

## Term 2 and Term 4- Fisheries Monitoring Tasks



**Sonoma  
Water**

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## Introduction

On May 26, 2022, the Sonoma County Water Agency (Sonoma Water) 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 and in Dry Creek to address low storage in Lake Mendocino and Lake Sonoma (SWRCB 2022a). The SWRCB issued an Order (Order) approving the Water Agency's TUCP on June 17, 2022 (SWRCB 2022a). The Order was later amended on October 11, 2022 (SWRCB 2022b). The SWRCB's Order included fisheries monitoring and reporting tasks that are summarized in terms 2 and 4 of the Order and presented in the Methods section of this report.

The fisheries monitoring terms in the Order are tailored to document how minimum instream flows prescribed by the Order may affect adult, juvenile, and smolt life stages of salmonids and their habitat. The federally and state listed salmonids found in the Russian River are Chinook salmon, Coho salmon, and steelhead. Because of differences in species biology, habitat preference and migration timing, the effect of flow in the mainstem Russian River varies by species and life stage. These differences are incorporated into the Summary and Discussion section of this report.

In the June 17, 2022, TUCO there are monitoring terms to document the number of adult salmonids that return to the Russian River, the stream conditions adults may encounter during their upstream migration, and the distribution and timing of redds that adult salmonids construct. There are also terms to document the distribution of juvenile steelhead and the water quality conditions experienced by these fish.

## Methods

In the sections that follow, we outline the monitoring methods required under Terms 2 and 4 (Fisheries Monitoring) of the Order (SWRCB 2022a). The location of sample sites and their respective river Km can be found in Figure 1 and Table 1.



Figure 1. Sample sites for the fisheries monitoring terms in the State Water Resources Control Board 2022 Order.

Table 1. River kilometers (Rkm) for sample sites in the mainstem Russian River and in the East Fork Russian River.

Tributary	RKm	Site
East Fork Russian River	1.35	Downstream of Coyote Valley Dam
Russian River	152.59	Gobbi Street
	136.62	Parsons Creek confluence
	136.49	USGS 11462500 Russian River near Hopland
	120.02	Pieta Creek confluence
	118.16	Downstream of Leaping Lady Rock
	114.27	USGS 11463000 Russian River near Cloverdale
	109.88	Hwy 101 bridge at Geyser Rd
	39.67	Mirabel Dam
	37.01	Steelhead Beach
	34.77	USGS 11467000 Russian River at Hacienda Bridge
	23.47	Hulbert Creek
	21.36	Vacation Beach
	16.23	Monte Rio
11.17	Browns Riffle	

## Habitat measurements

### Lower Russian River

#### *Transects*

Sonoma Water was required to visit at least one but up to four critical riffles in the lower Russian River to assess adult salmonid passage opportunities. These surveys were to begin October 1 and continue through December 14, 2022. Critical riffle sites were selected based on consultation with NMFS. Sites included Brown’s Riffle near the confluence of the Russian River and Austin Creek, Monte Rio, Vacation Beach, the Russian River near the confluence with Hulbert Creek, and Steelhead Beach. Length, width, and depth measurements were to be collected, and sites documented with photographs. Sonoma Water was also tasked with conducting visual surveys of likely holding pools located near riffle sites to document whether adult salmonids were congregating in pools.

## Spawning Surveys

### Dry Creek

Beginning no later than October 1, 2022, and after 100 adult salmonids have been counted at the Mirabel fish ladder, Sonoma Water was to begin boat-based salmon spawning surveys in Dry Creek. A total of three surveys from Warms Springs Dam to the confluence with the Russian River were to be conducted.

## Alexander Valley and Upper Russian River

If flow at Healdsburg exceeds 100 cfs and at least 100 adult Chinook salmon moved past the Mirabel fish ladder, then Sonoma Water was to monitor the number of adult salmonids in representative reaches in Alexander Valley and in the upper Russian River.

## Snorkel Surveys

### Upper Russian River

Two snorkel surveys were to be conducted between June 1 and October 1. These surveys were intended to be conducted in the early (July) and late (September) portions of the monitoring season. The survey sites chosen were located on the mainstem Russian River at the following locations: at the end of Gobbi Street in Ukiah; near the mouth of Parsons Creek; downstream of Leaping Lady Rock; downstream of the confluence of Pieta Creek; and at the Highway 101 bridge near Geysers Road.

### Lower Russian River

Starting in October Sonoma Water was to conduct biweekly snorkel surveys in at least one and up to six pools based on consultation with NMFS and CDFW. These surveys were to occur between the Mirabel Dam and the estuary and to document the presence of adult salmonids.

## Video Monitoring

Sonoma Water was tasked with operating an underwater video camera in the fish ladder that provides fish passage around the Mirabel Dam, which is located on the mainstem Russian River near the town of Forestville. The video camera was to be operated from September 1, 2022, to December 14, 2022.

## Water Quality

To supplement water quality data collected at permanent USGS gage stations Sonoma Water collected temperature and dissolved oxygen (D.O.) in 5 deep pools in the upper Russian River. These sites were at the same locations as the upper Russian River snorkel survey sites.

