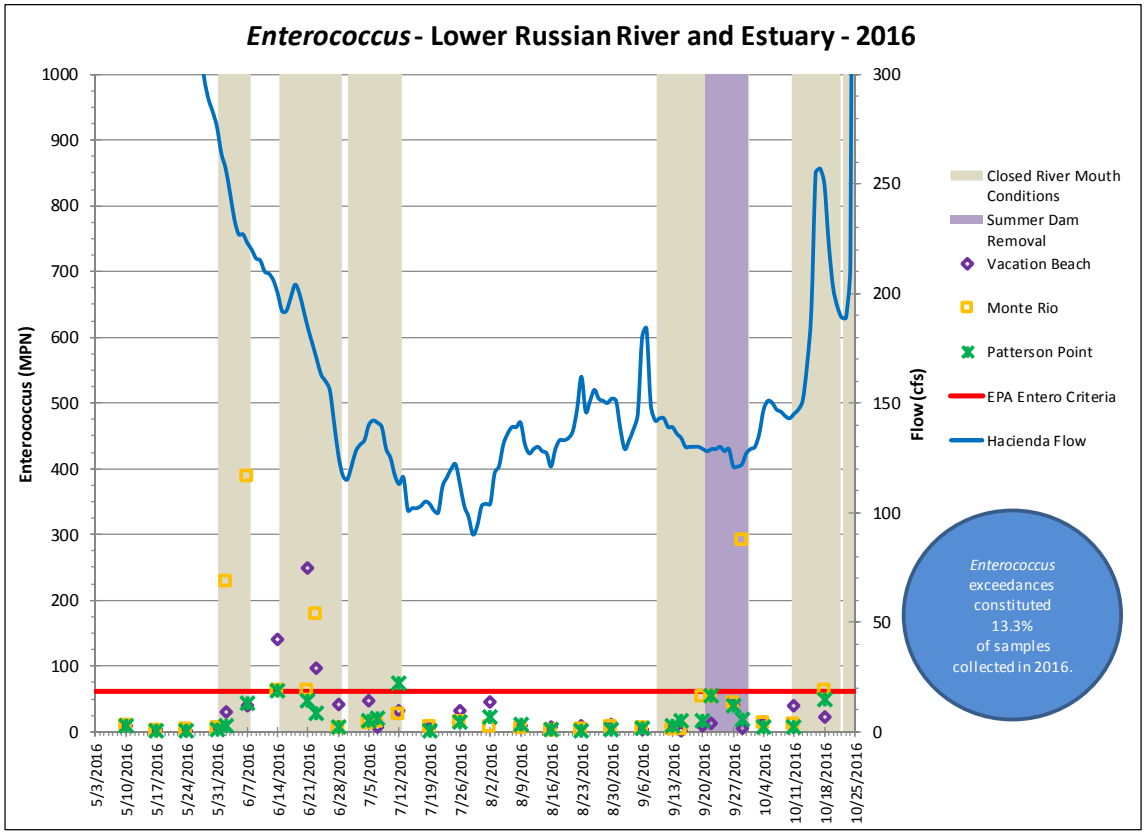


Figure 3-11. *Enterococcus* results for the Russian River from Vacation Beach to Patterson Point in 2016.

The EPA criteria for Total Nitrogen was exceeded twice at the Vacation Beach and Monte Rio stations and three times at Patterson Point with Hacienda flows ranging from 343 cfs to 468 cfs (Tables 3-8 through 3-10). All exceedances were observed to occur during open estuary conditions at the beginning of the season (Figure 3-12). In contrast, all three stations predominantly exceeded the EPA criteria for Total Phosphorous during the term of the Order and under Hacienda flows that ranged from 104 cfs to 468 cfs, continuing a trend of consistent exceedances observed in previous years (Tables 3-8 through 3-10). Interestingly, all three stations had concentrations below the EPA criteria for Total Phosphorus at least twice during the months of August and September, with open and closed estuary conditions and Hacienda flows ranging from 129 cfs to 181 cfs (Figure 3-13).

The EPA criteria for Turbidity was exceeded periodically at Vacation Beach throughout the season, and three times each at Monte Rio and Patterson Point (Tables 3-8 through 3-10). Exceedances were observed to occur during open and closed estuary conditions with Hacienda flows ranging from 104 cfs to 377 cfs (Figure 3-14). Streamflow over the Vacation Beach summer dam and through the fish ladder is likely contributing to the elevated turbidity values at the Vacation Beach station.

Algal (*chlorophyll a*) results exceeded the EPA criteria at all three stations periodically throughout the season, under open and closed conditions and Hacienda flows that ranged from 104 cfs to 468 cfs (Tables 3-8 through 3-10 and Figure 3-15). However, algal concentrations and exceedances were observed to be more pronounced during the first half of the season when flows were still declining from spring storm events (Figure 3-15).

Table 3-8. 2016 Vacation Beach nutrient grab sample results. This site experiences freshwater conditions.

Vacation Beach	Time	Temperature	pH	Total Organic Nitrogen	Ammonia as N	Ammonia as N Unionized	Nitrate as N	Nitrite as N	Total Kjeldahl Nitrogen	Total Nitrogen**	Phosphorus, Total	Total Orthophosphate	Dissolved Organic Carbon	Total Organic Carbon	Total Dissolved Solids	Turbidity	Chlorophyll-a	USGS 11467000 RR near Guerneville (Hacienda)***
MDL*				0.200	0.10	0.00010	0.030	0.030	0.10		0.020	0.020	0.0400	0.0400	4.2	0.020	0.000050	Flow Rate****
Date		°C		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	mg/L	(cfs)
5/10/2016	11:30	17.3	8.1	ND	ND	ND	0.29	ND	ND	**0.46**	**0.036**	0.069	1.32	1.92	180	2.2	**0.0051**	468
5/17/2016	11:30	20.5	8.0	1	ND	ND	0.21	0.061	1	**1.3**	**0.034**	0.078	1.46	1.86	190	**2.6**	**0.0029**	377
5/24/2016	12:20	18.6	8.1	ND	ND	ND	0.16	ND	ND	0.3	**0.033**	0.083	0.81	1.14	170	1.6	0.0010	343
5/31/2016	11:50	21.0	8.0	ND	ND	ND	0.15	0.061	ND	0.35	**0.036**	0.062	1.43	1.85	170	1.8	**0.0023**	277
6/2/2016	14:20	22.9	8.2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	259
6/7/2016	10:40	20.9	8.1	ND	ND	ND	0.077	ND	ND	0.25	**0.031**	0.052	1.44	1.90	140	1.4	**0.0020**	224
6/14/2016	11:10	20.8	8.2	ND	ND	ND	0.05	ND	ND	0.22	**0.034**	0.05	1.87	2.13	170	1.3	**0.0024**	202
6/21/2016	10:20	21.8	8.1	ND	ND	ND	0.045	ND	ND	0.15	**0.031**	0.071	1.61	2.30	170	1.2	**0.0050**	186
6/23/2016	11:10	22.9	8.1	ND	ND	ND	ND	ND	ND	0.18	**0.031**	0.06	1.36	2.11	180	**2.4**	**0.0034**	170
6/28/2016	12:40	24.3	8.1	ND	ND	ND	ND	ND	ND	0.18	**0.028**	0.068	1.61	2.23	160	2.0	**0.0034**	127
7/5/2016	10:00	21.9	8.0	ND	ND	ND	ND	ND	ND	0.14	**0.037**	0.063	1.96	2.30	150	**2.9**	**0.0024**	140
7/7/2016	12:20	23.1	8.0	ND	ND	ND	ND	ND	ND	0.1	**0.029**	0.031	1.82	1.77	180	**2.5**	**0.0026**	141
7/12/2016	9:40	23.3	8.1	0.24	ND	ND	ND	ND	0.24	0.24	**0.030**	0.050	1.64	1.91	150	2.0	0.0009	113
7/19/2016	9:40	23.3	8.0	ND	ND	ND	ND	ND	ND	0.14	**0.030**	0.058	1.72	2.07	150	2.0	**0.0022**	104
7/26/2016	9:40	23.5	7.9	ND	ND	ND	ND	ND	ND	0.14	**0.029**	0.049	1.62	2.31	150	1.8	0.0011	113
8/2/2016	9:40	23.5	7.9	ND	ND	ND	ND	ND	ND	0.14	**0.031**	0.072	1.58	2.14	140	2.1	**0.0020**	104
8/9/2016	10:50	22.5	7.9	ND	ND	ND	ND	ND	ND	0.14	**0.023**	0.046	1.45	2.22	140	2.2	0.0012	141
8/16/2016	11:10	22.5	7.9	ND	ND	ND	ND	ND	ND	0.14	**0.025**	0.059	1.65	2.19	250	1.7	0.0017	121
8/23/2016	11:30	21.8	7.9	ND	ND	ND	ND	ND	ND	0.1	0.021	0.054	1.20	0.96	140	2.0	0.0014	162
8/30/2016	11:40	21.5	7.8	ND	0.1	0.0029	ND	ND	ND	0.1	ND	0.055	1.48	2.03	140	1.4	0.0007	152
9/6/2016	11:00	21.2	8.0	ND	ND	ND	ND	ND	ND	0.18	ND	0.05	1.88	2.13	120	**2.7**	0.0005	181
9/13/2016	11:20	20.2	7.9	ND	ND	ND	ND	ND	ND	0.1	0.021	0.056	1.63	2.18	150	1.6	0.00064	140
9/15/2016	12:10	20.0	7.9	ND	ND	ND	0.022		ND	0.092	0.020	0.034	1.59	2.33	140	**2.4**	0.00032	136
9/20/2016	11:20	20.9	7.8	ND	ND	ND	ND	ND	ND	0.14	0.021	0.037	1.49	1.84	120	2.0	0.0003	129
9/22/2016	10:50	19.6	7.7	ND	ND	ND	ND	ND	ND	0.1	**0.024**	0.054	1.67	1.89	130	2.1	0.0011	130
9/27/2016	10:20	19.6	7.8	ND	ND	ND	ND	ND	ND	0.10	**0.022**	0.06	1.73	1.79	140	**3.5**	0.0005	121
9/29/2016	12:50	20.0	7.7	ND	ND	ND	ND	ND	ND	0.10	**0.026**	0.083	1.48	1.77	130	**2.7**	0.0007	122
10/4/2016	11:10	16.9	7.7	ND	ND	ND	ND	ND	ND	0.14	**0.027**	0.041	1.70	1.89	120	**2.7**	0.0010	147
10/11/2016	11:00	17.2	7.8	ND	ND	ND	ND	ND	ND	0.10	**0.023**	0.056	1.74	1.96	130	**3.8**	**0.0020**	142
10/18/2016	0:00	16.3	7.7	ND	ND	ND	0.1	ND	ND	0.21	**0.050**	0.11	2.80	3.92	3500	**3.6**	**0.0018**	240

* Method Detection Limit - limits can vary for individual samples depending on matrix interference and dilution factors, all results are preliminary and subject to final revision.

** Total nitrogen is calculated through the summation of the different components of total nitrogen: organic and ammoniacal nitrogen (together referred to as Total Kjeldahl Nitrogen or TKN) and nitrate/nitrite nitrogen.

*** United States Geological Survey (USGS) Continuous-Record Gaging Station

**** Flow rates are preliminary and subject to final revision by USGS.

Recommended EPA Criteria based on Aggregate Ecoregion III

Total Phosporus: 0.02188 mg/L (21.88 ug/L) ≈ 0.022 mg/L

Chlorophyll *a* : 0.00178 mg/L (1.78 ug/L) ≈ 0.0018 mg/L

Total Nitrogen: 0.38 mg/L

Turbidity: 2.34 FTU/NTU

Table 3-9. 2016 Monte Rio nutrient grab sample results. This site experiences freshwater conditions.

Monte Rio	Time	Temperature	pH	Total Organic Nitrogen	Ammonia as N	Ammonia as N Unionized	Nitrate as N	Nitrite as N	Total Kjeldahl Nitrogen	Total Nitrogen**	Phosphorus, Total	Total Orthophosphate	Dissolved Organic Carbon	Total Organic Carbon	Total Dissolved Solids	Turbidity	Chlorophyll-a	USGS 11467000 RR near Guerneville (Hacienda)***
MDL*				0.200	0.10	0.00010	0.030	0.030	0.10		0.020	0.020	0.0400	0.0400	4.2	0.020	0.000050	Flow Rate****
Date		°C		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	mg/L	(cfs)
5/10/2016	11:10	15.6	7.9	0.21	ND	ND	0.29	0.057	0.21	**0.56**	**0.040**	0.081	1.53	1.94	180	1.7	**0.0063**	468
5/17/2016	11:10	19.8	7.8	ND	ND	ND	0.21	0.06	ND	**0.44**	**0.037**	0.078	1.49	1.90	180	**2.4**	**0.0033**	377
5/24/2016	12:00	17.9	8.0	ND	ND	ND	0.16	ND	ND	0.34	**0.040**	0.091	0.86	1.12	180	1.8	0.0015	343
5/31/2016	11:30	21.0	7.9	ND	ND	ND	0.14	0.061	ND	0.34	**0.036**	0.058	1.64	1.86	160	1.4	**0.0022**	277
6/2/2016	14:00	22.4	8.0	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	259
6/7/2016	10:20	21.9	8.2	ND	ND	ND	ND	ND	ND	0.14	**0.026**	0.059	1.53	1.96	150	1.1	**0.0035**	224
6/14/2016	10:50	21.4	8.1	ND	ND	ND	0.049	ND	ND	0.15	**0.027**	0.046	1.48	2.22	170	1.5	0.0017	202
6/21/2016	10:10	21.5	8.0	0.21	ND	ND	ND	ND	0.21	0.21	**0.034**	0.047	1.48	2.27	170	1.1	**0.0060**	186
6/23/2016	10:50	22.9	8.1	ND	ND	ND	0.04	ND	ND	0.22	**0.035**	0.067	1.46	2.14	160	1.9	**0.0035**	170
6/28/2016	12:20	24.0	7.8	ND	ND	ND	ND	ND	ND	0.07	**0.049**	0.100	1.52	2.21	160	1.9	0.0017	127
7/5/2016	9:40	21.9	7.9	ND	ND	ND	ND	ND	ND	0.1	**0.039**	0.067	1.91	2.32	150	2.2	**0.0040**	140
7/7/2016	12:00	23.3	7.9	ND	ND	ND	0.041	ND	ND	0.15	**0.032**	0.042	1.64	1.87	170	1.7	**0.0028**	141
7/12/2016	9:20	23.4	7.8	ND	ND	ND	ND	ND	ND	0.14	**0.035**	0.065	1.62	1.91	150	1.4	**0.0022**	113
7/19/2016	9:20	23.1	7.9	ND	ND	ND	ND	ND	ND	0.1	**0.032**	0.078	1.97	2.01	150	**2.6**	**0.0022**	104
7/26/2016	9:20	23.8	7.9	ND	ND	ND	ND	ND	ND	0.17	**0.039**	0.061	1.81	2.19	170	2.0	0.0016	113
8/2/2016	9:25	23.2	7.8	ND	ND	ND	ND	ND	ND	0.21	**0.032**	0.061	1.77	2.20	140	1.8	0.0016	104
8/9/2016	10:20	22.4	7.8	ND	ND	ND	ND	ND	ND	0.07	**0.027**	0.050	1.44	2.20	140	2.0	0.0013	141
8/16/2016	10:50	22.3	7.8	ND	ND	ND	ND	ND	ND	0.14	**0.029**	0.055	1.39	1.60	220	1.1	0.0012	121
8/23/2016	11:05	21.6	7.8	ND	ND	ND	ND	ND	ND	0.14	ND	0.039	1.13	1.08	140	1.3	0.0014	162
8/30/2016	11:20	21.1	7.8	ND	ND	ND	ND	ND	ND	0.14	**0.029**	0.055	1.46	2.13	140	1.0	**0.0019**	152
9/6/2016	10:50	20.8	7.9	ND	ND	ND	ND	ND	ND	0.07	0.021	0.054	1.61	2.16	110	1.8	0.0010	181
9/13/2016	11:00	19.8	7.8	ND	ND	ND	ND	ND	ND	0.1	**0.022**	0.052	1.68	2.33	140	1.2	0.00096	140
9/15/2016	11:50	19.9	7.8	ND	ND	ND	ND	ND	ND	0.18	**0.025**	0.042	1.88	2.50	150	2.0	0.00096	136
9/20/2016	10:50	21.1	7.8	ND	ND	ND	ND	ND	ND	0.18	**0.024**	0.048	1.74	1.86	130	1.4	0.0003	129
9/22/2016	10:40	20.1	7.8	ND	ND	ND	ND	ND	ND	0.07	**0.024**	0.038	1.48	1.87	150	0.7	0.00060	130
9/27/2016	10:00	19.8	7.7	ND	ND	ND	ND	ND	ND	0.07	**0.022**	0.056	1.72	2.07	140	1.7	0.0005	121
9/29/2016	12:30	20.0	7.7	ND	ND	ND	ND	ND	ND	0.1	**0.030**	0.067	1.78	1.94	130	1.3	0.0002	122
10/4/2016	10:50	16.8	7.6	ND	ND	ND	ND	ND	ND	0.19	**0.039**	0.087	1.53	2.05	130	1.3	0.0003	147
10/11/2016	10:40	17.1	7.8	ND	ND	ND	0.14	ND	ND	0.18	**0.030**	0.060	1.55	1.97	130	**2.5**	0.0016	142
10/18/2016	10:20	16.7	7.7	ND	ND	ND	0.11	ND	ND	0.28	**0.072**	0.180	3.26	3.92	170	1.5	0.0014	240

* Method Detection Limit - limits can vary for individual samples depending on matrix interference and dilution factors, all results are preliminary and subject to final revision.

** Total nitrogen is calculated through the summation of the different components of total nitrogen: organic and ammoniacal nitrogen (together referred to as Total Kjeldahl Nitrogen or TKN) and nitrate/nitrite nitrogen.

*** United States Geological Survey (USGS) Continuous-Record Gaging Station

**** Flow rates are preliminary and subject to final revision by USGS.

Recommended EPA Criteria based on Aggregate Ecoregion III

Total Phosporus: 0.02188 mg/L (21.88 ug/L) ≈ 0.022 mg/L

Chlorophyll *a* : 0.00178 mg/L (1.78 ug/L) ≈ 0.0018 mg/L

Total Nitrogen: 0.38 mg/L

Turbidity: 2.34 FTU/NTU

Table 3-10. 2016 Patterson Point nutrient grab sample results. This site experiences freshwater conditions.