## Results

This report is due before the Order expires (due on December 1, 2022) and presents data that has been collected through October 31, 2022. From June 17, 2022, when the Order went into effect, to October 31, 2022, flow at the Russian River USGS gage at Hacienda (USGS gage number 11467000) was typically under 100 cfs (Figure 1).

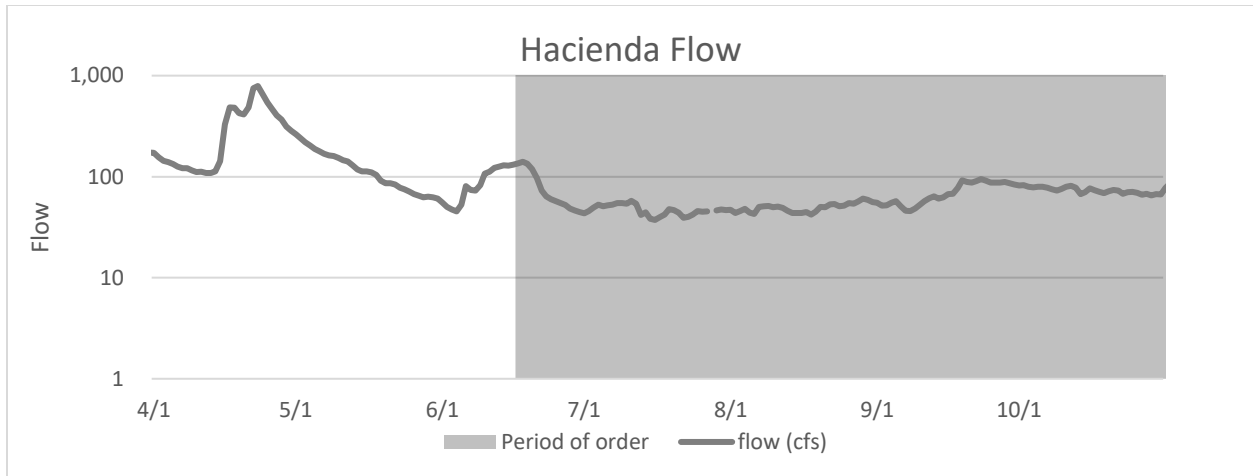


Figure 1. Flow in cubic feet per second (cfs) in the Russian River at the U.S. Geological Survey Hacienda stream gage (USGS gage number 11467000) from June 17, 2022, to October 31, 2022. Gray indicates the period included in the TUC Order issued by the State Water Resources Control Board on June 17, 2022.

## Habitat measurements

### Lower Russian River

#### Transects

From October 1 through December 14, 2022, Sonoma Water was to measure one and up to four riffles in the lower river to assess fish passage. As of October 31, 2022, those surveys had not yet been implemented but the sites that will be surveyed include the mainstem Russian River at Monte Rio, Vacation Beach, at the confluence with Hulbert Creek, and at Steelhead Beach.

### Spawning surveys

#### Dry Creek, Alexander Valley, and Upper Russian River

As of October 31, 2022, spawner surveys in Dry Creek and the mainstem Russian River had not yet been implemented.

## Snorkel Surveys

### Upper Russian River

Two dive surveys were conducted in the upper Russian River. These surveys were intended to be conducted in the early (July) and late (September) portions of the monitoring season. The early survey was conducted on June 21, 2022, however, due to staffing constraints it was necessary to conduct the late survey on August 31, 2022 (Table 2. **Error! Reference source not found.**). Visibility was variable between sites, but was suitable during the August 31, 2022, survey at most sites. The Russian River near Parsons Creek was not surveyed on August 31, 2022, due to lack of landowner access. In total 65 juvenile steelhead were observed during the June 21, survey (Table 1). Most (49) of these fish were observed at one site, Hwy 101 crossing near Geysers Road, upstream of Cloverdale. A total of 10 juvenile

steelhead were observed during the August 31, 2022, survey. No juvenile steelhead were observed at the Hwy 101 crossing near Geysers Road during the August 31, 2022, survey. The lack of juvenile steelhead at this site during the August survey is likely due to unsuitable water temperatures.

Table 2. The number of fish observed at dive survey sites in the upper Russian River on June 21 and August 31, 2022. Also shown is water visibility in meters. All steelhead observed were juveniles. No survey was conducted at Parsons Creek on August 31, 2022, due to lack of landowner access.

Date	Site	Visibility (meters)	Steel-head	Hard-head	Pike-minnow	Roach	Sacramento Sucker	Smallmouth Bass	Russian River Tule Perch
6/21	Gobbi Street	3	8				3		
	Parsons Creek	4	1						10
	D.S. of Leaping Lady Rock	1							
	D.S. of Pieta Creek	4	7	20		75	60		30
	Hwy 101 bridge near Geysers Rd	5	49				1		
8/31	Gobbi Street	3	1						
	Parsons Creek	no survey							
	D.S. of Leaping Lady Rock	10		20				4	30
	D.S. of Pieta Creek	10	9	1035	8	1	50	1	50
	Hwy 101 bridge at Geyser Rd	10		52	2		10	13	5

### Lower Russian River

On October 13, 2022, Sonoma Water conducted a dive survey in the lower Russian River (Table 33). Sites sampled included downstream of the Mirabel Dam in Forestville, the pool at the Hacienda Bridge crossing, and the mainstem Russian River at the confluence with Hulbert Creek. Visibility ranged from 1 m at Hulbert Creek to 4 m at Mirabel Dam and Hacienda. No adult salmonids were observed. One juvenile steelhead was observed downstream of the Mirabel Dam.