Patterson Point	Time	Temperature	pH	Total Organic Nitrogen	Ammonia as N	Ammonia as N Unionized	Nitrate as N	Nitrite as N	Total Kjeldahl Nitrogen	Total Nitrogen**	Phosphorus, Total	Total Orthophosphate	Dissolved Organic Carbon	Total Organic Carbon	Total Dissolved Solids	Turbidity	Chlorophyll-a	USGS 11467000 RR near Guerneville (Hacienda)***
MDL*				0.200	0.10	0.00010	0.030	0.030	0.10		0.020	0.020	0.0400	0.0400	4.2	0.020	0.000050	Flow Rate****
Date		℃		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	mg/L	(cfs)
5/10/2016	11:00	16.6	7.9	0.21	ND	ND	0.29	ND	0.21	**0.5**	**0.040**	0.081	1.55	1.97	180	2.1	**0.0041**	468
5/17/2016	10:50	20.1	7.9	ND	ND	ND	0.21	0.06	ND	**0.44**	**0.047**	0.074	1.46	1.86	180	1.8	0.0014	377
5/24/2016	11:40	18.1	8.0	0.32	ND	ND	0.17	ND	0.32	**0.49**	**0.031**	0.083	0.93	1.24	180	1.4	0.0007	343
5/31/2016	10:50	21.4	8.0	ND	ND	ND	0.15	0.061	ND	0.31	**0.036**	0.062	1.46	1.89	170	2.2	**0.0021**	277
6/2/2016	13:40	22.6	8.1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	259
6/7/2016	10:00	21.7	8.1	ND	ND	ND	0.065	ND	ND	0.24	**0.024**	0.055	1.61	1.89	150	2.1	**0.0058**	224
6/14/2016	10:30	21.3	8.1	0.24	ND	ND	0.058	ND	0.24	0.31	**0.026**	0.054	1.57	2.44	170	1.4	**0.0024**	202
6/21/2016	9:40	21.5	8.2	ND	ND	ND	ND	ND	ND	0.1	**0.036**	0.051	1.40	2.38	170	1.0	**0.0039**	186
6/23/2016	10:10	22.6	8.1	0.21	ND	ND	ND	ND	0.21	0.21	**0.035**	0.067	1.52	2.25	160	1.7	**0.0027**	170
6/28/2016	11:50	23.7	7.8	0.24	ND	ND	ND	ND	0.24	0.24	**0.043**	0.096	1.65	2.27	160	2.2	**0.002**	127
7/5/2016	9:20	21.7	7.9	ND	ND	ND	0.04	ND	ND	0.18	**0.036**	0.09	1.79	2.24	150	2.1	0.0015	140
7/7/2016	11:10	22.6	7.9	ND	ND	ND	ND	ND	ND	0.14	**0.037**	0.073	1.75	1.89	160	1.6	**0.0035**	141
7/12/2016	8:50	23.1	7.9	ND	ND	ND	ND	ND	ND	0.18	**0.038**	0.069	1.57	1.92	140	2.2	**0.0024**	113
7/19/2016	9:00	22.2	7.8	ND	ND	ND	0.041	ND	ND	0.22	**0.034**	0.086	1.89	2.04	170	**3.0**	0.0011	104
7/26/2016	9:00	23.0	7.6	ND	ND	ND	ND	ND	ND	0.17	**0.035**	0.068	1.77	2.12	170	**2.40**	0.0013	113
8/2/2016	9:00	22.7	7.8	0.21	ND	ND	ND	ND	0.21	0.24	**0.033**	0.068	1.47	2.19	140	**2.4**	0.0012	104
8/9/2016	9:50	22.1	7.8	ND	ND	ND	ND	ND	ND	0.1	**0.027**	0.065	1.35	2.31	140	2.2	0.0015	141
8/16/2016	10:30	21.9	7.8	ND	ND	ND	ND	ND	ND	0.070	**0.026**	0.059	1.40	1.52	240	1.2	0.0012	121
8/23/2016	10:10	21.7	7.9	ND	ND	ND	ND	ND	ND	0.1	0.021	0.05	1.13	1.27	150	1.8	0.0014	162
8/30/2016	10:40	21.2	8.1	ND	ND	ND	ND	ND	ND	0.1	0.021	0.055	1.17	2.05	140	1.8	0.0016	152
9/6/2016	10:30	20.8	8.0	ND	ND	ND	ND	ND	ND	0.21	ND	0.058	1.60	2.01	130	1.6	0.0012	181
9/13/2016	10:30	19.8	7.8	ND	ND	ND	ND	ND	ND	0.10	0.021	0.05	1.67	2.40	170	1.0	0.00080	140
9/15/2016	11:00	20.0	7.8	ND	ND	ND	ND		ND	0.1	**0.022**	0.042	1.60	2.56	570	1.50	0.00064	136
9/20/2016	10:30	20.8	7.8	0.24	ND	ND	ND	ND	0.24	0.24	**0.024**	0.048	1.56	1.87	130	2.00	0.00060	129
9/22/2016	10:10	20.0	7.7	ND	ND	ND	ND	ND	ND	0.07	0.020	0.042	1.49	1.94	130	1.2	0.00090	130
9/27/2016	9:40	20.3	7.8	ND	ND	ND	ND	ND	ND	0.14	**0.025**	0.052	1.55	2.05	140	1.4	0.0012	121
9/29/2016	12:00	20.4	7.9	ND	ND	ND	ND	ND	ND	0.10	**0.026**	0.13	1.62	1.77	130	1.2	0.00050	122
10/4/2016	10:20	16.8	7.5	ND	ND	ND	ND	ND	ND	0.08	**0.030**	0.041	1.47	2.08	84	1.2	ND	147
10/11/2016	10:10	17.2	7.9	ND	ND	ND	0.14	ND	ND	0.21	**0.027**	0.068	1.56	2.16	130	1.9	0.0012	142
10/18/2016	9:50	16.6	7.7	ND	ND	ND	0.079	ND	ND	0.15	**0.065**	0.17	2.36	3.59	160	1.0	0.00089	240

* Method Detection Limit - limits can vary for individual samples depending on matrix interference and dilution factors, all results are preliminary and subject to final revision.

** Total nitrogen is calculated through the summation of the different components of total nitrogen: organic and ammoniacal nitrogen (together referred to as Total Kjeldahl Nitrogen or TKN) and nitrate/nitrite nitrogen.

*** United States Geological Survey (USGS) Continuous-Record Gaging Station

**** Flow rates are preliminary and subject to final revision by USGS.

Recommended EPA Criteria based on Aggregate Ecoregion III

Total Phosporus: 0.02188 mg/L (21.88 ug/L) ≈ 0.022 mg/L

Chlorophyll *a* : 0.00178 mg/L (1.78 ug/L) ≈ 0.0018 mg/L

Total Nitrogen: 0.38 mg/L

Turbidity: 2.34 FTU/NTU

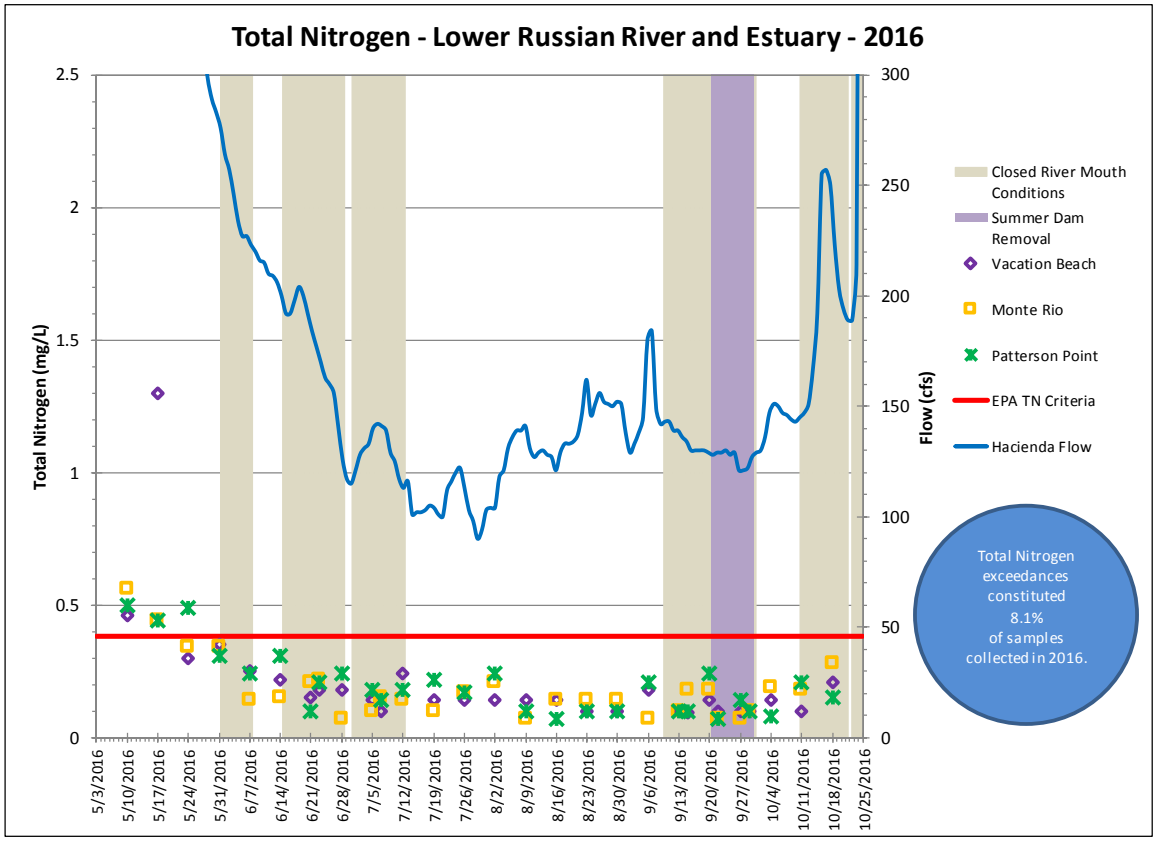


Figure 3-12. Total Nitrogen results for the Russian River from Vacation Beach to Patterson Point in 2016.

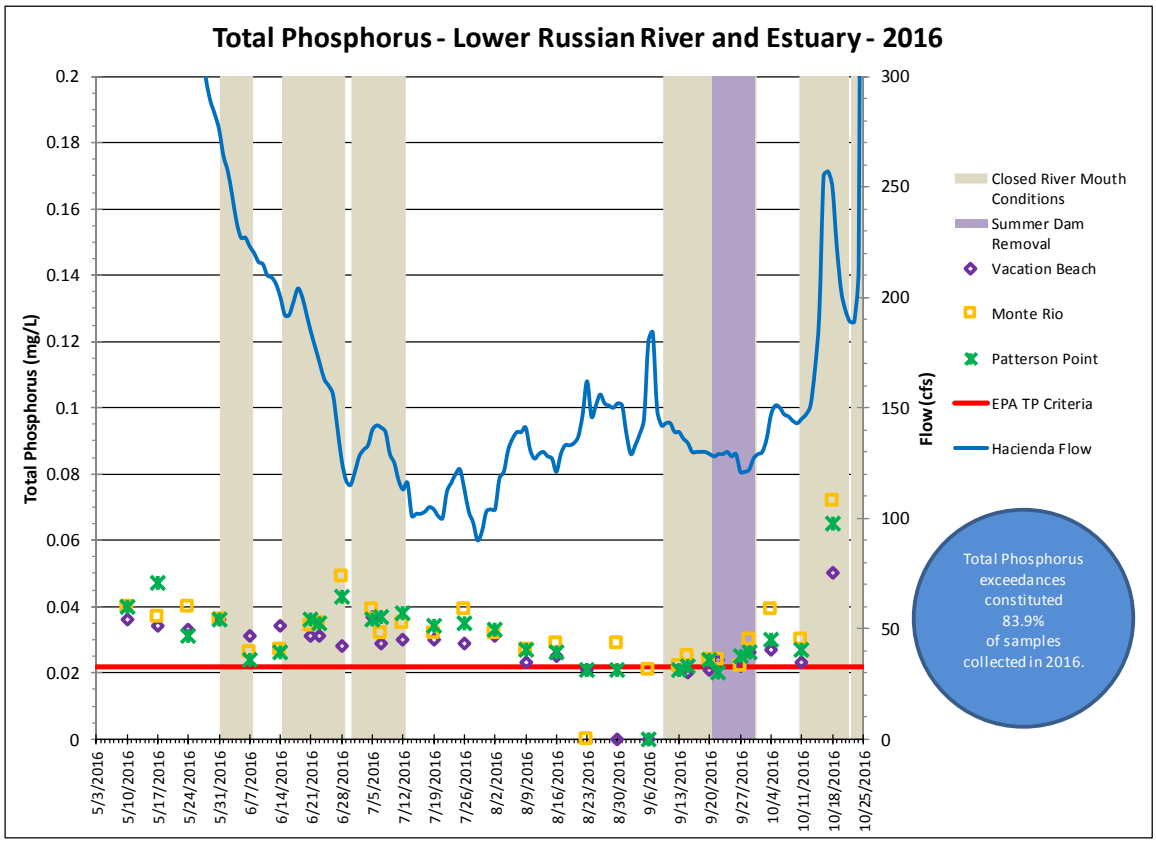


Figure 3-13. Total Phosphorus results for the Russian River from Vacation Beach to Patterson Point in 2016.

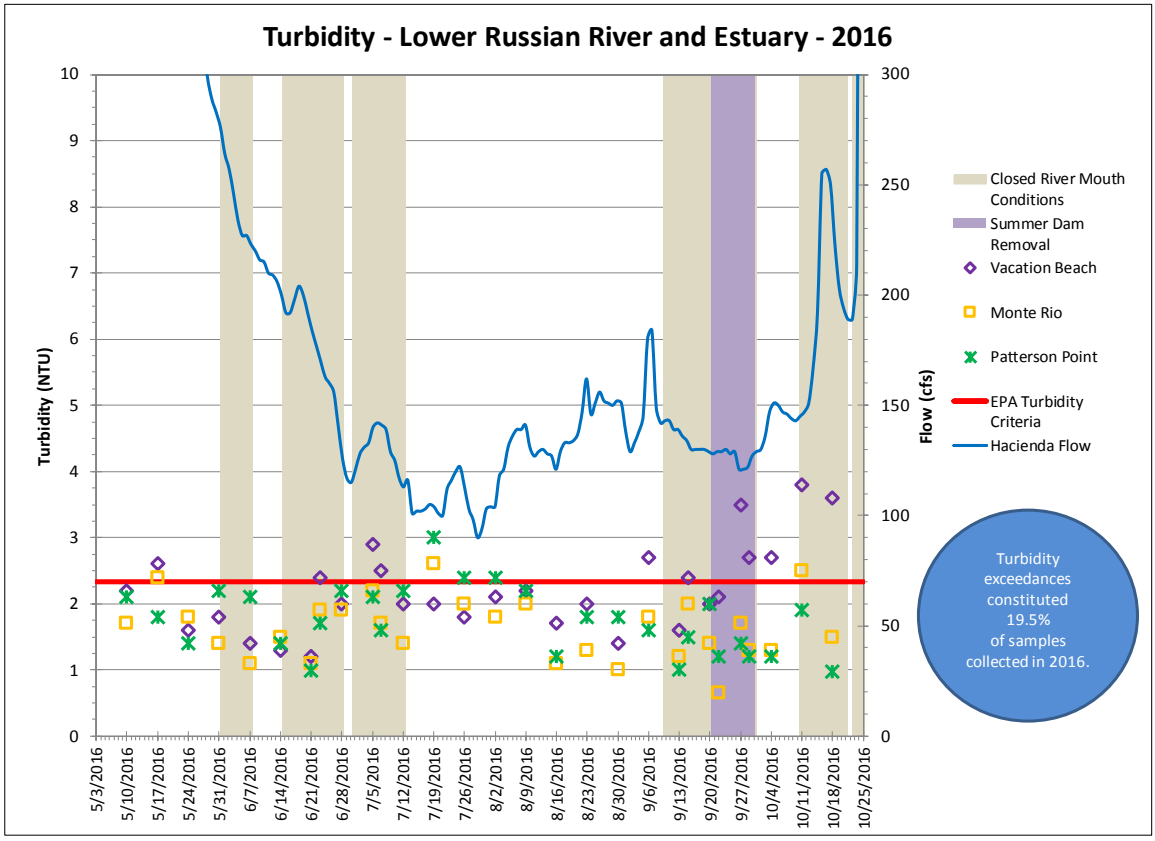


Figure 3-14. Turbidity results for the Russian River from Vacation Beach to Patterson Point in 2016.

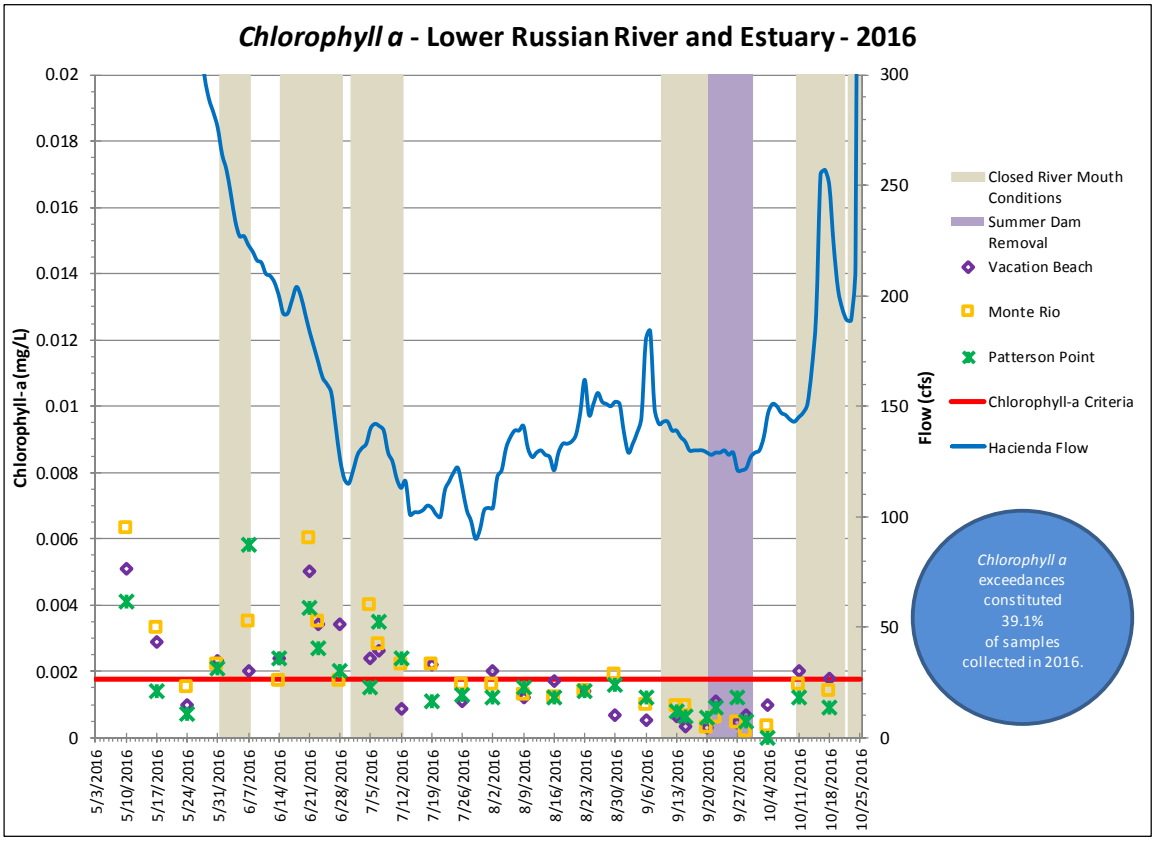


Figure 3-15. ***Chlorophyll a*** **results for the Russian River from Vacation Beach to Patterson Point in 2016.**