Table 33. The number of fish by species, observed during a dive survey in the mainstem Russian River at the Mirabel Dam, at Hacienda Bridge, and at the confluence with Hulbert Creek on October 13, 2022.

Site	Water Visibility (meters)	Species	Number of Fish
Mirabel Dam	4	Steelhead	1
		Hardhead	20
		Tule perch	5
Hacienda Bridge	4	Carp	4
		Hardhead	10
		Largemouth bass	15
		Pikeminnow	20
		Sacramento sucker	100
		Smallmouth bass	10
RR at Hulbert Creek	1	Sacramento Sucker	1

### Video Monitoring

Sonoma Water installed a video camera in the fish ladder at the Mirabel Dam on September 1, 2022, to monitor adult salmonids as they returned to the Russian River. By October 31, 2022, a total of 104 adult Chinook salmon, and 6 adult Coho had passed the Mirabel Dam (Figure 2 and Table 4).

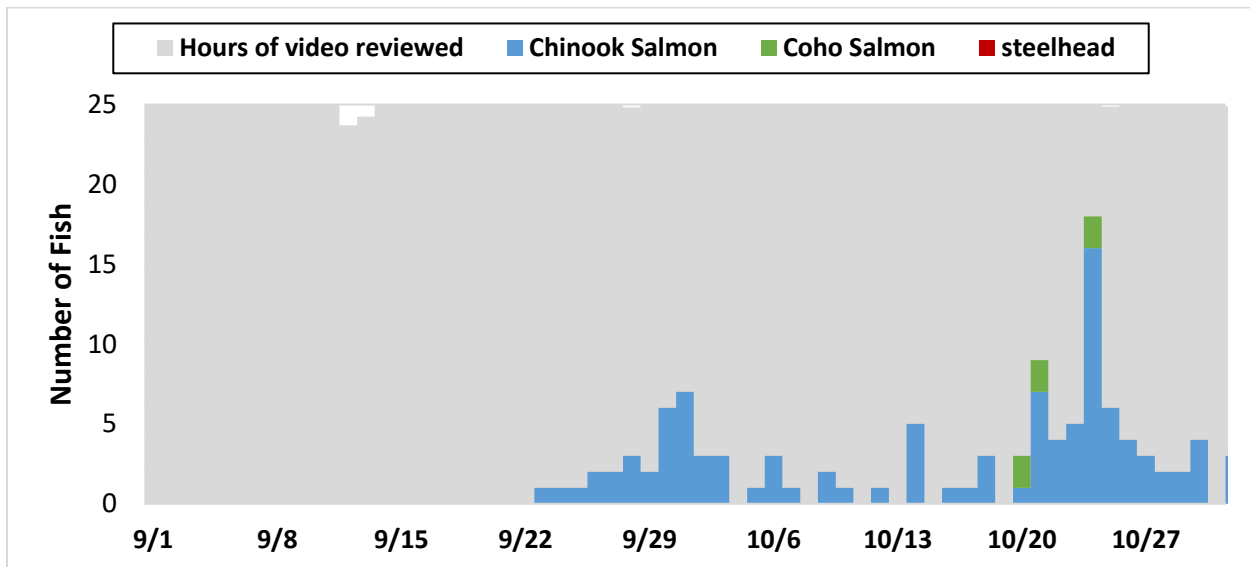


Figure 2. Number of adult salmonids and proportion of each day reviewed for video monitoring data collected at the Mirabel Dam, (9/1/2022-10/31/22).



Table 4. Weekly totals of adult salmonids observed on the Mirabel Dam video camera (9/1/2022-10/31/2022) and historic run timing.

Week	<i>Chinook Salmon</i>		<i>Coho Salmon</i>		<i>Steelhead</i>	
	2022	2000-2019 Avg	2022	2000-2019 Avg	2022	2000-2019 Avg
09/01	0	0.05%	0	0.00%	0	0.65%
09/08	0	0.14%	0	0.00%	0	0.65%
09/15	0	0.24%	0	0.10%	0	0.71%
09/22	10	0.59%	0	0.00%	0	0.93%
09/29	22	6.10%	0	0.30%	0	1.30%
10/06	8	3.57%	0	0.61%	0	1.30%
10/13	10	13.30%	0	1.73%	0	2.35%
10/20	43	13.66%	6	3.05%	0	1.42%
10/27	11	17.31%	0	1.12%	0	1.27%