4.0 Additional Monitoring

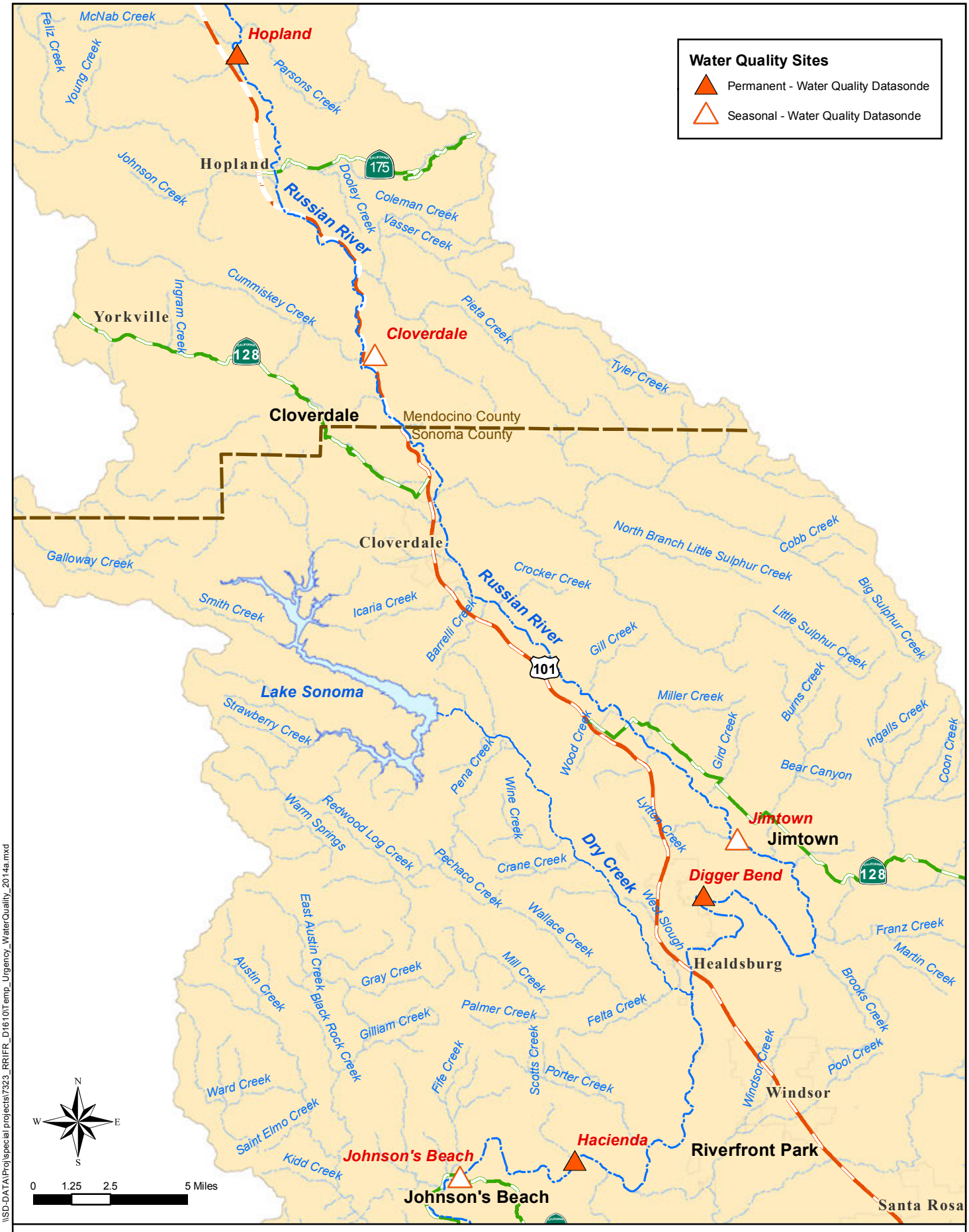
4.1 Water Agency and USGS Permanent and Seasonal Datasondes

In coordination with the USGS the Water Agency maintains three, multi-parameter water quality sondes on the Russian River located at Russian River near Hopland, Russian River at Digger Bend near Healdsburg, and Russian River near Guerneville (aka Hacienda). These three sondes are referred to as "permanent" because the Water Agency maintains them as part of its early warning detection system for use year-round (Figure 4.1). The sondes take real time readings of water temperature, pH, dissolved oxygen content (DO), specific conductivity, turbidity, and depth, every 15 minutes.

In addition to the permanent sondes, the Water Agency, in cooperation with the USGS, installed three seasonal sondes with real-time telemetry at the USGS river gage station at Russian River near Cloverdale (north of Cloverdale at Comminsky Station Road), at the gage station at Russian River at Jimtown (Alexander Valley Road Bridge), and at Johnson's Beach in Guerneville (Figure 4.1). The two seasonal sondes at Cloverdale and Jimtown are included by the USGS on its "Real-time Data for California" website: https://waterdata.usgs.gov/ca/nwis/rt.

The data collected by the sondes described above are evaluated in Section 4.2 in response to the terms of the SWRCB TUC Order to evaluate whether and to what extent the reduced flows authorized by the Order caused any impacts to water quality or availability of aquatic habitat for salmonids. In addition,

the 2016 data will help provide information to evaluate potential changes to water quality and availability of habitat for aquatic resources resulting from the proposed permanent changes to D1610 minimum instream flows that are mandated by the Biological Opinion and will be included in the Biological Opinion Annual Monitoring Report. The annual report will be available on the Water Agency's website: http://www.scwa.ca.gov/bo-annual-report/.



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Water Agency and USGS Russian River Mainstem
Permanent and Seasonal Datasonde Monitoring Stations

This Map is for general reference only.

Figure 4-1

4.2 Aquatic Habitat for Salmonids

4.2.1 Introduction

In Term 6(b) of the Temporary Urgency Change Order (Order), the State Water Resource Control Board (SWRCB) tasked the Water Agency with evaluating the effects of reductions in minimum instream flows authorized by the Order on water quality and the availability of aquatic habitat for Russian River salmonids. This section of the report summarizes temperature and dissolved oxygen conditions in the Russian River during the Order and relates these conditions to fisheries monitoring data collected by the Water Agency.

4.2.2 Russian River Salmonid Life Stages

Salmonids in the Russian River can be affected by water temperature and dissolved oxygen (DO) changes at multiple life stages. The Russian River supports three species of salmonids: coho salmon (*Oncorhynchus kisutch*), steelhead (*Oncorhynchus mykiss*), and Chinook salmon (*Oncorhynchus tshawytscha)*. These species follow a similar life history pattern. Adults migrate from the ocean to the river and move upstream to spawn in the fall and winter. Females dig nests called redds in the stream substrate and deposit eggs that remain in the redd for several weeks before hatching. After hatching, the larval fish remain in the gravel for several more weeks before emerging. After emerging from the gravel these young salmonids are identified first as fry and then later as parr once they have undergone some freshwater growth. Parr rear for a few months (Chinook salmon) to 2 years (steelhead) in freshwater before undergoing a physiological change identified as smoltification. At this stage fish, identified as smolts, are physiologically able to adapt to living in saltwater, and are ready for ocean entry (Quinn 2005). In the Russian River smolts move downstream to the ocean in the spring (Chase et al. 2005 and 2007, Obedzinski et al. 2006). Salmonids spend several months to a few years at sea before returning to the river to spawn as adults (Moyle 2002). Because all three species of Russian River salmonids spend a period of time in the Russian River, they must cope with the freshwater conditions they encounter including water temperature, and DO. While all three species follow a similar life history, each species tends to spawn and rear in different locations and are present in the Russian River watershed at slightly different times. These subtle, but important, differences may expose each species to a different set of freshwater conditions.

Coho Timing and Distribution

Wild coho salmon have become scarce in the Russian River watershed and monitoring data relies mainly on fish released from the hatchery at the Warm Springs Dam as part of the Russian River Coho Salmon Captive Broodstock Program (RRCSCBP). Data collected on the Water Agency's Mirabel inflatable dam underwater video camera system from 2011 through 2013 indicate that the adult coho salmon run may start in late October and continue through at least January. The bulk of adult coho salmon migrate through the river from November through February. In 2013, 97% of coho were observed after 20 November (Martini-Lamb and Manning 2014). Spawning and rearing occurs in the tributaries to the Russian River (NMFS 2008). Downstream migrant trapping in tributaries of the Russian River indicate that the coho smolt out-migration starts before April and continues through mid-June (Obedzinski et al. 2006). Coho salmon smolts have been detected as late as mid-July in the mainstem Russian River downstream migrant traps operated by the Water Agency (Martini-Lamb and Manning 2011). Most

coho smolts emigrate from the Russian River from March through May. The water temperature and DO data relating to juvenile coho salmon rearing and smolt life stages will be analyzed in this report as these are the life stages likely to be present in the Russian River during the time period governed by the Order (1 May through 27 October, 2016).

Steelhead Timing and Distribution

Based on video monitoring at the Water Agency's Mirabel inflatable dam and returns to the Warm Springs Hatchery, the bulk of adult steelhead return to the Russian River after the Order would expire. Continuous underwater video monitoring at the Water Agency's Mirabel inflatable dam fro, late fall 2006 through spring 2007, timing of returns to the hatchery, and data gathered from steelhead angler report cards (SCWA unpublished data, Jackson 2007) suggests that adult steelhead return to the Russian River from December through March with the majority returning in January and February. Deflation of the inflatable dam and removal of the underwater video camera system preclude a precise measure of adult return timing or numbers.

Many steelhead spawn and rear in the tributaries of the Russian River while some steelhead rear in the upper mainstem Russian River (NMFS 2008, Cook 2003). Cook (2003) found that summer rearing steelhead in the mainstem of the Russian River were distributed in the highest concentrations between Hopland and Cloverdale (Canyon Reach). The Canyon Reach is the highest gradient section of the mainstem Russian River and contains fast water habitats that include riffles and cascades (Cook 2003). Steelhead were also found in relatively high numbers (when compared to habitats downstream of Cloverdale) in the section of river between the Coyote Valley Dam (Lake Mendocino) and Hopland. Both the Canyon and Ukiah reaches generally have cooler water temperatures when compared to other mainstem reaches due to releases made from Lake Mendocino.

The steelhead smolt migration in the Russian River begins at least as early as March and continues through June, peaking between March and May (Martini-Lamb and Manning 2011). For Russian River steelhead, parr (rearing) and smolt life stages are present in the mainstem during the time period covered by the Order. Therefore only the temperature and DO data relating to the juvenile steelhead rearing and smolt life stages will be analyzed in this report.

Chinook Timing and Distribution

Based on video monitoring at the Water Agency's Mirabel inflatable dam, adult Chinook salmon are typically observed in the Russian River before coho and steelhead. Chinook enter the Russian River as early as September and the migration is complete by early February. For this report we have defined the adult Chinook migration period as October through December because generally the bulk of Chinook salmon pass the Mirabel inflatable dam from October through December. Chinook salmon are mainstem spawners and deposit their eggs into the stream bed of the mainstem Russian River and in Dry Creek (a tributary to the Russian River near Healdsburg) during the fall (Chase et al. 2005 and 2007, Cook 2003, Martini-Lamb and Manning 2011). Chinook offspring rear for approximately two to four months before out-migrating to sea in the spring. The bulk of Chinook salmon smolt out-migration occurs from April through June. The adult and smolt life stages are present in the mainstem Russian River during the time period covered by the Order. Therefore, water temperature and DO data relating to the Chinook salmon adult and smolt life stages will be analyzed for this report.

4.2.3 Methods

The Water Agency uses underwater video, dual frequency identification sonar (DIDSON), downstream migrant traps, and water quality data collected in the Russian River and Dry Creek to evaluate Russian River water quality conditions when salmonids where present. The Water Agency operates underwater video cameras and DIDSON to enumerate adult salmonids, and downstream migrant traps to enumerate salmonid smolts. USGS stream gages and Water Agency-operated data sondes were used to provide water quality data in the mainstem Russian River and In Dry Creek.

To estimate the number of adult Chinook salmon that return to the Russian River the Water Agency typically operates underwater video cameras in two fish ladders located on the east and west banks of the Russian River at Mirabel. However, a continuing construction project to improve fish passage at the Mirabel inflatable dam in 2016 created challenges in operating a video camera system at this site. In 2016 we experimented with one camera in the newly constructed fish ladder on the west bank, but were unable to operate a camera in the existing fish ladder on the east bank of the Russian River. In addition to the Mirabel camera system, the Water Agency counted adult salmon at a DIDSON at Dry Creek. The DIDSON collects sonar images of fish as they pass the sample site. This allows us to count fish across a larger area of the stream channel than can be captured by video images and collect images of fish during periods of high turbidity when an underwater camera would be ineffective. The resolution of DIDSON precludes the accurate identification of species, however fish can often be identified to the family lever (i.e. salmonidae). In addition to operating a DIDSON at Dry Creek the Water Agency experimented with an underwater video camera in a fish ladder at Memorial Beach near Healdsburg. This site is located on the mainstem Russian River upstream of Dry Creek. Data from these monitoring sites were used to determine when adult salmonids were present in the Russian River during 2016.

Physical habitat conditions (flow, water temperature, and DO) were collected at multiple sites in the Russian River. USGS (United States Geological Survey) stream gages located on the Russian River at Hacienda and Hopland provided flow, water temperature, and DO data. These water quality conditions were compared to findings in the literature and were used to construct temperature and DO criteria for Russian River salmonids (Table 4-1 through Table 4-4).

Table 4-1. Adult salmonid water temperature (°C) thresholds used for migration when describing water quality conditions during the term of the May 2016 temporary urgency change order. Criteria is from SCWA (2016).

Description	Chinook	Coho	Steelhead
optimal upper limit	15.6	11.1	11.1
suitable upper limit	17.8	15.0	15.0
stressful upper limit	19.4	21.1	21.1
acutely stressful upper limit	23.8	23.8	23.8
lethal	23.9	23.9	23.9

Table 4-2. Juvenile salmonid rearing temperature (°C) thresholds used for describing water quality conditions during the term of the May 2016 temporary urgency change order. Criteria is from SCWA (2016).

Description	Chinook	Coho	Steelhead
optimal upper limit	16.9	13.9	16.9
suitable upper limit	17.8	16.9	18.9
stressful upper limit	20.0	17.8	21.9
acutely stressful upper limit	23.8	23.8	23.8
lethal	23.9	23.9	23.9

Table 4-3. Salmonid smolting temperature (°C) thresholds used for describing water quality conditions during the term of the May 2016 temporary urgency change order. Criteria is from SCWA (2016).

Description	Chinook	Coho	Steelhead
optimal upper limit	16.9	10.0	11.1
suitable upper limit	17.8	13.9	12.8
stressful upper limit	20.0	16.9	15.0
acutely stressful upper limit	23.8	23.8	23.8
lethal	23.9	23.9	23.9

Table 4-4. Dissolved oxygen (mg/L) thresholds for all salmonid life stages used for describing water quality conditions during the term of the May 2016 temporary urgency change order. Criteria is from SCWA (2016).

Description	Dissolved Oxygen (mg/L)
optimal upper limit	>12
suitable upper limit	8.0-11.9
stressful upper limit	5.0-7.9
acutely stressful upper limit	3.0-4.9
lethal	<3

Salmonid counts are used to relate water quality conditions to the timing and magnitude of salmonid migrations. We compared fish counts with water quality information only where water quality stations

were in close proximity to fish counting station. The timing and magnitude of salmonid migrations and the water quality conditions these fish likely experienced can be understood by displaying water quality information with salmonids counts. Adult count data collected at Mirabel are paired with water quality data collected at Hacienda. Adult counts collected at the Healdsburg fish ladder are paired with water quality data from the USGS stream gage at Digger Bend. Dry Creek DIDSON adult counts are paired with water quality data collected in Dry Creek at the USGS stream gage at Lambert Bridge. The majority of steelhead rearing habitat in the mainstem Russian River occurs upstream of Hopland. For steelhead rearing in the mainstem Russian River his report presents the water quality data from the USGS Hopland gaging station and from the East Fork Russian River. Dry Creek is also used as rearing habitat by steelhead juveniles and steelhead rearing criteria is displayed with water quality data collected from the USGS stream gage at Lambert Bridge in Dry Creek. Smolts moving downstream out of Dry Creek first pass the Dry Creek downstream migrant trap then pass the Hacienda USGS stream gage before entering the ocean. Therefore Dry Creek salmonid smolt data has been paired with Dry Creek and Hacienda water quality data to describe the conditions these fish likely experienced as they migrated downstream out of Dry Creek and the lower Russian River.

4.2.4 Results

Flow

During the Order period from May 1 to October 27, 2016, flow in the Russian River at Hacienda ranged from a low of 90 cfs in July high of over 900 cubic feet per second (cfs) during a storm in late October. Flows at Hacienda during the Order were typically between 129 cfs and 222 cfs (25th and 75th percentiles of the instantaneous flow from the USGS stream gage at Hacienda (gage number 11467000). The Russian River was influenced by tributary in-flow until July, and was generally controlled by reservoir releases from July through early-October, and again by tributary inflow in late October.

During the period of the Order, 1,642 adult salmonids were observed at the Mirabel, Dry Creek and Healdsburg counting stations. However, some adult salmon may have been double counted since individuals counted at Healdsburg or Dry Creek would have first passed and may have been counted at Mirabel. At Mirabel, 826 Chinook salmon, 7 fish that had coho salmon characteristics, 2 adult steelhead, and 27 unidentified adult salmonids were observed during the Order. At Healdsburg, 241 Chinook, 2 fish that had coho characteristics, 1 steelhead adult, and 23 unidentified adult salmonids were observed during the Order. At the Dry Creek DIDSON, 513 adult salmonids were observed during the Order. The mouth of the Russian River was closed by a barrier beach for much of September (Figure 4-2). With the exception of 2 fish, all adult salmonids observed at our counting stations were observed after September 30, 2016. A barrier beach formed and closed the mouth of the Russian River on September 11, 2016, precluding fish entry, and remained intact until September 30, 2016.

Two significant rain events occurred in October 2016 that may have encouraged Chinook salmon to migrate upstream. The Russian River watershed received over 2 inches of rain between October 14 and October 16. In the 3 days following this rain event 415 adult salmonids were observed on video collected at Mirabel. The second rain storm delivered approximately 7 inches of rain between October 24 and October 31. We observed 100 adult Chinook at Mirabel on October 25, 2016, but many more likely passed undetected because water visibility was too poor to detect all fish passing Mirabel. Shortly after the Order expired the Mirabel dam was deflated in response to higher flows associated with a

storm event. The deflation of the Mirabel dam allowed for many adult Chinook to pass Mirabel undetected.

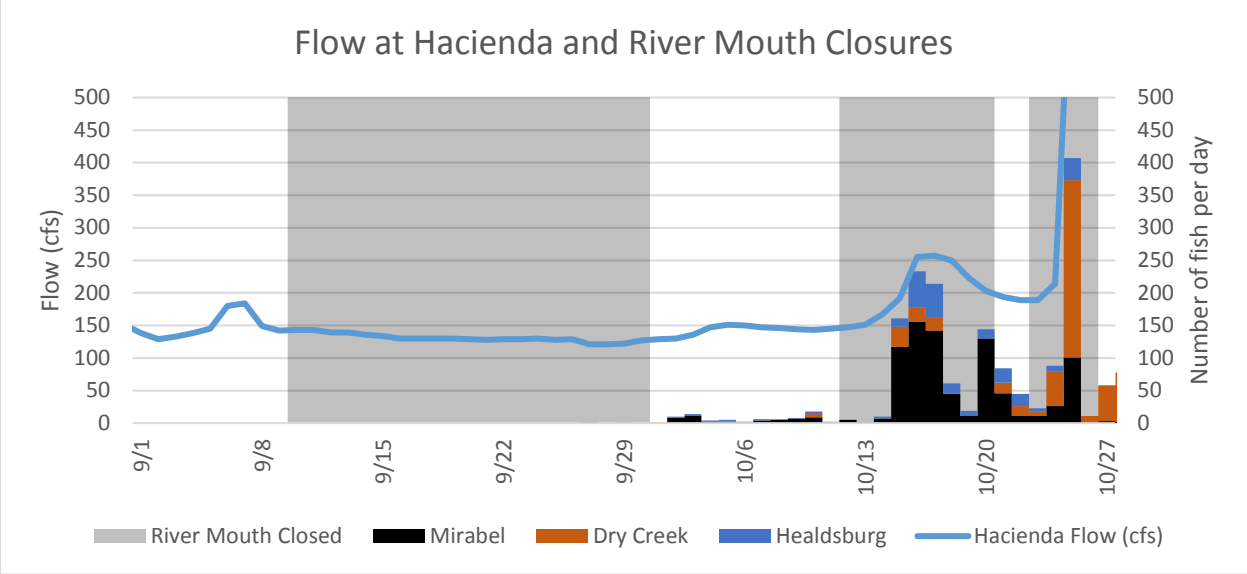

Figure 4-2. Flow in the Russian River at the USGS Hacienda stream gage (11467000) shown from 1 September 2016 to 27 October 2016. Times when the mouth of the Russian River was closed due to the formation of a barrier beach are shown as shaded areas. Also shown are the adult salmonid counts (the sum of adult Chinook, coho, steelhead, and unidentified salmonids) from underwater video collected at Mirabel and Healdsburg, and DIDSON collected on Dry Creek.