### Water Quality

Temperature and dissolved oxygen loggers were recovered on October 25, 2022; however, the loggers located at the Highway 101 crossing near Geysers Road was stolen before data could be downloaded. Temperature at Gobbi Street ranged from 11.9 °C to 18.5 °C, temperature at the confluence with Parsons Creek ranged from 12.9 °C to 22.5 °C, temperature at the confluence with Pieta Creek ranged from 13.4 °C to 23.4 °C, temperature at Leaping Lady Rock ranged from 13.5 °C to 22.6 °C (Figure 3 to Figure 6). Dissolved oxygen at Gobbi Street was poor after mid-August, dissolved oxygen at Parsons Creek and at Pieta Creek was fair (Figure 3 to Figure 6). The dissolved oxygen sensor for Leaping Lady Rock was being serviced and could not be installed until late July. It was installed on the stream bottomed at the bottom of a deep pool. After the D.O. logger was installed at Leaping Lady Rock D.O. declined sharply (Figure 6).

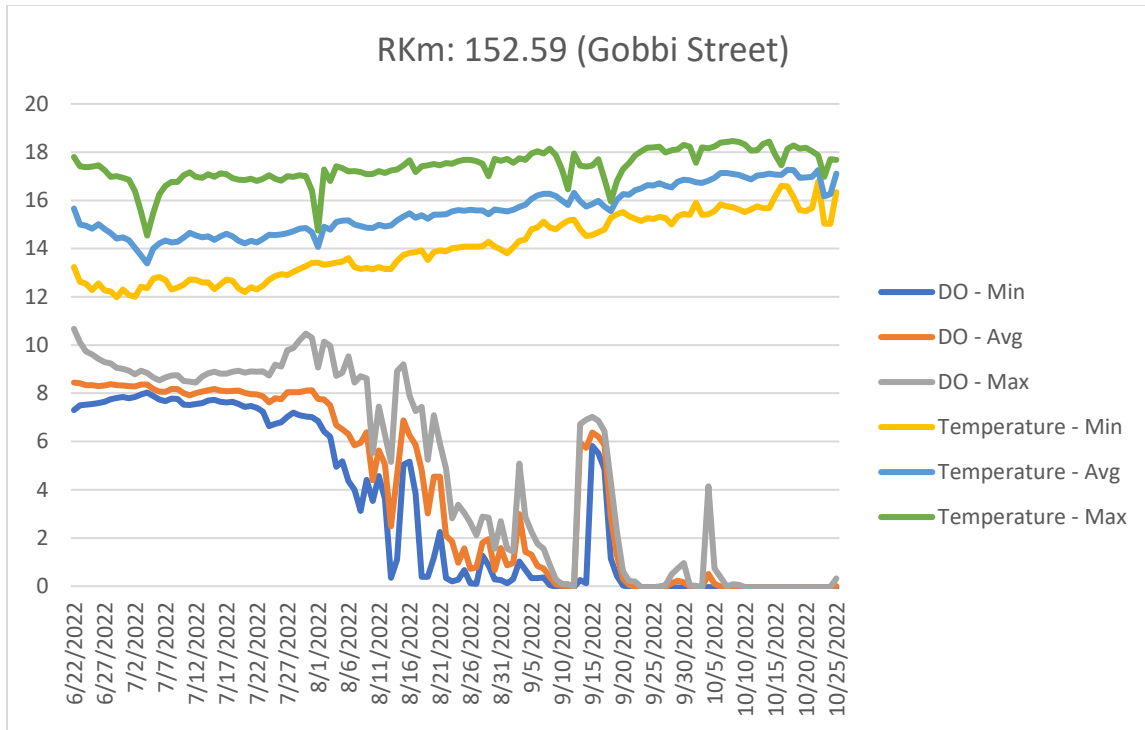


Figure 3. Temperature and dissolved oxygen collected in the mainstem Russian River near the end of Gobbi Street in Ukiah at river km 152.59 from June 22, 2022, to October 25, 2022.

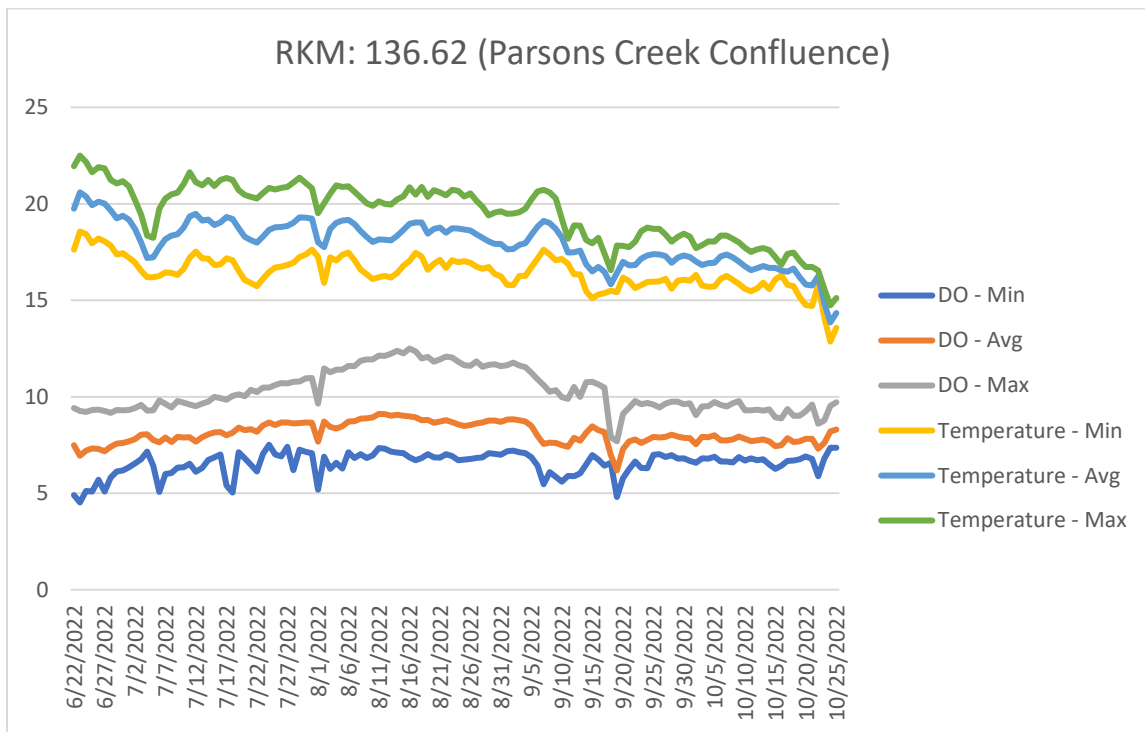


Figure 4. Temperature and dissolved oxygen collected in the mainstem Russian River near the confluence with Parsons Creek near Hopland at river km 136.62 from June 22, 2022, to October 25, 2022.

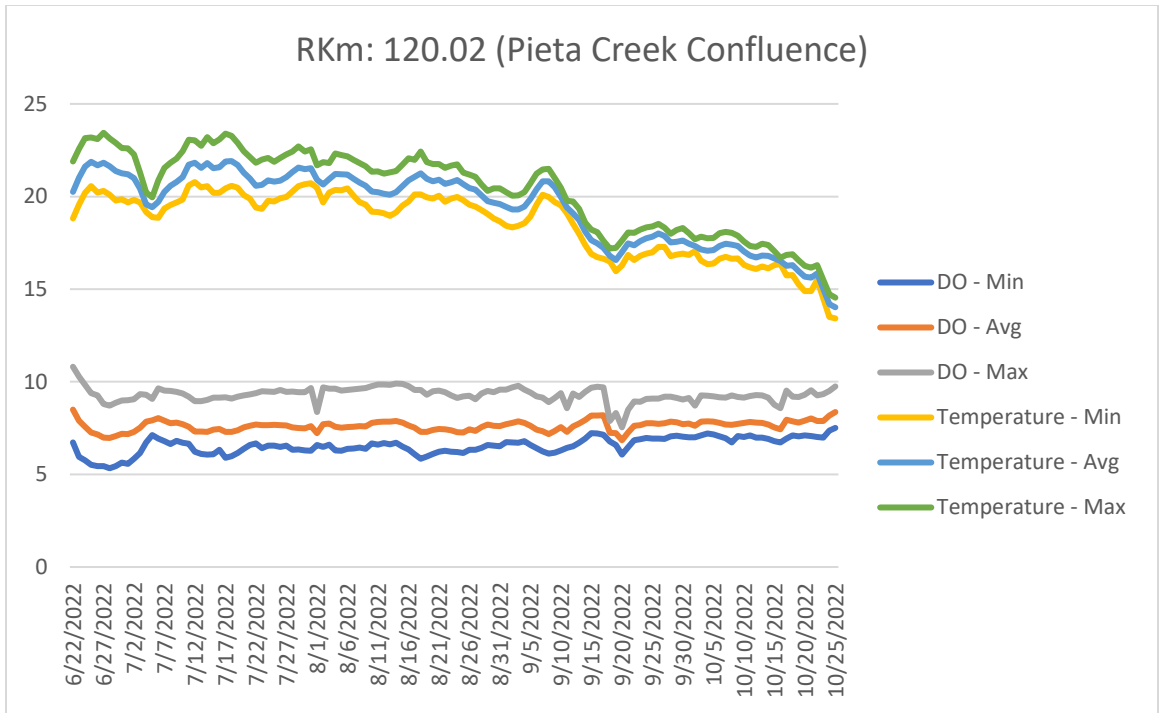


Figure 5. Temperature and dissolved oxygen collected in the mainstem Russian River near the confluence with Pieta Creek near Hopland at river km 120.02 from June 22, 2022, to October 25, 2022.