Temperature

Adult Salmonid Migration

During the Order we observed 563 adult salmonids that we were unable to identify to species, 1,067 adult Chinook, 9 fish that had coho characteristics, and 3 adult steelhead. It is important to note that the river mouth was closed for much of September and that the bulk of the adult salmonid run occurred after the end of the Order when water temperatures were suitable to optimal. Most of the unidentified adult salmonids observed on the Dry Creek DIDSON during the Order were likely Chinook based on run timing information from previous years of monitoring at Mirabel. After the Order expired many more adult salmonids were observed on the Dry Creek DIDSON. From 28 October 2016, to the end of December 2016, a total of 2,205 adult salmonids were observed on the Dry Creek DIDSON.

Water temperatures for Chinook salmon were favorable during the portion of the Order that overlaps with the Chinook adult migration (October). At the Hacienda gage the temperature ranged from optimal to acutely stressful for adult salmonids based on our criteria (Table 4-1). However, on days when adult salmonids were observed at the Mirabel counting station the maximum and minimum daily water temperature were declining and generally fell within the suitable range (Figure 4-3). Moving upstream from Hacienda, Chinook would experience water temperatures similar to Hacienda at Digger Bend and Jimtown, but significantly cooler at Hopland and in the East Fork Russian River near Coyote Valley Dam (Figures 4-3 through 4-7). Water temperatures in Dry Creek were optimal during the period of time that the Order overlaps with the adult Chinook migration (Figure 4-8).

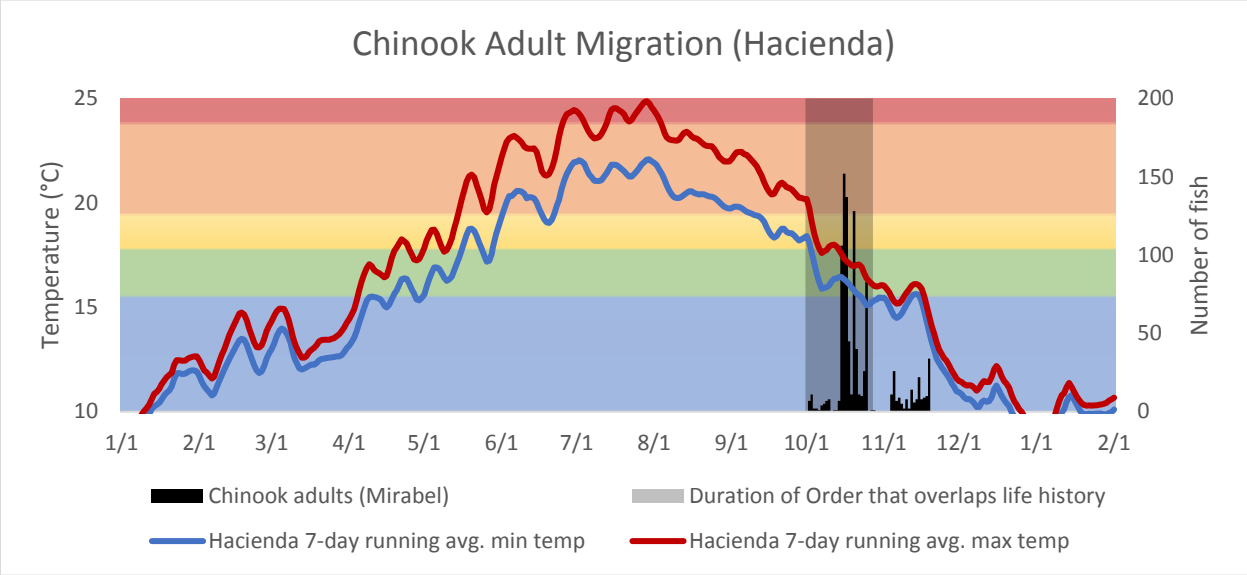

Figure 4-3. The 7-day running average of the minimum and maximum water temperatures collected at Hacienda (USGS gage number 11467000) shown with the Chinook counts from the mainstem Russian River at Mirabel. Also show are optimal, suitable, stressful, acutely stressful, and lethal water temperature thresholds for adult Chinook salmon based on Table 4-1.

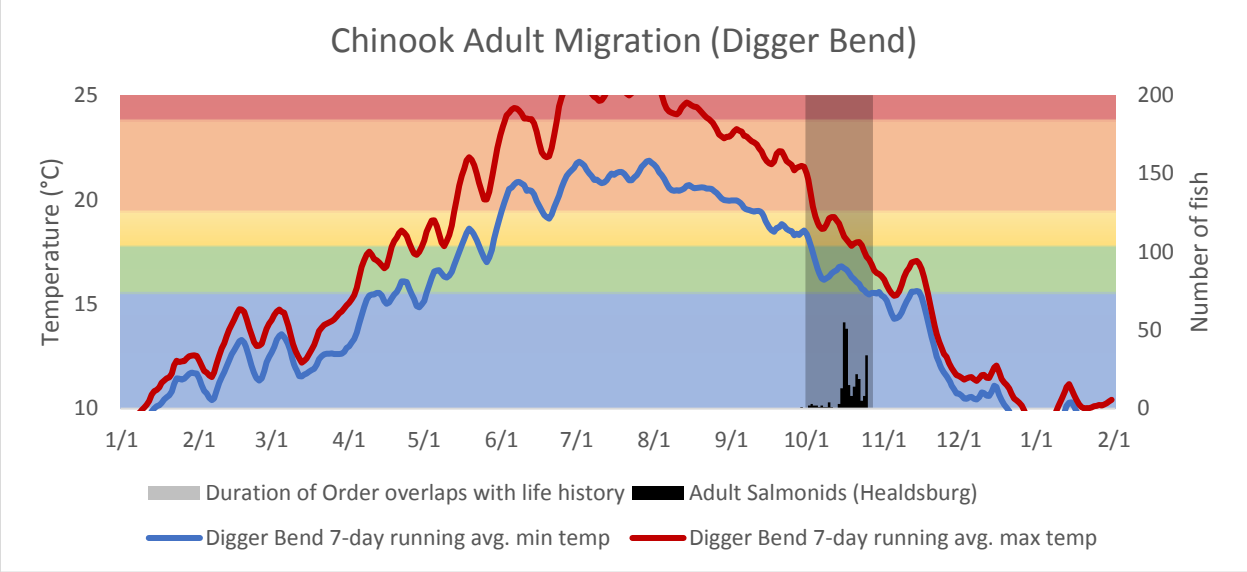

Figure 4-4. The 7-day running average of the minimum and maximum water temperatures collected at the USGS stream gage at Digger Bend (11463980) shown with the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for Chinook adult migration based on Table 4-1.

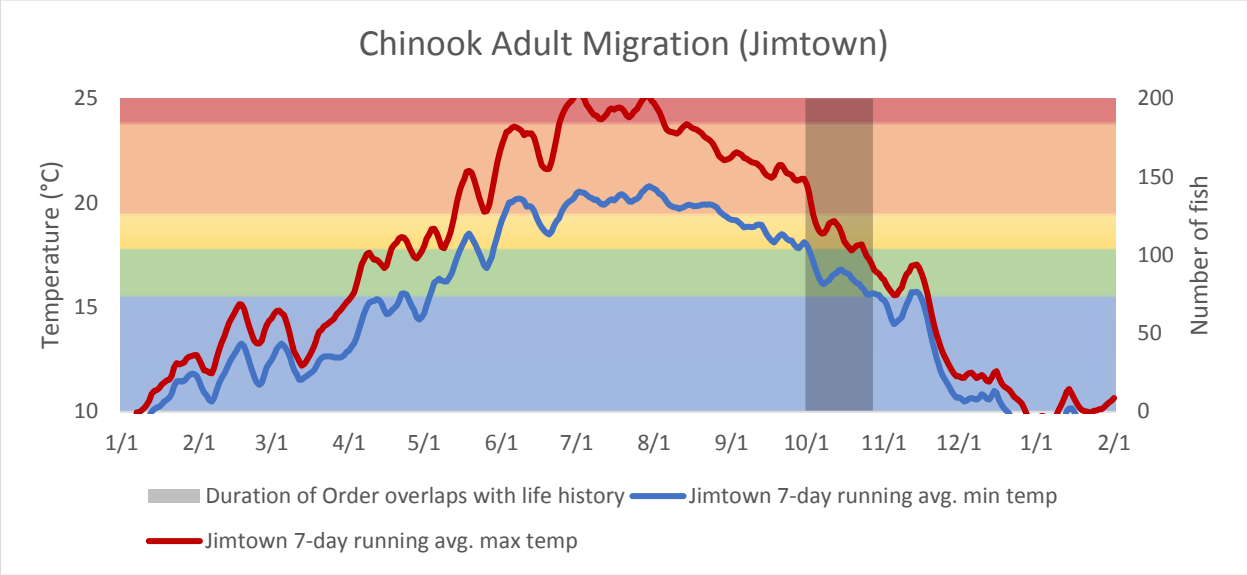

Figure 4-5. The 7-day running average of the minimum and maximum water temperatures collected at the USGS stream gage at Jimtown (USGS gage number 11463682) shown with the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for Chinook adult migration based on Table 4-1.

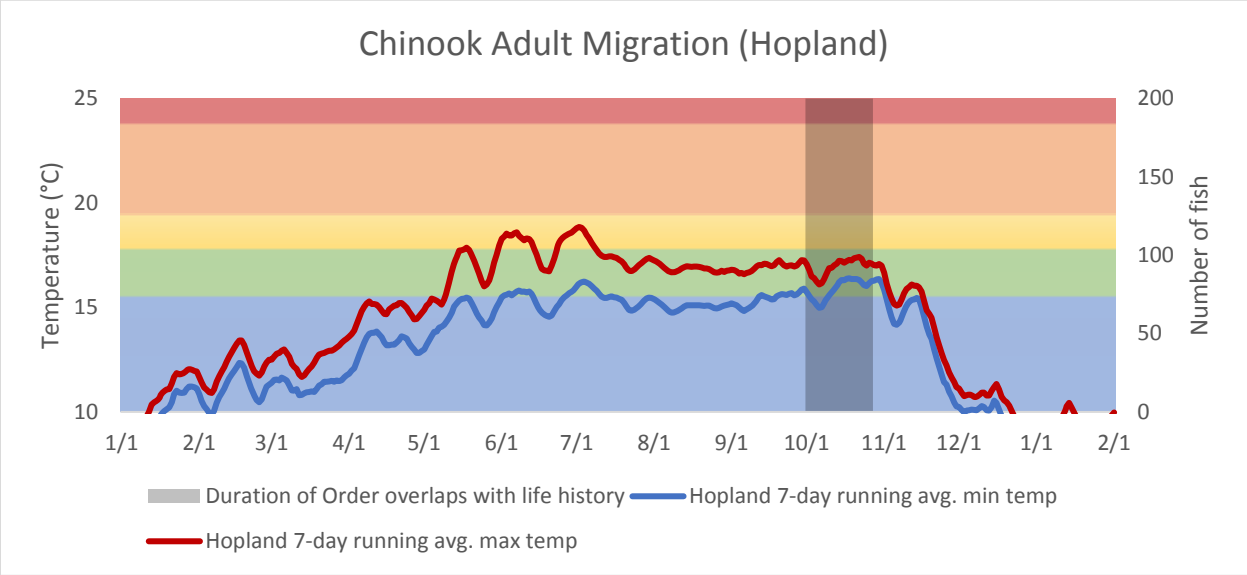

Figure 4-6. The 7-day running average of the minimum and maximum water temperatures collected at the USGS stream gage at Hopland (11462500) shown with the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for Chinook adult migration based on Table 4-1.

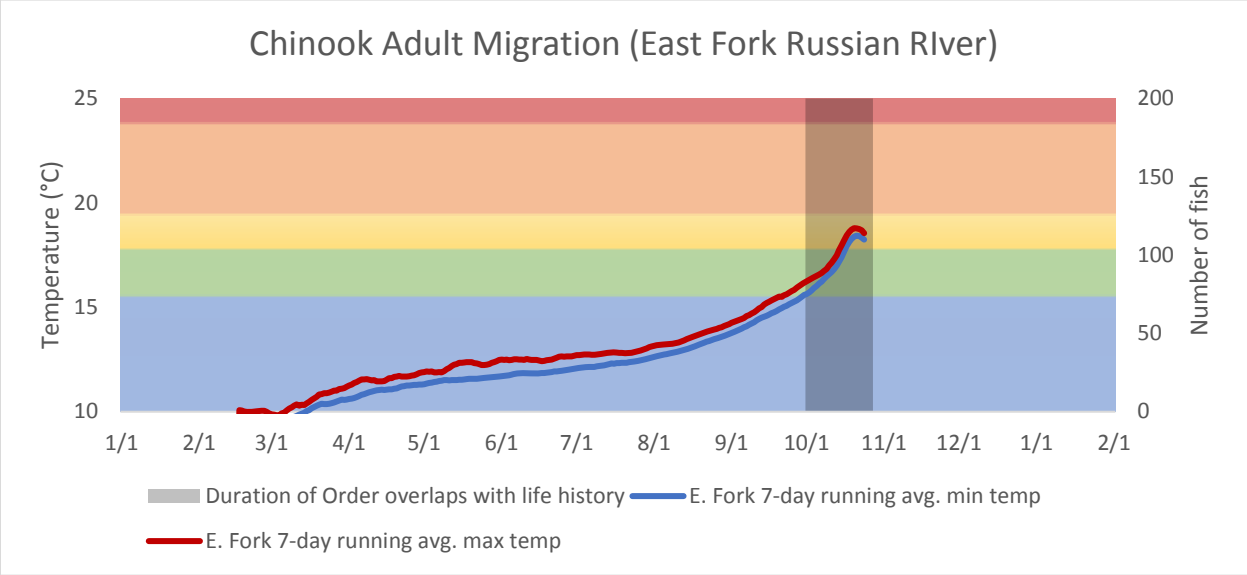

Figure 4-7. The 7-day running average of the minimum and maximum water temperatures collected in the East Fork Russian River approximately 1/3 of a mile downstream of the Coyote Valley Dam shown with the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for Chinook adult migration based on Table 4-1.

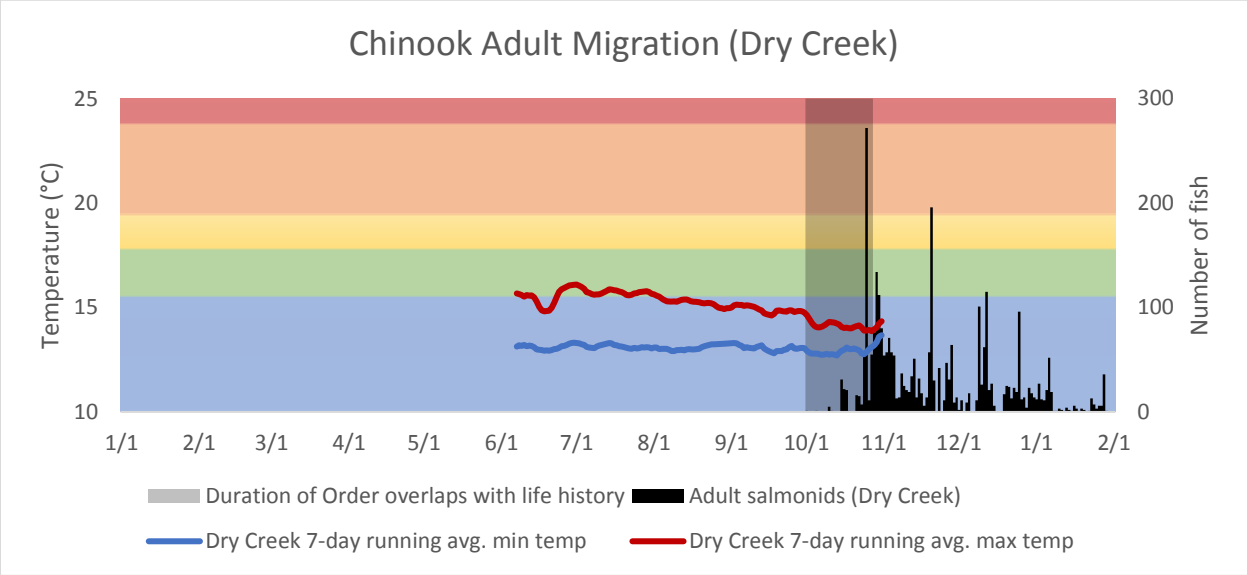

Figure 4-8. The 7-day running average of the minimum and maximum water temperatures collected at the USGS stream gage at Lambert Bridge (gage number 11465240) in Dry Creek shown with the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for Chinook rearing based on Table 4-1.

Salmonid Rearing

In the Russian River watershed much of the salmonid rearing habitat is located in tributaries to the Russian River, including Dry Creek. Water temperatures from Dry Creek are shown with the temperature criteria for coho, Chinook, and steelhead as this is an important rearing area for these species. Coho typically emerge from the gravel and spend 1 year in fresh water before immigrating to sea in the early spring. During this freshwater rearing phase they require cold water. Because of this cold water rearing requirement coho are not thought to rear in the Mainstem Russian River. Instead the

tributaries to the Russian River, including Dry Creek are important coho rearing habitat. For this report water temperature criteria for coho is related to water temperature data collected in Dry Creek at Lambert Bridge (USGS stream gage number 11465240). Chinook and steelhead rear in the mainstem Russian River as well as Dry Creek. Chinook emerge from redds in the upper Russian River in the early spring and begin rearing in the shallow portions of the stream margins. In the mainstem Russian River Chinook finish rearing in the spring when water temperatures are still relatively cool throughout the river. As a result Chinook rear at more locations in the Russian River, but for a shorter season than steelhead or Coho. We relate water temperature at a number of mainstem Russian River sites to Chinook water temperature criteria. Steelhead rear for over one year and are restricted to the portion of Russian River where water released from the cold water pool (the bottom portion of the lake) in Lake Mendocino and Lake Sonoma has the potential to provide steelhead with cold water rearing habitat through the summer. We relate steelhead water temperature criteria to water temperature collected in the East Fork Russian River, at Hopland, and in Dry Creek as these sites are within the section of the Russian River and Dry Creek that can provide year-round rearing opportunities for juvenile steelhead.

Chinook

During 2016 water temperatures for rearing Chinook were favorable in the early spring at all sites and became less favorable in May and June in the mainstem Russian River at Jimtown, Digger Bend, and Hacienda. Water temperatures were generally in the optimal or suitable range for Chinook salmon rearing in the East Fork Russian River and at the USGS stream gage at Hopland (gauge number 11462500, Figure 4-9 and Figure 4-10). At Jimtown, Digger Bend, and Hacienda water temperatures were generally favorable for Chinook rearing until May, then temperatures became stressful and eventually acutely stressful or even potentially lethal by June (Figure 4-11 through Figure 4-13). It is important to note that this change in water temperature suitability was not due to the implementation of the Order and resultant changes in minimum instream flow, but due to warming air temperature. At Jimtown and Digger Bend the maximum daily water temperature first became acutely stressful in mid-May, but flows remained above minimum instream flows outlined by Decision 1610 (185 cfs) until early to mid-June depending on the site. At Hacienda the maximum daily water temperature first became acutely stressful in mid-May, but flows remained above minimum instream flows outlined by D1610 (125 cfs) until late June. Furthermore, Chinook have adapted to local conditions and migrate downstream and out to sea in the spring to avoid rearing at high temperatures. In Dry Creek water temperatures are optimal during the Chinook rearing period (Figure 4-14).

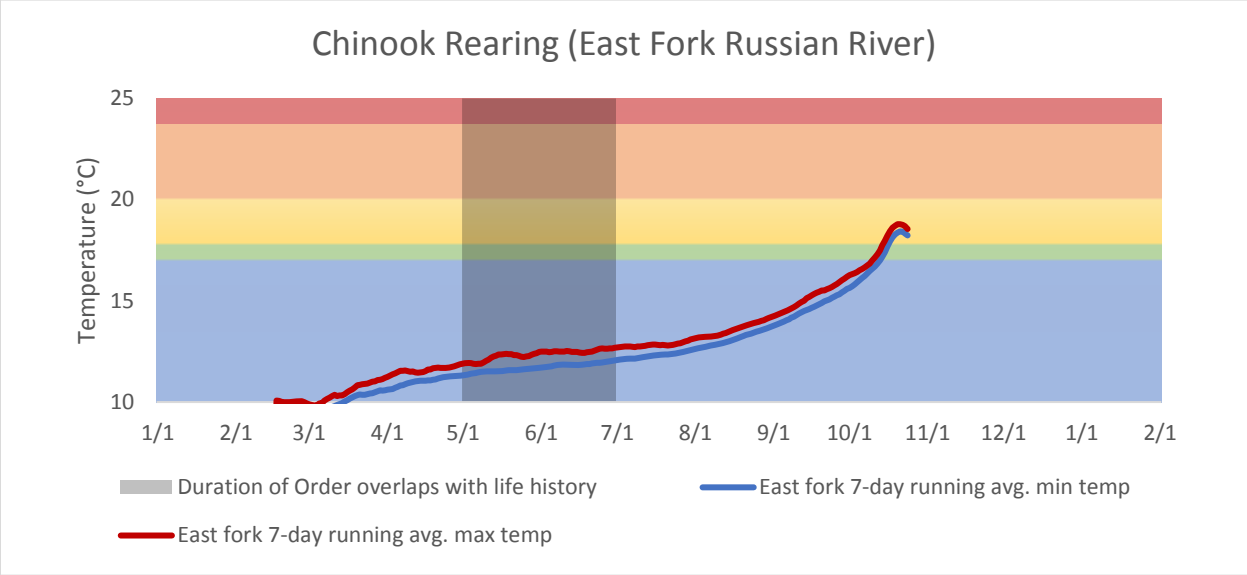

Figure 4-9. The 7-day running average of the minimum and maximum water temperatures collected in the East Fork Russian River approximately 1/3 of a mile downstream of the Coyote Valley Dam shown with the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for Chinook rearing based on Table 4-2.

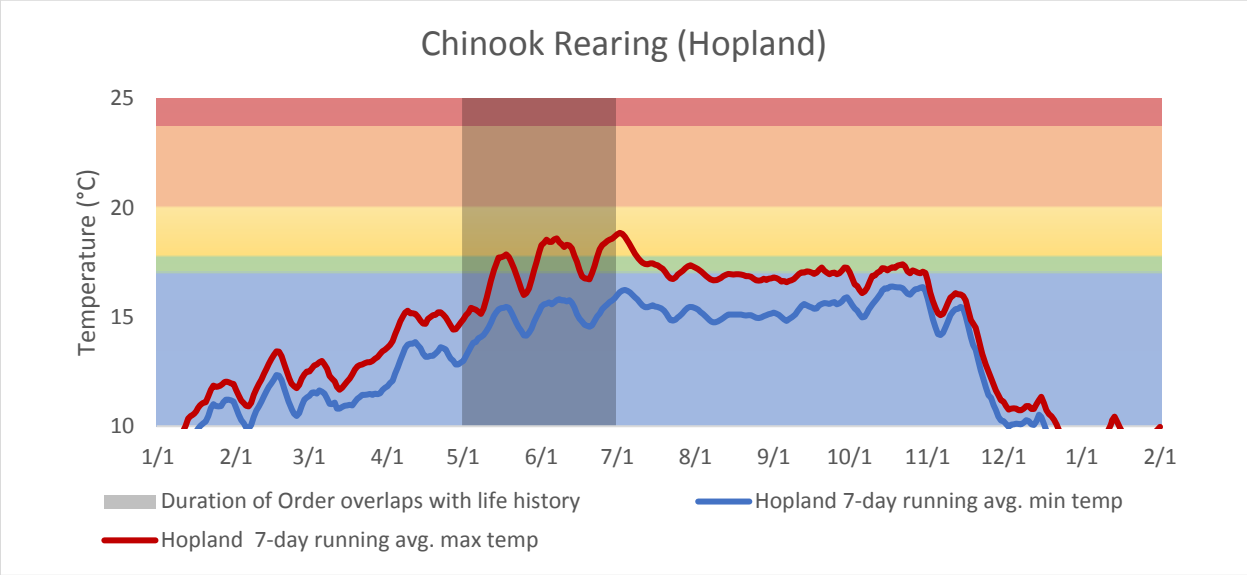

Figure 4-10. The 7-day running average of the minimum and maximum water temperatures collected at the USGS stream gage at Hopland (11462500) shown with the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for Chinook rearing based on Table 4-2.

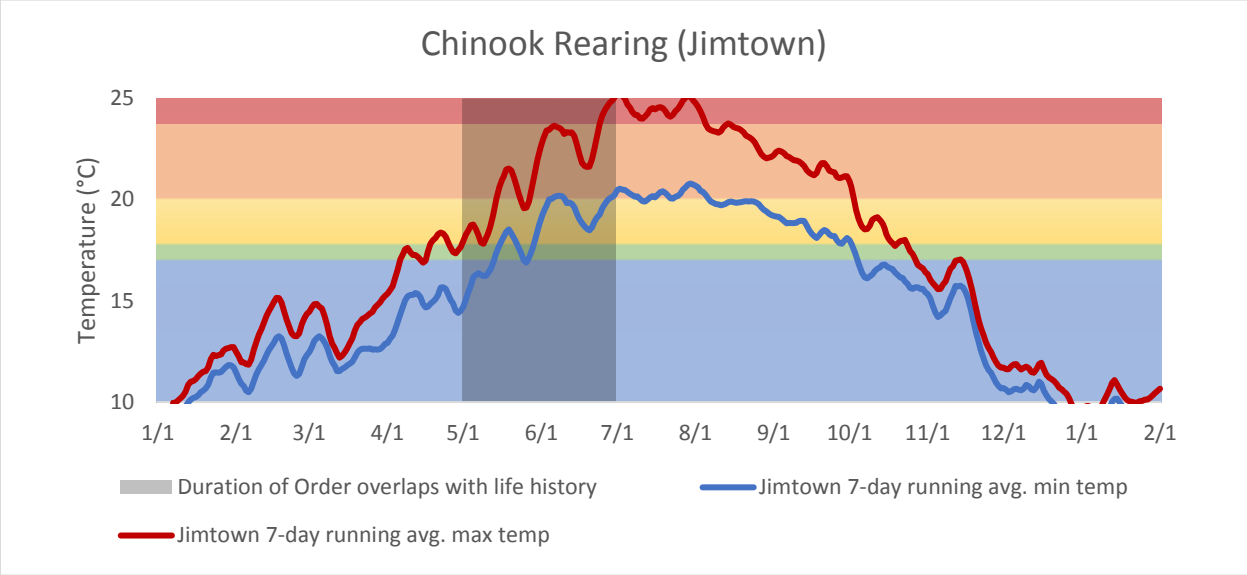

Figure 4-11. The 7-day running average of the minimum and maximum water temperatures collected at the USGS stream gage at Jimtown (USGS gage number 11463682) shown with the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for Chinook rearing based on Table 4-2.

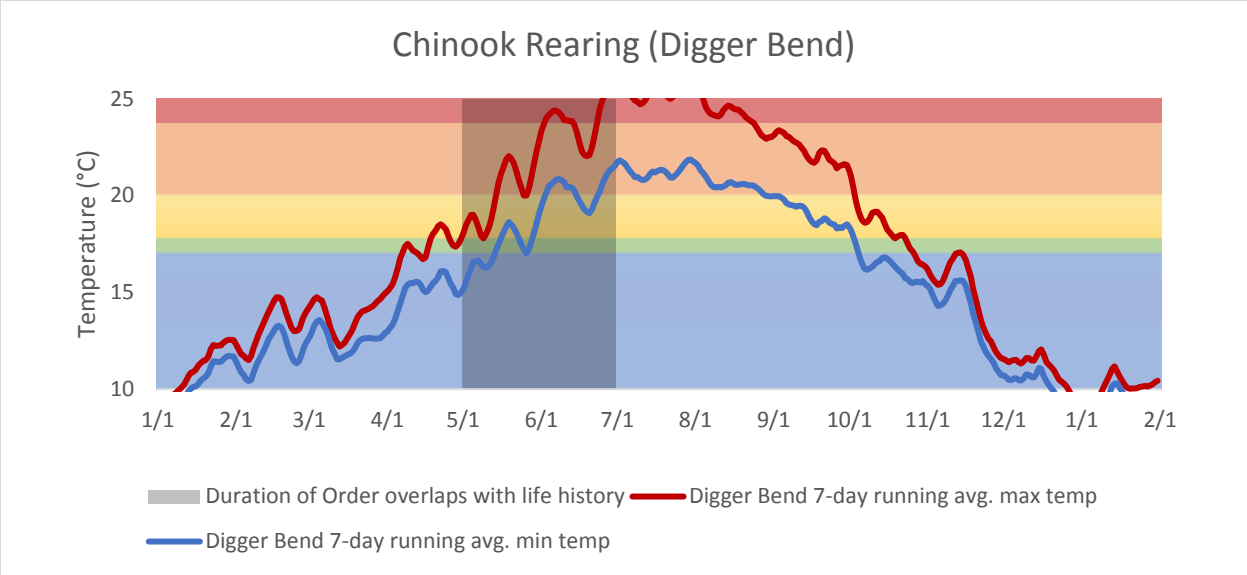

Figure 4-12. The 7-day running average of the minimum and maximum water temperatures collected at the USGS stream gage at Digger Bend (11463980) shown with the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for Chinook rearing based on Table 4-2.

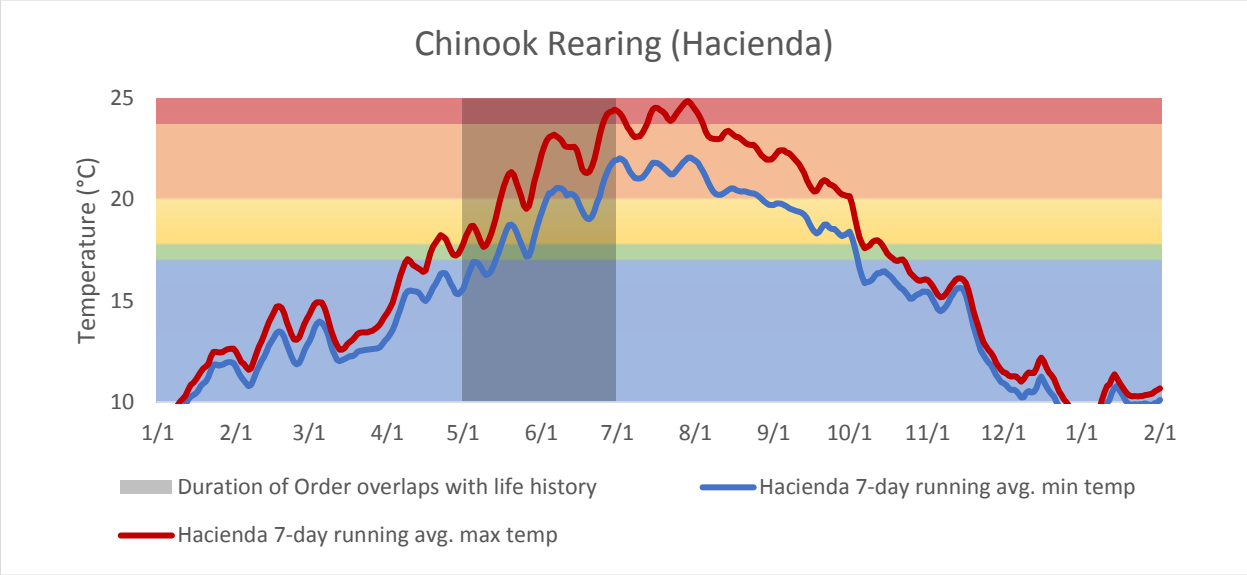

Figure 4-13. The 7-day running average of the minimum and maximum water temperatures collected at the USGS stream gage at Hacienda (gage number 11467000) shown with the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for Chinook rearing based on Table 4-2.

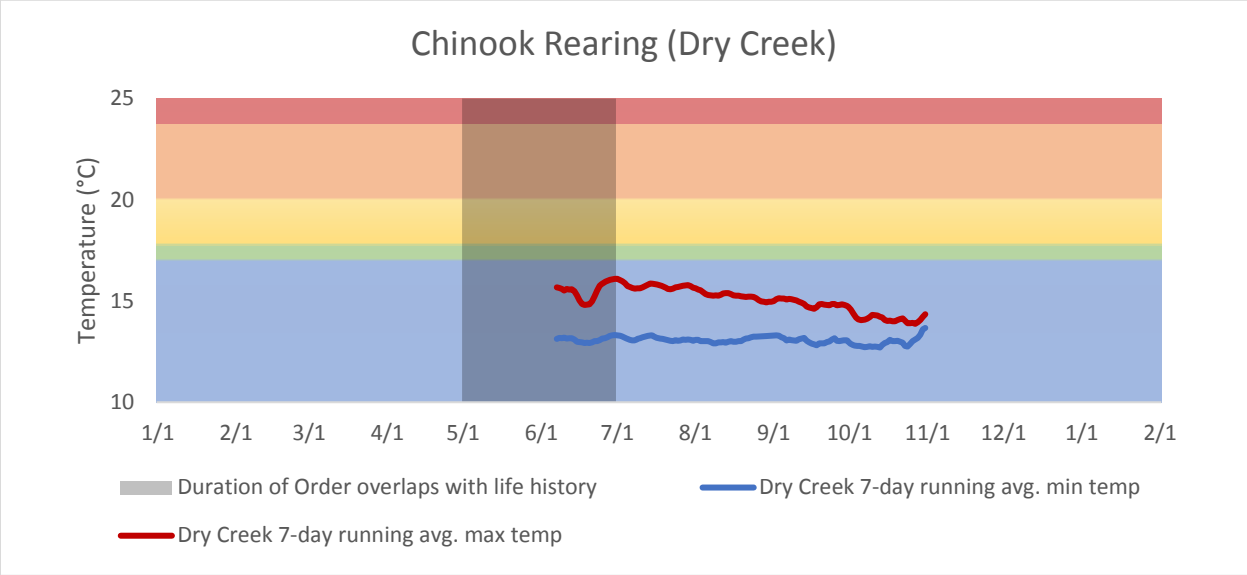

Figure 4-14. The 7-day running average of the minimum and maximum water temperatures collected at the USGS stream gage at Lambert Bridge (gage number 11465240) in Dry Creek shown with the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for Chinook rearing based on Table 4-2.

Coho

Water temperatures were favorable for coho rearing in Dry Creek. Releases from Warm Spring Dam provide cold water for coho rearing in Dry Creek. Water temperatures were optimal to suitable in Dry Creek (Figure 4-15). The mainstem Russian River is not considered rearing habitat for coho.

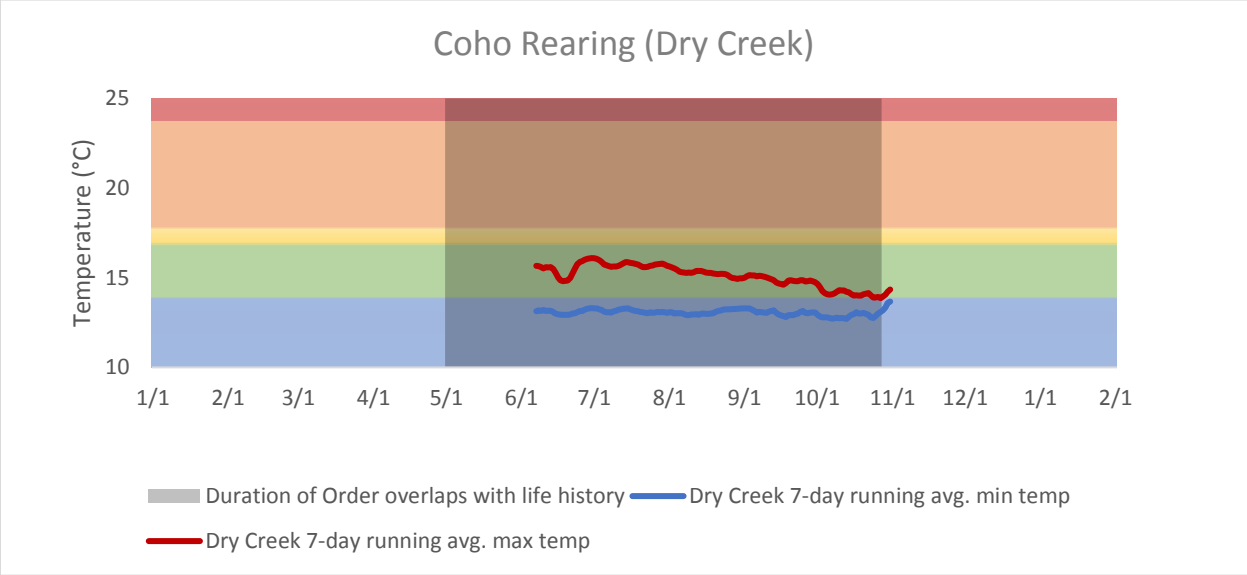

Figure 4-15. The 7-day running average of the minimum and maximum water temperatures collected at the USGS stream gage at Lambert Bridge (gage number 11465240) in Dry Creek shown with the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for Chinook rearing based on Table 4-2.

Steelhead

Steelhead parr rear year round in the upper Russian River. Water temperature was optimal for most of the order in the East Fork Russian River (Figure 4-16). During the Order water temperature at the USGS stream gage at Hopland mainly fell in the optimal to suitable range for steelhead parr (Figure 4-17). Water temperatures were optimal for steelhead raring in Dry Creek (Figure 4-18).