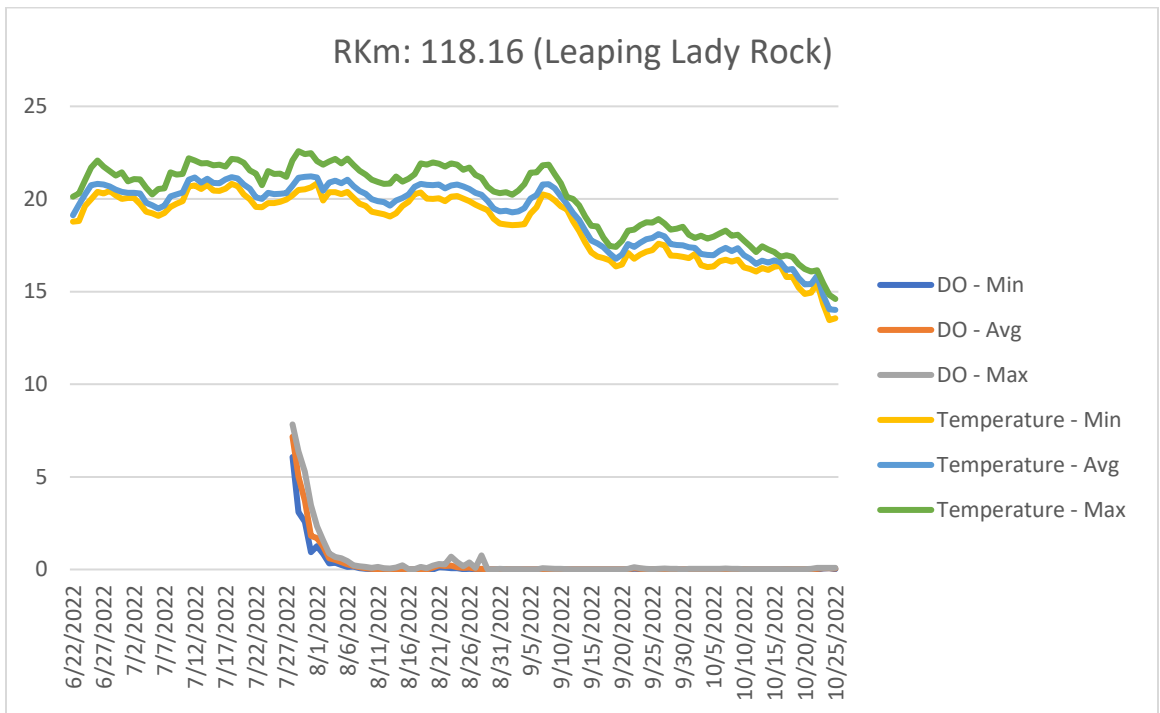


Figure 6. Temperature and dissolved oxygen (D.O.) collected in the mainstem Russian River near Leaping Lady Rock near Hopland at river km 118.16. Temperature data was collected from June 22, 2022, to October 24, 2022. The D.O. was collected from July 29, 2022, to October 25, 2022.

## Summary and Discussion

### Snorkel Surveys

The fish species assemblage observed in 2022 during snorkel surveys is similar to the species assemblage observed during snorkel surveys conducted for the Sonoma Water's Fisheries Enhancement Program and for surveys conducted for previous Orders where juvenile steelhead are relatively uncommon and non-salmonids dominate the fish assemblage. Sonoma Water conducted snorkel surveys in 2002 as part of the Fisheries Enchantment Program. Selected sections of the river from the confluence of the east and west fork of the Russian River to the confluence of the mainstem Russian River and with Dry Creek were sampled. During the 2002 survey 1,436 juvenile steelhead were detected. Steelhead were found in the upper portions of the Ukiah reach, throughout most of the canyon reach, and infrequently in the Alexander Valley and Healdsburg reaches. The effort of the 2002 snorkel surveys was much higher than snorkel surveys conducted in future years. However, juvenile steelhead only comprised 1% to 5 % of the fish counted depending on the reach surveyed in the 2002 study (Cook 2003). Snorkel surveys conducted for Temporary Urgency Change Orders in recent years have resulted in fewer observations of juvenile steelhead. For example, 16,384 fish comprised of 13 species were observed during snorkel surveys conducted in the upper Russian River in 2009, but only 18 of those fish were juvenile steelhead (SCWA 2010). In 2010, 9,655 fish comprised of 11 species were observed during the 2010 TUCO snorkel surveys, but only 11 of these individuals were juvenile steelhead (SCWA 2011). In 2011, a total of 5,226 fish comprised of 11 species were observed in upper Russian River snorkel surveys, but only 19 juvenile steelhead were observed (SCWA 2012). In 2012, a total of 7,321 fish were detected during summer dive surveys consisting of 11 species, but only 15 juvenile steelhead were detected (SCWA 2013). In 2013, a total of 5,928 fish were detected during summer dive surveys consisting of 8 fish species, with 311 being juvenile steelhead (SCWA 2014). In August 2021, 759 fish were observed consisting of 7 species, but only 5 were juvenile steelhead (Sonoma Water 2022). Because the number of sample sites, the location of sites, and water visibility differed between years, direct comparisons between years should not be made.