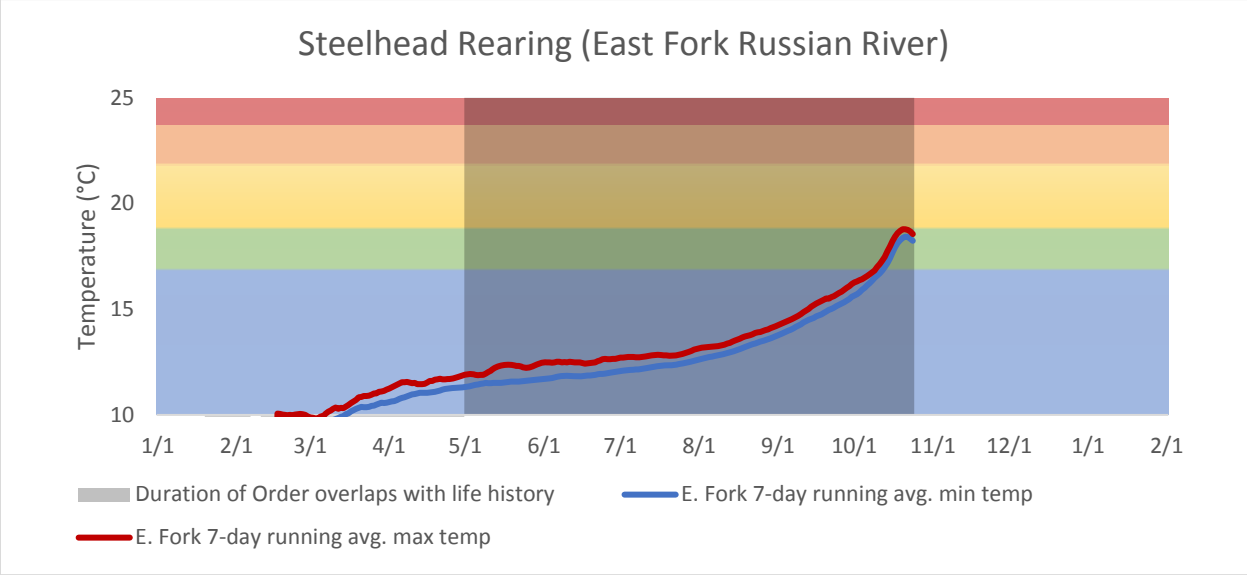

Figure 4-16. The 7-day running average of the minimum and maximum water temperatures collected in the East Fork Russian River. The optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for steelhead parr based on Table 4-2 are also shown.

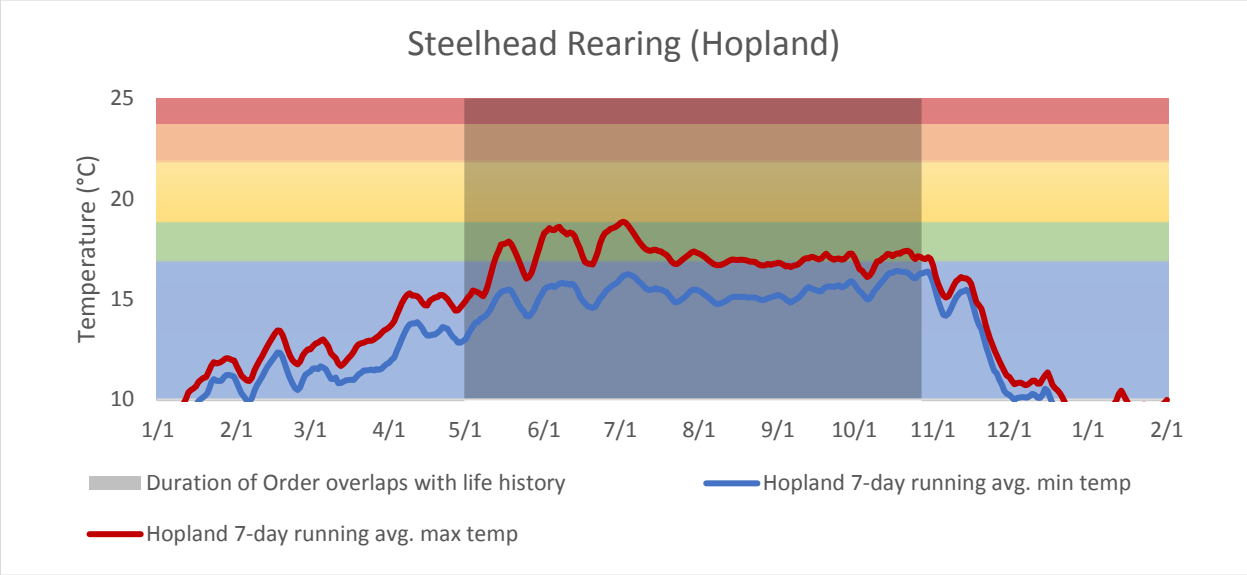

Figure 4-17. The 7-day running average of the minimum and maximum water temperatures collected at Hopland (USGS stream gage number 11462500). The optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for steelhead parr based on Table 4-2 are also shown.

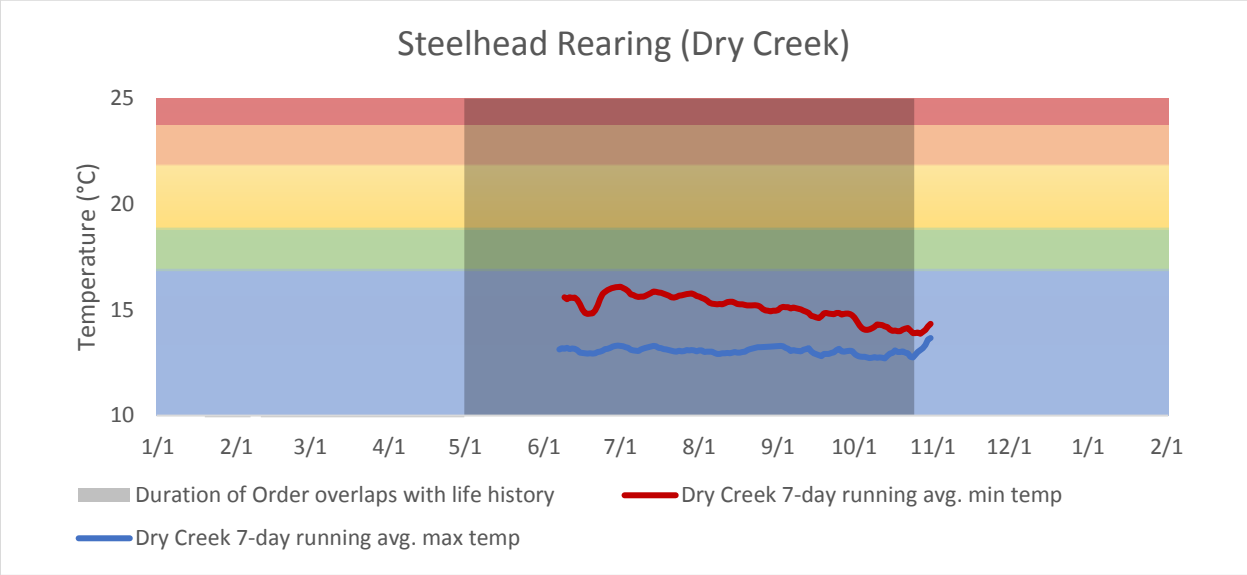

Figure 4-18. The 7-day running average of the minimum and maximum water temperatures collected in Dry Creek at Lambert Bridge (USGS stream gage number 11465240). The optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for steelhead parr based on Table 4-2 are also shown.

Salmonid Smolt Outmigration

As salmonid smolts immigrate to the ocean they experience river temperatures that are often warmer than their natal tributary or mainstem river habitat. We summarize water temperatures for the East Fork Russian River, Hopland, Jimtown, and Digger Bend gages and show these temperatures with water temperature criteria for Chinook and steelhead. We operated a downstream migrant trap at Dry Creek from April 14, 2016, until July 31, 2016. During the Order we captured 9,823 Chinook salmon smolts, 259 coho salmon smolts and 126 wild and hatchery steelhead smolts at this trapping site. We relate

these catch data to temperature collected at Dry Creek and at Hacienda. Hacienda is located approximately 20 km downstream of the trap site and represents temperatures experienced by smolts as they emigrate through the lower river. It is worth noting that temperatures at the Dry Creek trap site are significantly cooler than temperatures at Hacienda.

Chinook

Water temperature in the Russian River near the Coyote Valley Dam was favorable for Chinook smolts during the period of time that Chinook are expected to emigrate from that portion of the Russian River (April through June, Figure 4-19 and Figure 4-20). However, water temperature became less favorable in the later part of the migration at sites located downstream of Hopland (Figure 4-21 through Figure 4-23). It is important to note that Chinook have evolved to emigrate during the spring before water temperatures become lethal. Trap catches at Chalk Hill (located on the mainstem Russian River approximately 10 miles upstream of Healdsburg and 5.5 miles upstream of Digger Bend) show that Chinook smolt counts peak before water temperatures reach the acutely stressful levels (Figure 4-21). Water temperatures in Dry Creek were favorable for Chinook smolts (Figure 4-24).

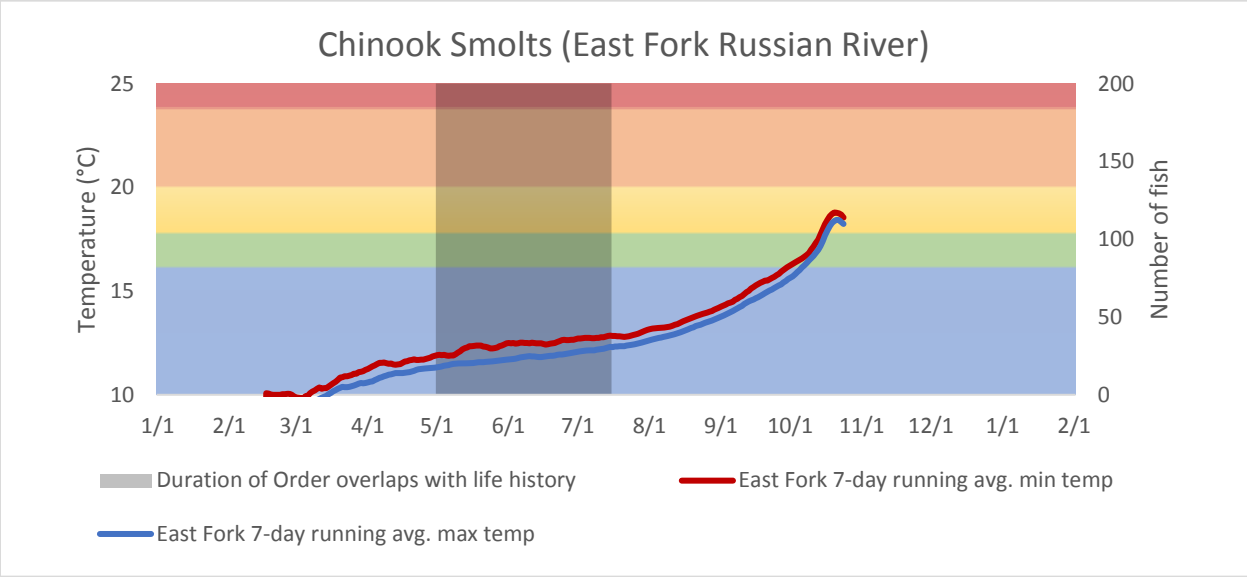

Figure 4-19. The 7-day running average of the minimum and maximum water temperatures collected in the East Fork Russian River shown with the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for Chinook smolts based on Table 4-3.

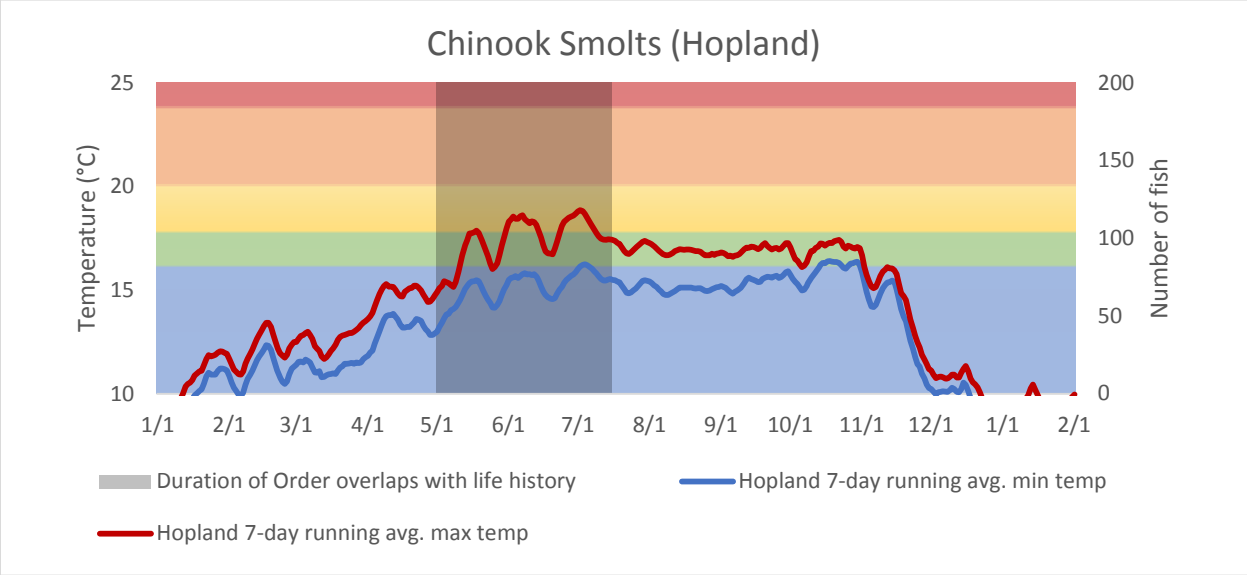

Figure 4-20. The 7-day running average of the minimum and maximum water temperatures collected at Hopland (USGS stream gage number 11462500). Shown with the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for Chinook smolts based on Table 4-3.

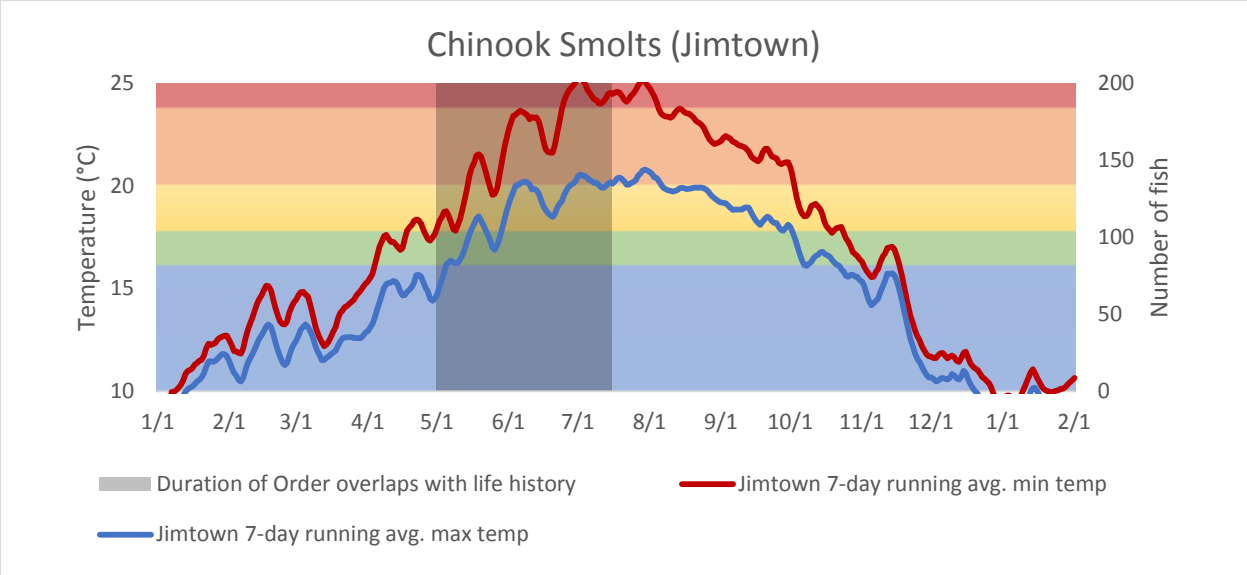

Figure 4-21. The 7-day running average of the minimum and maximum water temperatures collected at the Jimtown USGS stream Gage (1146382) shown with the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for Chinook smolts based on Table 4-3.

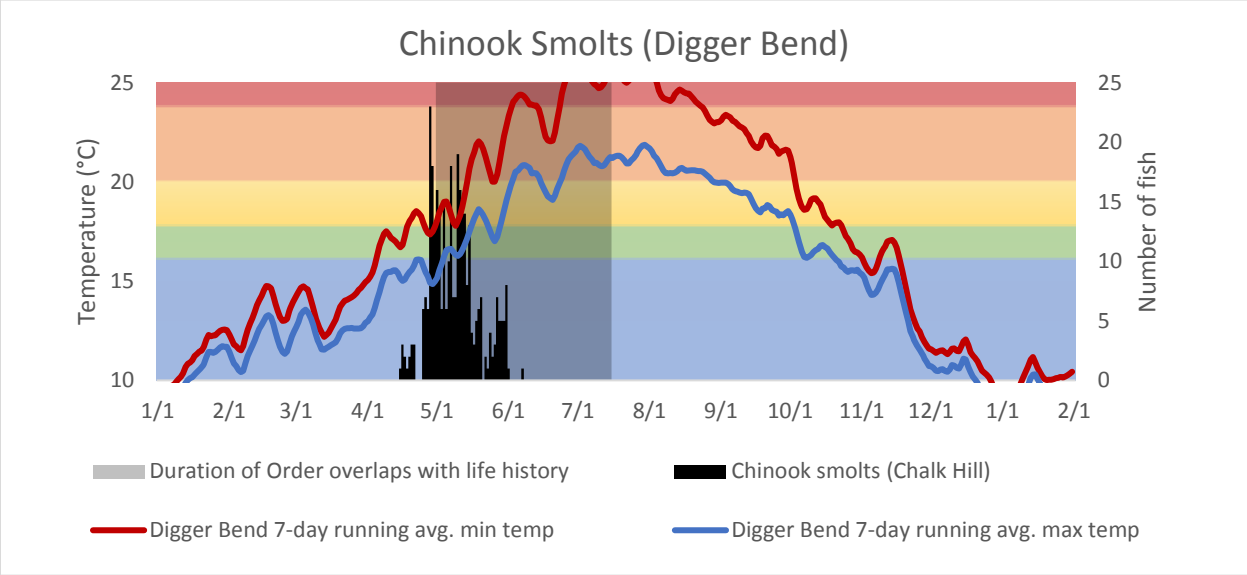

Figure 4-22. The 7-day running average of the minimum and maximum water temperatures collected at the Digger Bend USGS stream gage (11463980) shown with the daily Chinook smolt catch from a fish trap located at Chalk Hill approximately 5 miles upstream of Digger Bend. Also show are the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for Chinook smolts based on Table 4-3.

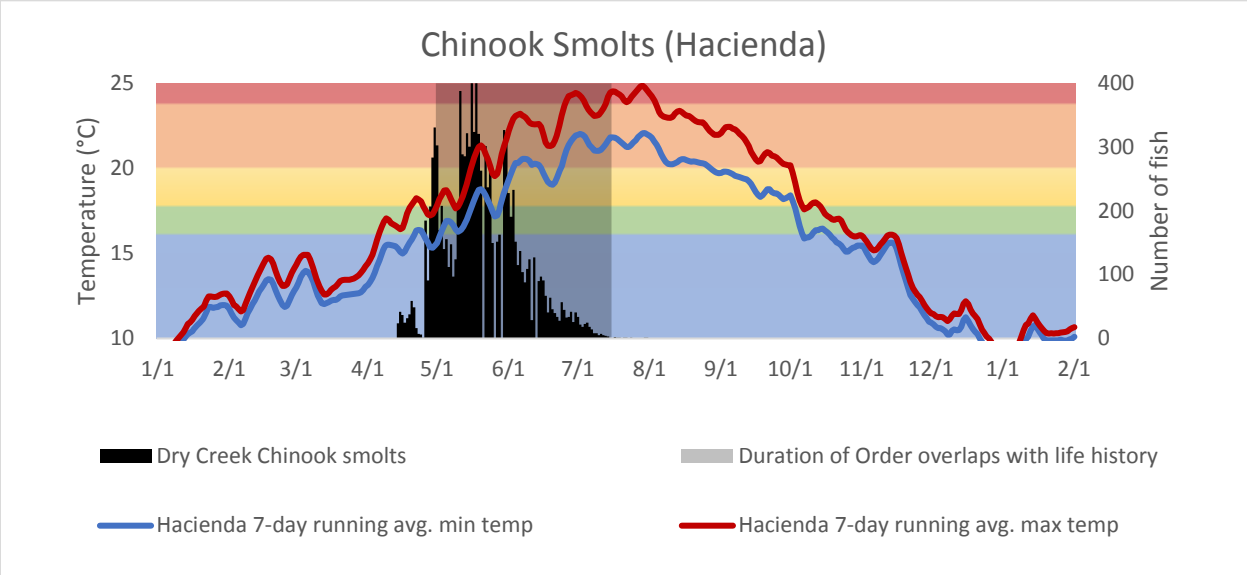

Figure 4-23. The 7-day running average of the minimum and maximum water temperatures collected at Hacienda (USGS gage number 11467000) shown with the Chinook smolt catch from Dry Creek. Also show are the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for Chinook smolts based on Table 4-3.

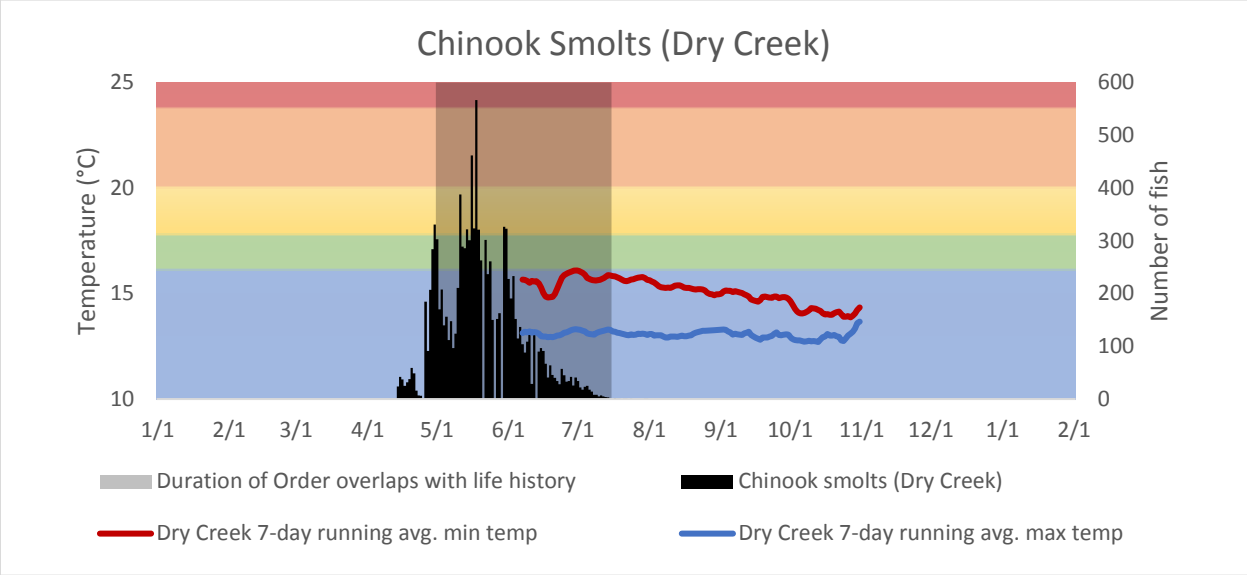

Figure 4-24. The 7-day running average of the minimum and maximum water temperatures collected at the Lambert Bridge USGS stream Gage (11463980) in Dry Creek shown with the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for Chinook smolts based on Table 4-3.

Coho

A total of 259 coho salmon smolts were captured at the downstream migrant trap from April 16 until July 28, 2016; however, only eight individuals were captured after May 31, 2016. In Dry Creek water temperatures were not collected during the coho smolt period. The water temperature at Hacienda ranged from 17.1°C to 24.3°C during the time we captured coho smolts at Dry Creek. For coho smolts the observed water temperatures were in the suitable through lethal range. For the days that we captured coho smolts the maximum and minimum daily water temperature were generally in the stressful to acutely stressful range (Figure 4-25).

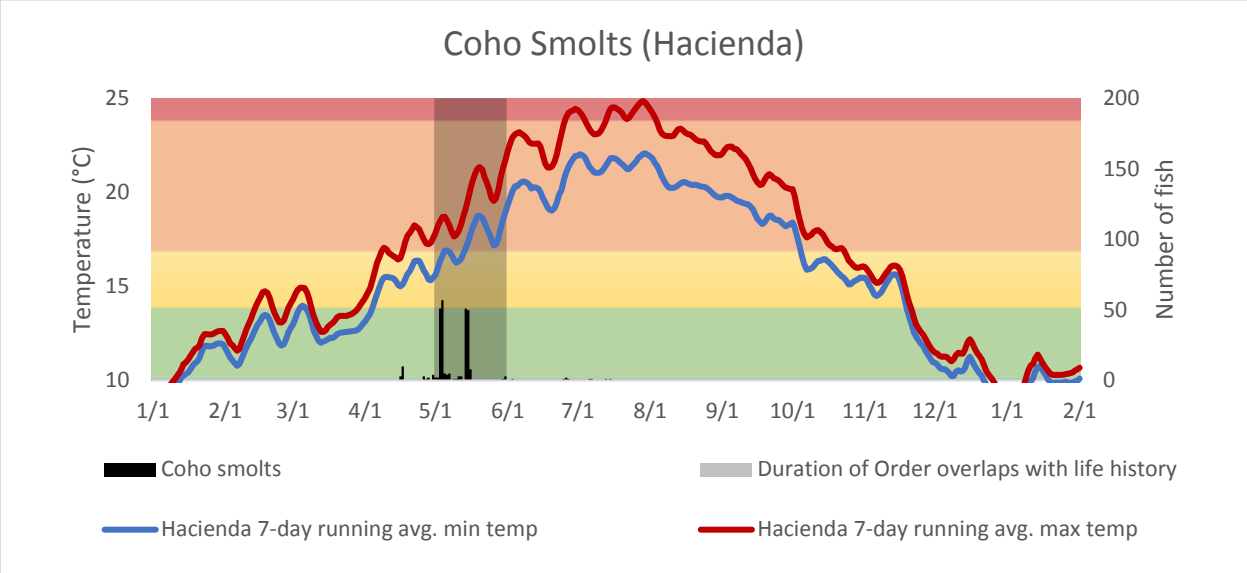

Figure 4-25. The 7-day running average of the minimum and maximum water temperatures collected at Hacienda (USGS gage number 11467000) shown with the coho smolt catch from Dry Creek. Also show are the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for coho smolts based on Table 4-3.

Steelhead

Water temperature for steelhead smolting ranged from suitable to lethal during the time period that steelhead smolts are expected to be in the Russian River (March 1, to May 31). Water temperatures in the East Fork Russian River were suitable for steelhead smolting (Figure 4-26). At Hopland water temperatures for smolting steelhead were stressful to acutely stressful (Figure 4-27). At Jimtown water temperatures were acutely stressful (Figure 4-28). At Digger Bend water temperatures were acutely stressful to lethal (Figure 4-29). We captured steelhead smolts at the downstream migrant trap from April 17, until July 30, 2016. The water temperature at Hacienda ranged from 15.1 °C to 24.9 °C during the time we captured steelhead smolts. For days that fish were captured during the Order the minimum and maximum daily water temperature was generally acutely stressful at Hacienda (Figure 4-30). However, most steelhead smolts likely leave much earlier in the year when water temperatures are cooler. At Dry Creek water temperatures were not collected during the steelhead smolt period.

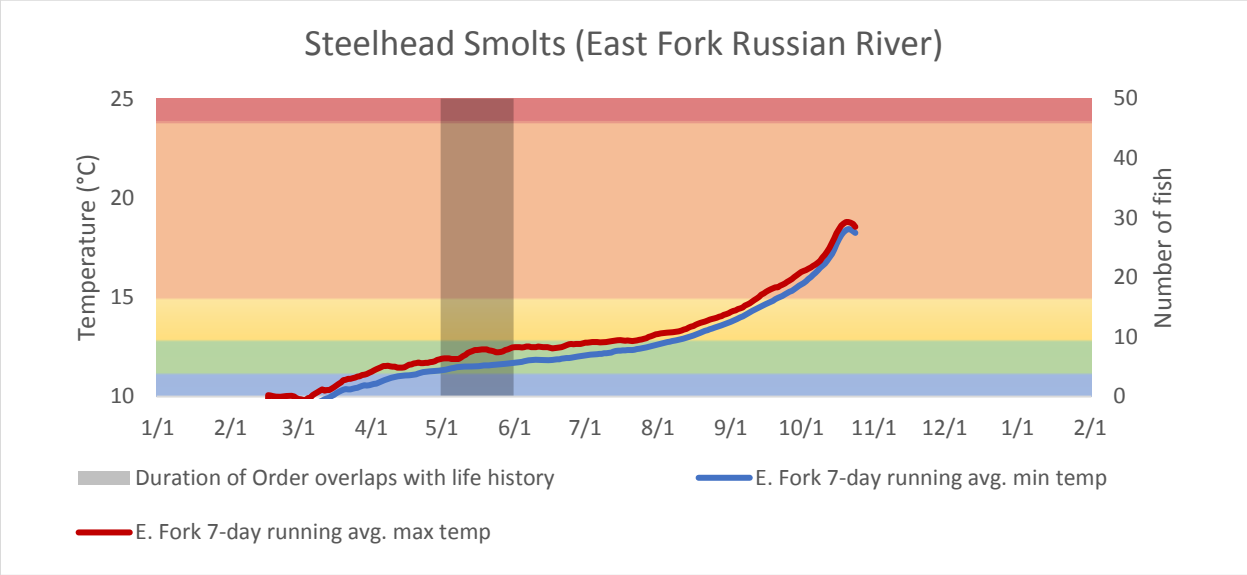

Figure 4-26. The 7-day running average of the minimum and maximum water temperatures collected in the East Fork Russian River shown with the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for steelhead smolts based on Table 4-3.

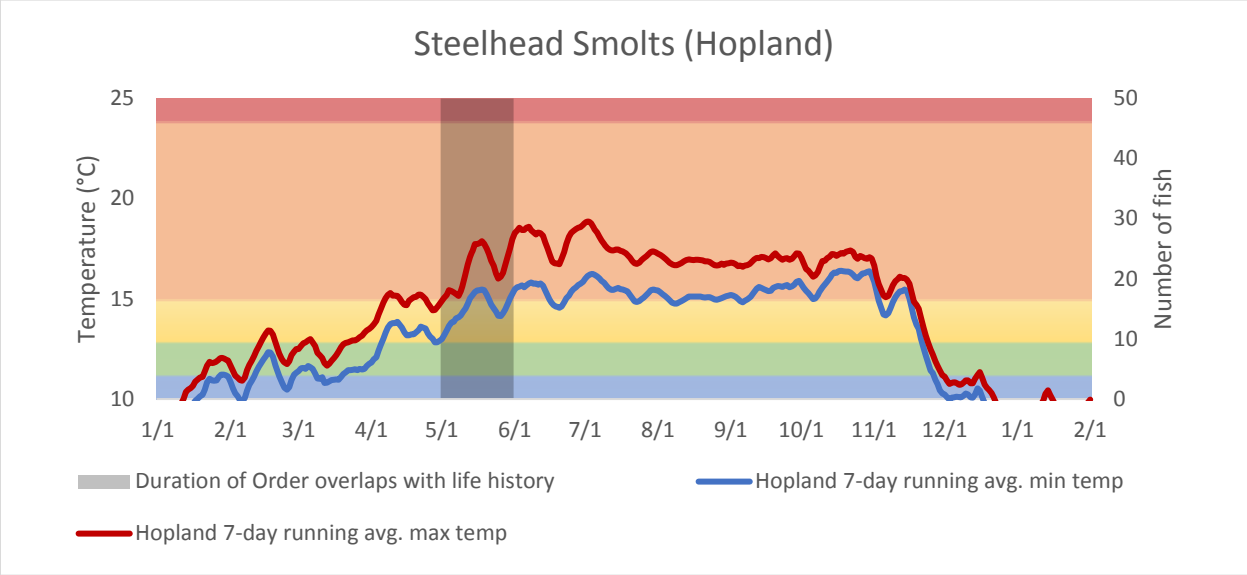

Figure 4-27. The 7-day running average of the minimum and maximum water temperatures collected at the USGS gage at Hopland (gage number 11462500) shown with the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for steelhead smolts based on Table 4-3.

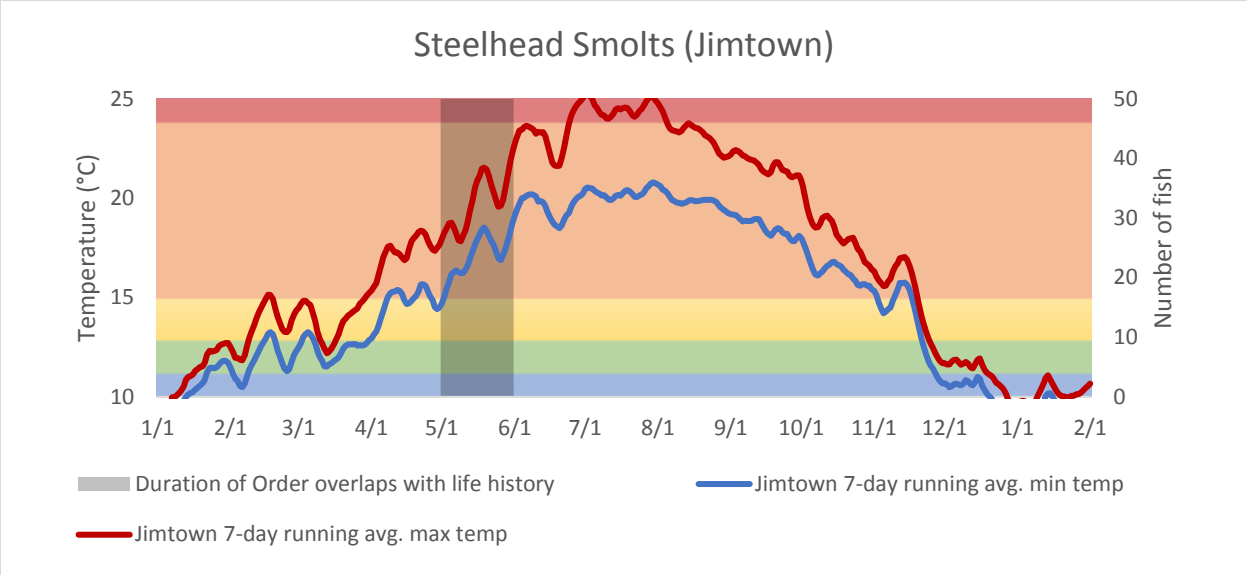

Figure 4-28. The 7-day running average of the minimum and maximum water temperatures collected at the USGS gage at Jimtown (USGS gage number 11463682) shown with the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for steelhead smolts based on Table 4-3.

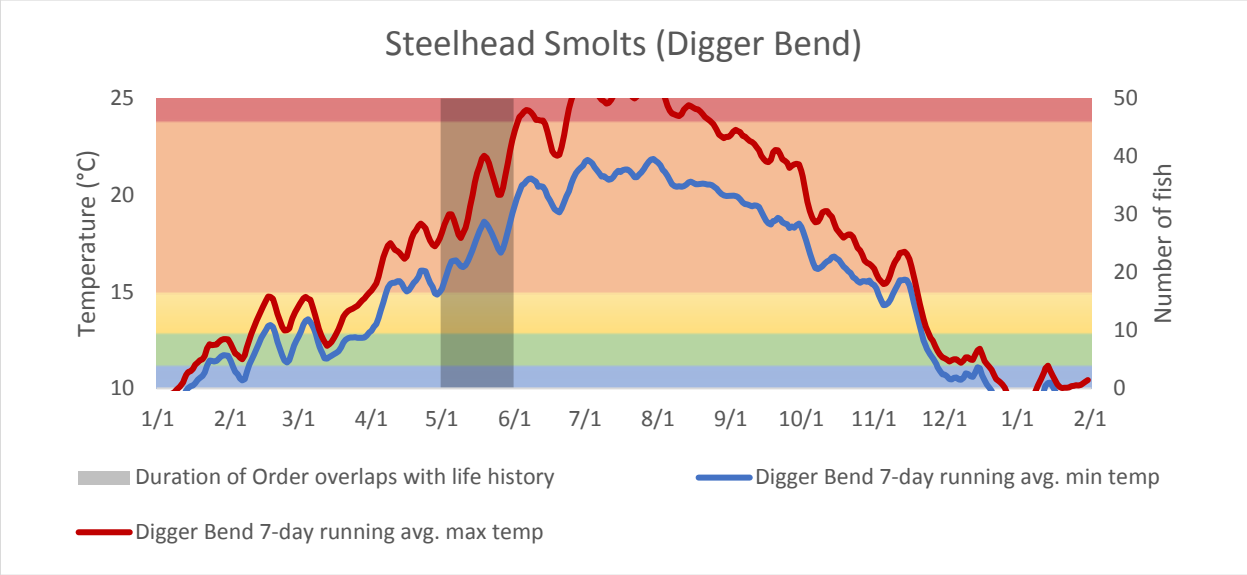

Figure 4-29. The 7-day running average of the minimum and maximum water temperatures collected at the USGS gage at Digger Bend (11463980) shown with the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for steelhead smolts based on Table 4-3.

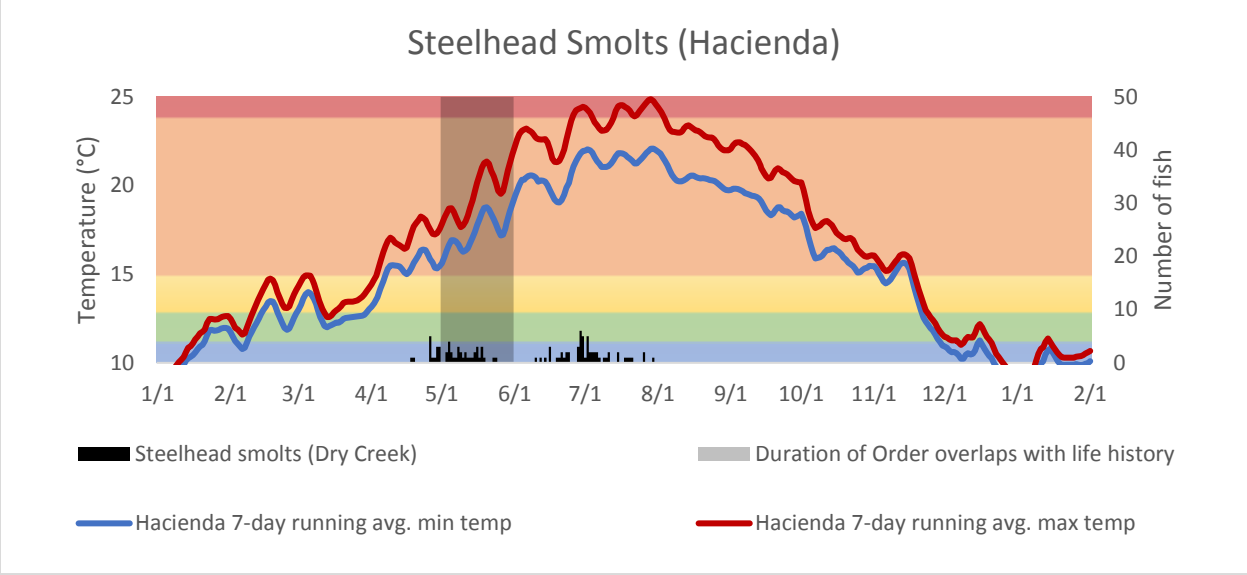

Figure 4-30. The 7-day running average of the minimum and maximum water temperatures collected at Hacienda (USGS gage number 11467000) shown with the steelhead smolt catch from Dry Creek. Also show are the optimal, suitable, stressful, acutely stressful and lethal water temperature thresholds for steelhead smolts based on Table 4-3.