### Video Monitoring

In total 104 Chinook salmon were observed on the Mirabel camera from when the camera was installed on September 1, 2022, to October 31, 2022. Video monitoring of the adult Chinook run has been conducted annually from 2000 to 2022, with the exception of 2014 and 2015 when the fish ladder was being replaced. Compared to the long-term data set (2000-present), a large portion of the run typically returns to the Russian River by October 31 (Table 4). However, in other drought years there has been a late start to the adult Chinook salmon run (SCWA unpublished data) so it is likely that the 2022 adult Chinook run will be delayed.

### Water Quality

Water temperature likely influenced the distribution of juvenile steelhead in the upper Russian River. More juvenile steelhead were observed in the upper Russian River during the June dive surveys than the August dive survey. The lack of steelhead at the Cloverdale dive site (Hwy 101 crossing) in August is likely due to warm water temperatures. Releases from Coyote Valley Dam provide cool water for steelhead rearing in the upper Russian River. In most years the downstream end of this thermal refuge is

in the section of river between Hopland and Cloverdale. In 2022 water temperatures at the USGS Cloverdale gage (USGS gage number 11463000) reached unfavorable temperatures for steelhead rearing (Figure 7). However, it is worth noting that water temperatures are often acutely stressful at the Cloverdale site (Figure 7). For a detailed discussion of water temperature see Sonoma Water’s report that summarizes data collected for Term 3 (water quality) in the 2022 TUCO.

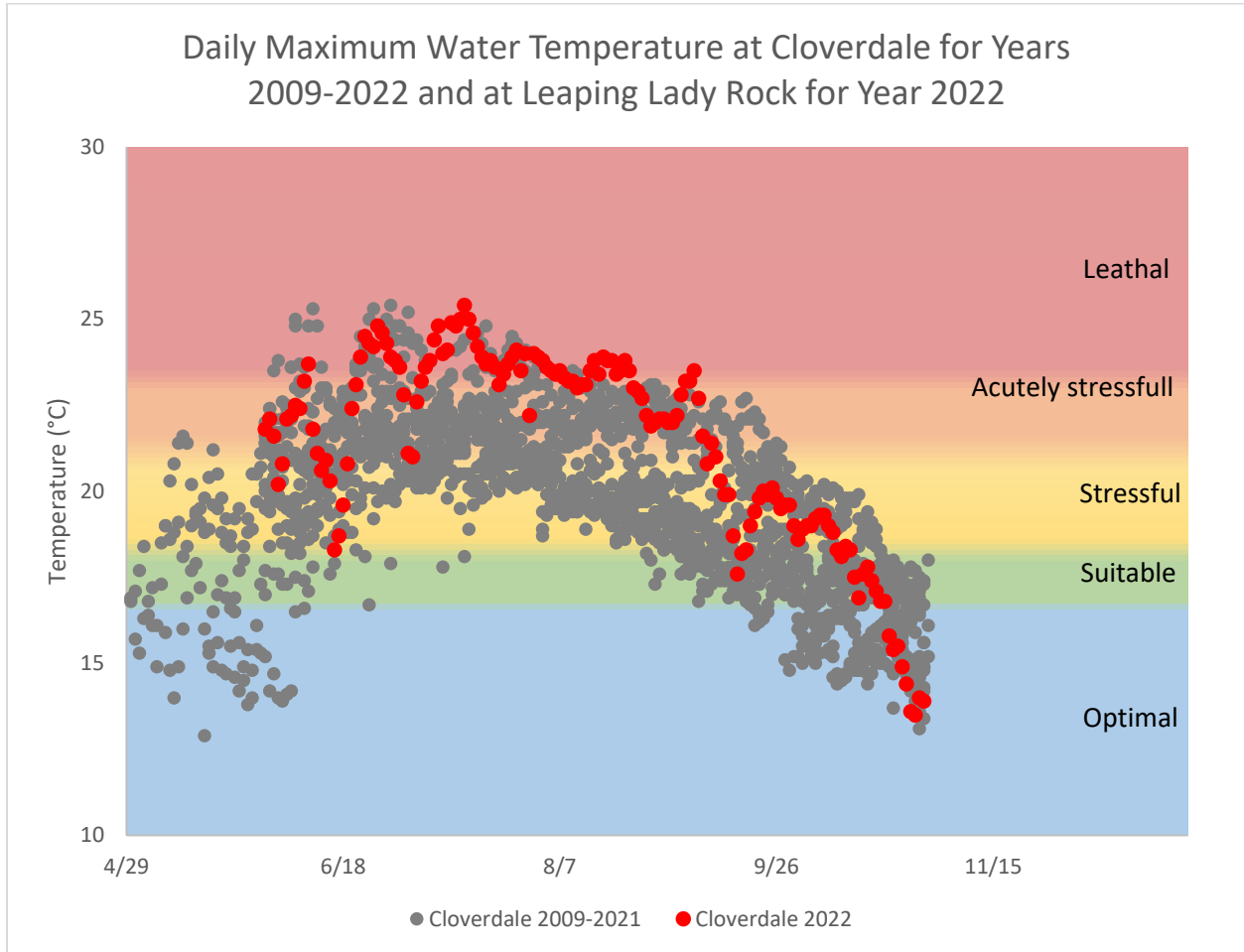


Figure 7. The daily maximum water temperatures for years 2009 through 2022 from the USGS Russian River gage at Cloverdale (USGS gage number 11463000) shown with optimal ( $< 16.9^\circ\text{C}$ ), suitable ( $16.9^\circ\text{C}$  to  $18.9^\circ\text{C}$ ), stressful ( $18.9^\circ\text{C}$  to  $21.9^\circ\text{C}$ ), acutely stressful ( $21.9^\circ\text{C}$  to  $23.8^\circ\text{C}$ ) and lethal ( $> 23.9^\circ\text{C}$ ) water temperature zones for steelhead rearing based on SCWA 2016.