Dissolved Oxygen

Dissolved oxygen was generally favorable for salmonids in the Russian River throughout the Order at most sites. However, dissolved oxygen declined throughout the year in the East Fork Russian River to a level that was very poor for salmonids (Figure 4-31). This is due to water with low dissolved oxygen being released from Lake Mendocino. In the summer Lake Mendocino stratifies with a layer of warmer less dense water laying on top of a cooler denser layer of water. The intake for the release point in Lake

Mendocino is located near the bottom of the lake. Dissolved oxygen near the bottom of the lake declines throughout the summer. In the fall dissolved oxygen recovers when stratification in the lake breaks down and oxygenated water mixes thought the lake. This pattern is fairly typical for Lake Mendocino and has been observed in previous years. In previous years dissolved oxygen in the East Fork Russian River recovers at the confluence with the West Fork Russian River about 1 mile downstream of Coyote Valley Dam. At Hopland, Jimtown, Digger Bend, and at Hacienda, dissolved oxygen levels were generally in the optimal and suitable range although the minimum daily dissolved oxygen levels became stressful at some sites (Figures 4-32 through 4-35).

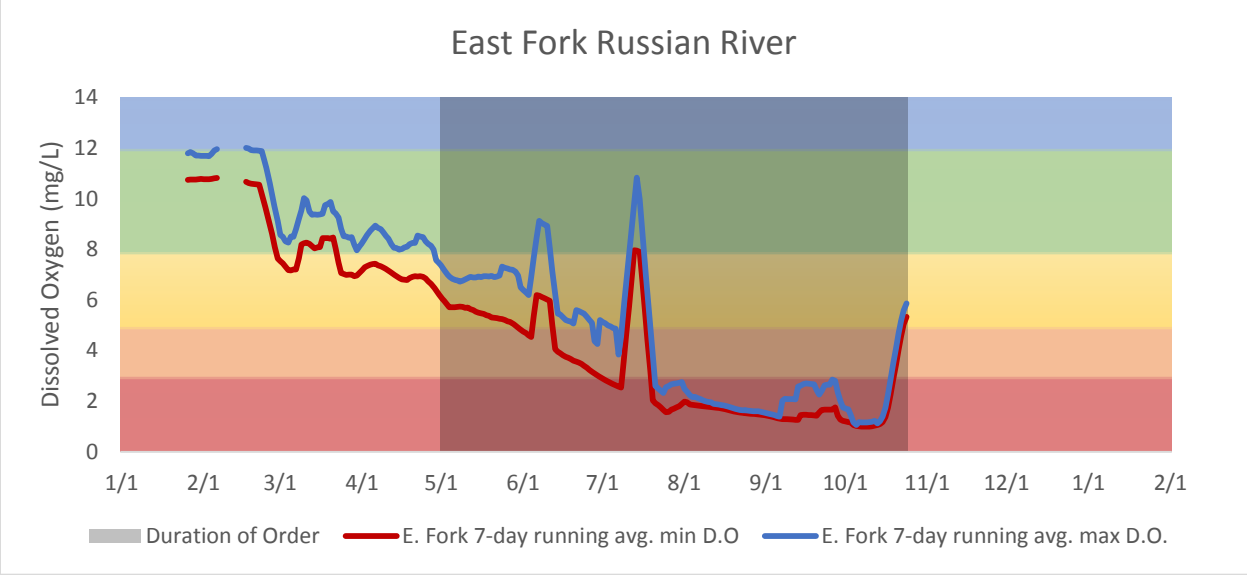

Figure 4-31. The 7-day running average of the minimum and maximum dissolved oxygen collected in the East Fork Russian River approximately 1/3 mile downstream of the Coyote Valley Dam. Shown with the optimal, suitable, stressful, acutely stressful, lethal dissolved oxygen zones based on our criteria. See Table 4-3 for a description of water quality zones.

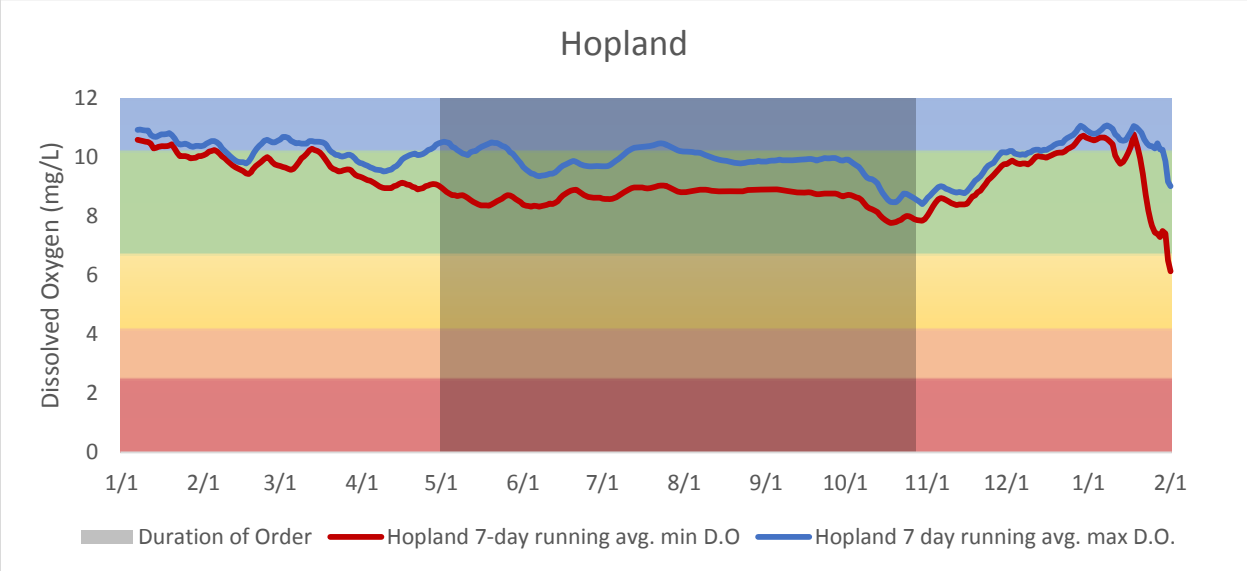

Figure 4-32. The 7-day running average of the minimum and maximum dissolved oxygen collected at Hopland (USGS stream gage number 11462500). Also shown are the optimal, suitable, stressful, acutely stressful, lethal dissolved oxygen zones based on our criteria. See Table 4-4 for a description of water quality zones.

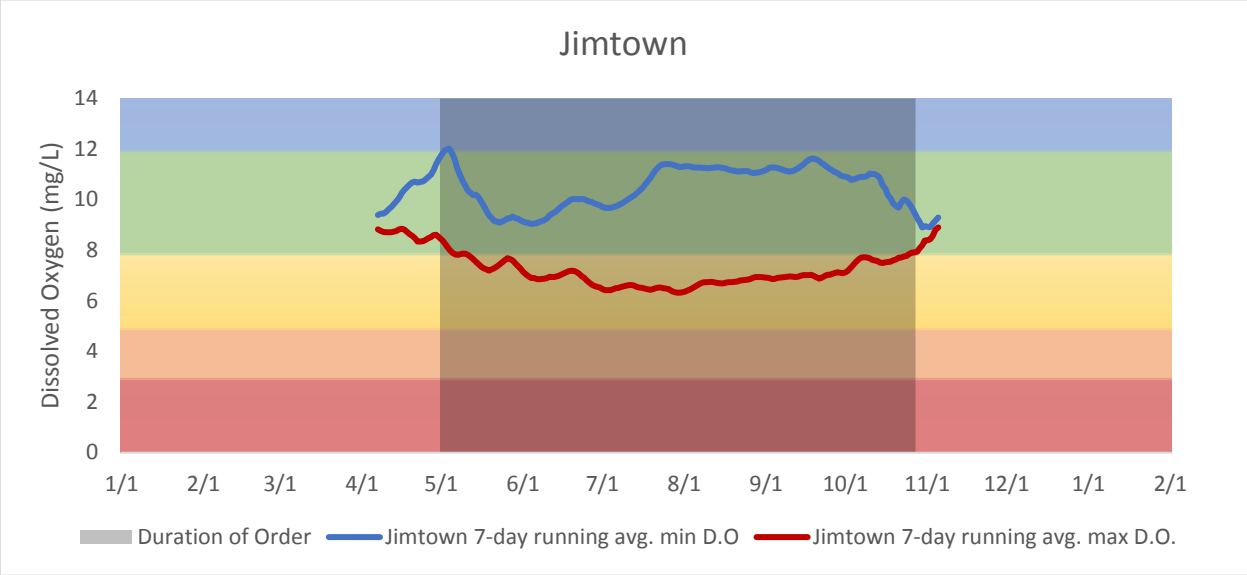

Figure 4-33. The 7-day running average of the minimum and maximum dissolved oxygen collected at the Jimtown USGS stream Gage (1146382). Also shown are the optimal, suitable, stressful, acutely stressful, lethal dissolved oxygen zones based on our criteria. See Table 4-4 for a description of water quality zones.

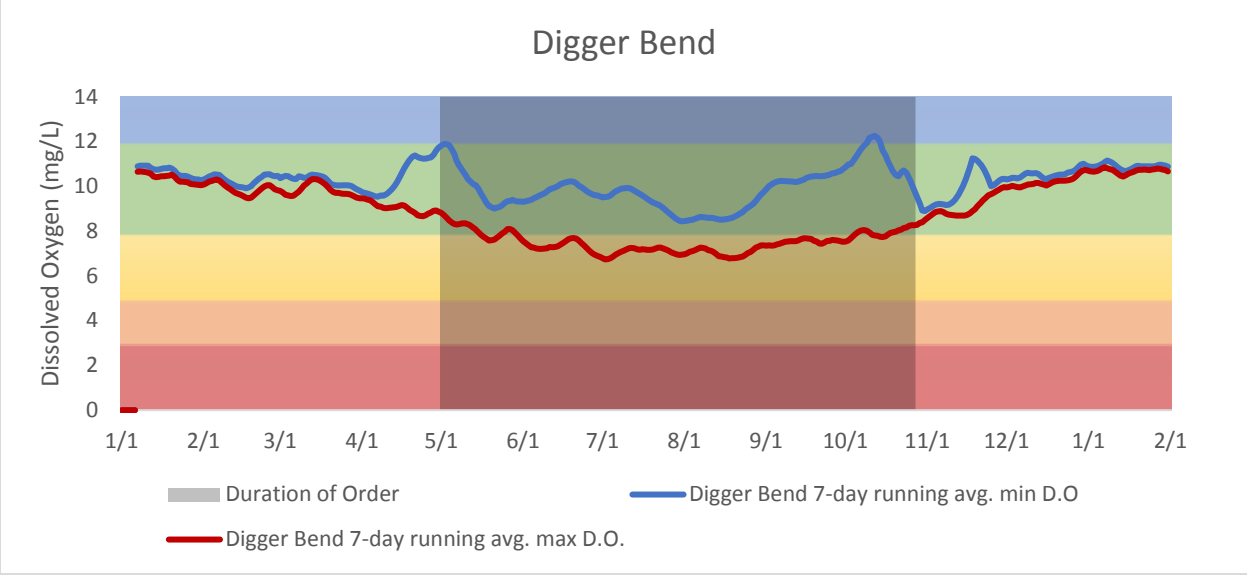

Figure 4-34. The 7-day running average of the minimum and maximum dissolved oxygen collected at the Digger Bend USGS stream gage (11463980). Also shown are the optimal, suitable, stressful, acutely stressful, lethal dissolved oxygen zones based on our criteria. See Table 4-4 for a description of water quality zones.

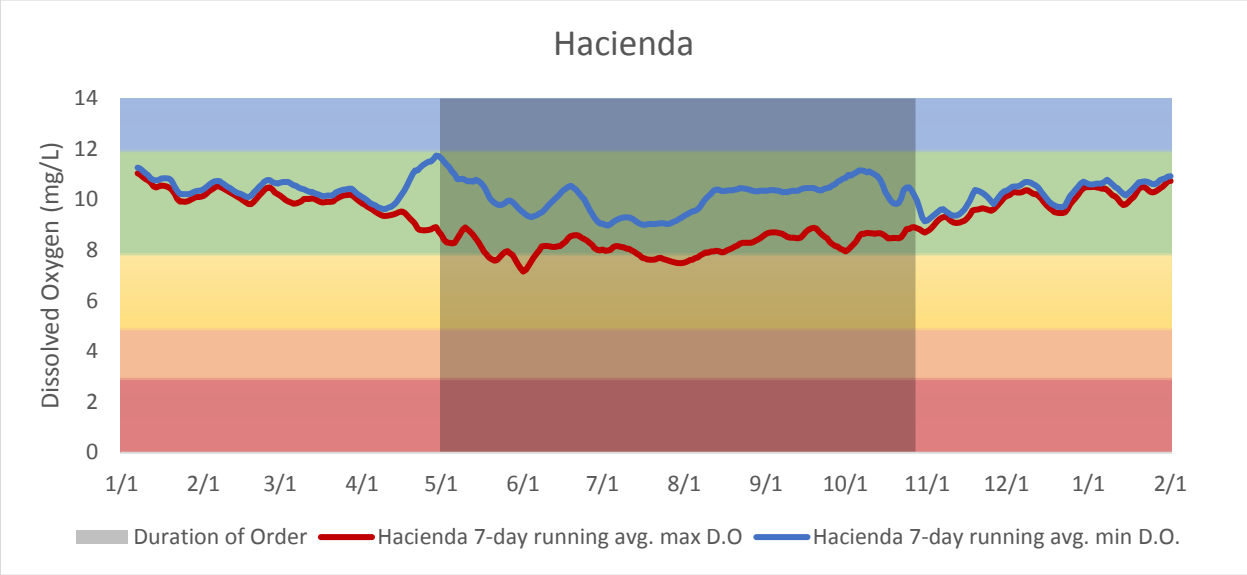

Figure 4-35. The 7-day running average of the minimum and maximum dissolved oxygen collected at the Hacienda USGS stream gage (1146700). Also shown are the optimal, suitable, stressful, acutely stressful, lethal dissolved oxygen zones based on our criteria. See Table 4-4 for a description of water quality zones.

4.2.5 Summary

Compared to the last few years of significant drought flows were higher in the Russian River during the spring, summer, and fall in 2016. Adult fish moved past Mirabel during the Order. However, like in previous years, a barrier beach that formed at the mouth of the river limited fish from entering the river during September. Significant rain events in October likely helped motivate adult Chinook to migrate upstream. When Chinook first began migrating upstream in 2016 water temperature at Hacienda was stressful to acutely stressful, but quickly improved to suitable to optimal temperatures. Water temperatures at sites upstream of Hacienda followed a similar trend where temperatures were acutely stressful to stressful then declined as air temperatures declined with the onset of fall. By mid-October water temperatures were suitable to optimal for adult Chinook at all sites with the exception of the East Fork Russian River. Water temperature in the East Fork Russian River increased to stressful levels in mid-October as the cold water pool in Lake Mendocino was exhausted. However, atmospheric temperatures cooled water released from Lake Mendocino and by Hopland water temperatures were suitable to optimal for adult Chinook. While temperatures were occasionally unfavorable for adult Chinook it is important to remember that Chinook have evolved to cope with seasonally warm water temperatures by returning to the river in the fall when water temperatures are cooler and that the vast majority of adult Chinook return to the Russian River after October 1 when water temperatures in the river are becoming favorable.

For Chinook smolts water temperature was favorable for rearing in the early spring and at most sites became unfavorable by the end of the rearing season. Water temperature remained suitable to optimal in the East Fork Russian River and in Dry Creek throughout the rearing season. Fish that remained at these sites to rear and emigrated as smolts late in the rearing season would encounter unfavorable water temperatures as they moved downstream and out to sea. It is important to note that Chinook have likely adapted to warm temperatures in the Russian River and have adjusted their run timing to further cope with seasonally warmer water temperatures by emigrating earlier in the year.

Water temperatures were favorable for coho rearing in Dry Creek in 2016. It is because of these favorable water temperatures that the NMFS recommended 6-miles of habitat enchantments be constructed in Dry Creek (NMFS 2008). The Water Agency has begun implementing these habitat enhancements (SCWA 2016). In the future there will be even more habitat available for coho rearing in Dry Creek.

Water temperatures near Hopland and in Dry Creek were favorable for steelhead rearing throughout the order. In the East Fork Russian River water temperature began to warm from August to the end of the order as the cold water pool in Lake Mendocino was depleted. However, water temperature in the East Fork Russian River remained below stressful levels for rearing steelhead.

Chinook had favorable water temperatures for smolting at the East Fork Russian River and Hopland. Water temperatures became acutely stressful after June 1, when most of the smolts had migrated past Chalk Hill (located on the mainstem Russian River approximately 10 miles upstream of Healdsburg and 5.5 miles upstream of Digger Bend) based on trap catches. Many Chinook smolts were captured in the Dry Creek downstream migrant trap after June 1, when water temperatures became stressful and acutely stressful at Hacienda. Cold water released from Lake Sonoma may keep Chinook smolts from receiving migration cues they might otherwise receive as the water warmed from changing seasons. This may delay some Chinook from emigrating from Dry Creek. Once these late emigrating fish leave Dry Creek they would be experience stressful and acutely stressful temperatures in the lower Russian River.

According to our criteria water temperatures for coho and steelhead smolts in Dry Creek was suitable to acutely stressful, but this criteria may not represent fish that have adapted to local conditions. Recent studies suggest that salmonids may adapt to local conditions and that salmonids may tolerate a much wider range of temperatures than reported in the literature (Verhille et al. 2015). Returning adults are evidence that steelhead and coho successfully smolt in the Russian River watershed (SCWA 2016). Russian River steelhead and coho that successfully smolt may either undergo the smoltification process earlier in the year when water is cooler, or they may be able to tolerate warmer water temperatures than reported in the literature. Furthermore, water temperatures in Dry Creek are significantly cooler in May and June than they would be under natural hydrology (unregulated).

Dissolved oxygen was favorable for salmonids at all sites and for the duration of the Order, with the exception of the East Fork Russian River. In the East Fork Russian River dissolved oxygen decreased throughout the season eventually reaching lethal levels. This would primarily affect summer rearing steelhead that are restricted by temperature to the upper Russian River. In the summer of 2016, water released from the cold water pool was hypoxic. However, oxygen levels typically recover by the time the released water reaches the confluence with the West Fork (Jeff Church, personal communication 2017). Low dissolved oxygen in this section of river probably has a relatively small impact on the steelhead population since the section of river from Coyote Valley Dam to the confluence with the West Fork Russian River is short when compared to the section of the river occupied by rearing steelhead. Furthermore summer rearing steelhead may have left this section of stream when dissolved oxygen became depressed and sought out more favorable habitat downstream. Adult Chinook migrating upstream in the fall could avoid this section of river if dissolved oxygen levels were unfavorable.

Therefore adult Chinook salmon are likely not affected by low dissolved oxygen in the East Fork Russian River.

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