D.O. at Leaping Lady Rock was lower than D.O. at the confluence of the mainstem Russian River with Pieta Creek and the confluence of the mainstem Russian River with Parson Creek. This is likely due to thermal stratification occurring in the pool at Leaping Lady Rock resulting in limited oxygen exchange with the hypolimnion. In 2021 the pool at Leaping Lady Rock was thermally stratified whereas the pools at the confluence of the mainstem Russian River with Pieta Creek and the confluence of the mainstem Russian River with Parson Creek were not thermally stratified. Thermal stratification in pools was not an environmental condition that was monitored in 2022. However, because flows in summer 2022 were similar to those in 2021, it is likely that stratification occurred at Leaping Lady Rock in 2022.

Unfortunately, the cooler water at the bottom of Leaping Lady Rock pool may not have been valuable rearing habitat as dissolved oxygen at the bottom of the pool was low (Figure 6).

Low dissolved oxygen levels at Gobbi Street may be related to conditions in Lake Mendocino but there is a possibility that the placement of the D.O. logger near the stream bottom affected the accuracy of its readings. Cool water releases made from the bottom of Lake Mendocino provide summer steelhead rearing habitat in the upper Russian River in most years. Dissolved oxygen is typically low in the east fork Russian River and generally recovers a short distance downstream (SCWA unpublished data). In 2022 dissolved oxygen in the east fork of the Russian River (6.8 rKm upstream of Gobbi Street) was also low (Figure 8). However, D.O. became low in the east fork Russian River approximately 2 months before D.O. became low at Gobbi Street. This suggests that the D.O. readings at Gobbi Street may not be related to low D.O. water released from Lake Mendocino. The pool at Gobbi Street that the logger was placed in was not stratified, but the logger was located near detritus on the stream bottom so it is possible that this decomposing material affected the D.O. measurements.

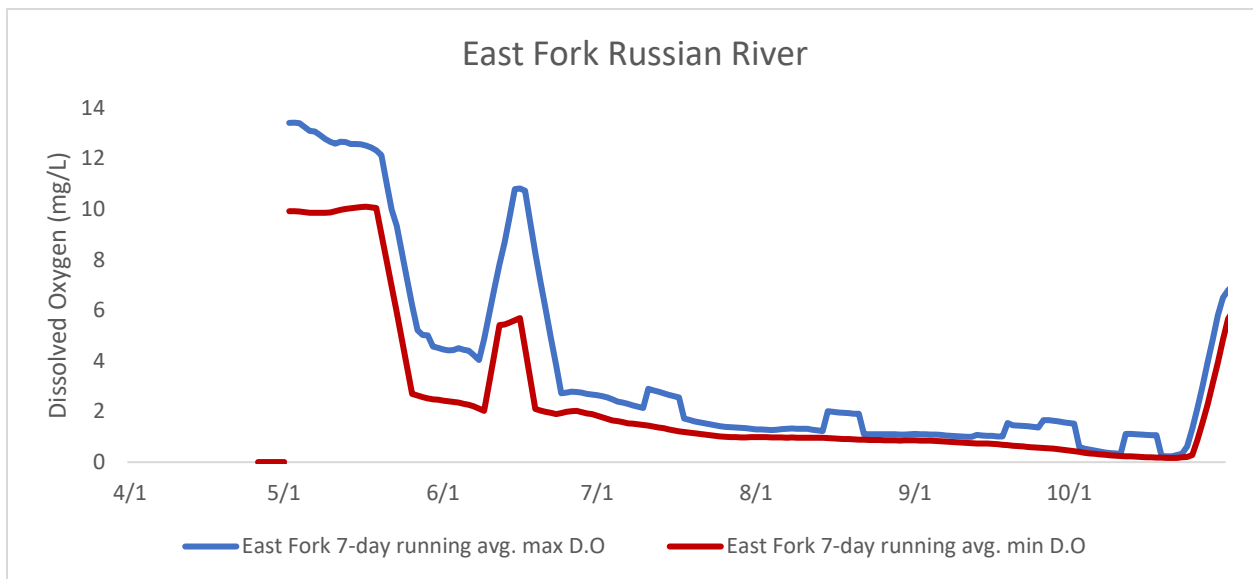


Figure 8. Dissolved oxygen in the east fork Russian River near the outlet of the Coyote Valley Dam.

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