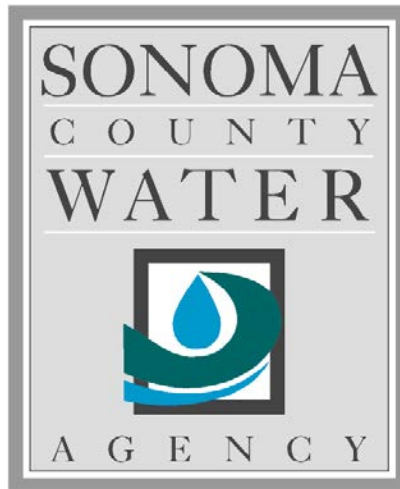


State Water Resources Control Board
Order 5/1/2016

Term 2 - Fisheries Monitoring Tasks



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Prepared by

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Introduction

On April 15, 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 upper Russian River to comply with operational constraints placed on the Water Agency 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, Water Agency, and the Mendocino County Russian River Flood Control and Water Conservation Improvement District in the Russian River watershed (Biological Opinion).

In summary, the Water Agency requested that the SWRCB make the following temporary changes to the Decision 1610 (D1610) instream flow requirements:

- (1) From May 1, 2016, through October 27, 2016, reduce instream flow requirements for the upper Russian River (from its confluence with the East Fork of the Russian River to its confluence with Dry Creek) from 185 cubic feet per second (cfs) to 125 cfs.
- (2) From May 1, 2016, through October 27, 2016, reduce instream flow requirements for the lower Russian River (downstream of its confluence with Dry Creek) from 125 cfs to 70 cfs.

The TUCP also requested that compliance with these minimum instream flow requirements be measured based on a 5-day running average of average daily stream flow measurements, provided that instantaneous flows on the upper Russian River shall be no less than 110 cfs and on the lower Russian River shall be no less than 60 cfs. These 5-day running average provisions allowed the Water Agency to reduce the operational buffers needed to manage these stream flows, thereby allowing the Water Agency to conserve more water in Lake Mendocino. The SWRCB issued an Order (Order) approving the Water Agency's TUCP on May 4, 2016 (SWRCB 2016).

The State Water Board's Order included fisheries monitoring and reporting tasks which are summarized in term 2 of the Order. Term 2 required that the Water Agency monitor and record the daily number of adult salmonids moving upstream through the Russian River past the Dry Creek life cycle monitoring station and past the Healdsburg fish ladder. Beginning October 1, 2016 if the mouth of the river was open and adult salmon and steelhead could enter the Russian River the Water Agency was to monitor the number of adult salmon and steelhead in relatively deep pools in the lower Russian River (downstream of the Mirabel inflatable dam) on a weekly basis continuing through the duration of the order or until sustain flow at Hacienda (USGS gage 11467000) was above 135 cfs. 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, the Water Agency was to consult with NMFS and CDFW regarding the possibility of increasing the instream flow at the gage at Hacienda (USGS gage 11467000) to a level not to exceeding 135 cfs. Consultations were to

occur every two weeks and a summary report of consultation details and any increases to the minimum flows was to be submitted to the Deputy Director for Water Rights within one week of each consultation meeting.

Methods

Adult fish counts

The Water Agency used a dual-frequency identification sonar (DIDSON) and underwater video to count adult salmonids at 3 different sites. At Dry Creek, DIDSON was used to monitor adult salmonids which allowed us to count adult salmonids as they returned to Dry Creek. The Water Agency also installed an underwater video camera at the Healdsburg fish ladder in order to count adult salmon migrating up the mainstem Russian River. Since this site is located on the main stem Russian River, upstream of Dry Creek we assume that fish counted at this station are different individuals for those counted at the Dry Creek station. In 2016 the Water Agency experimented with operating an underwater video camera in the newly constructed Mirabel fish ladder. This site is located downstream of Dry Creek and Healdsburg so combining counts at all three counting stations will lead to double counting of fish. While not required by the Order, we have included the Mirabel adult salmon and steelhead counts for completeness.

Snorkel surveys

The SWRCB requested that the Water Agency conduct snorkel surveys on a weekly basis in the lower Russian River to detect adult salmonids. In 2016 the Water Agency sampled sites at Northwood, Vacation Beach, Guerneville, Forestville, and Mirabel.

Results

Flow

From May 1, 2016 to October 27, 2016 flow in the Russian River at Hacienda ranged from a high of over 900 cfs during a storm in late October to a low of 90 cfs in July. During the period of the Order, 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 adult Chinook migration period flow was typically above 135 cfs (Figure 1).

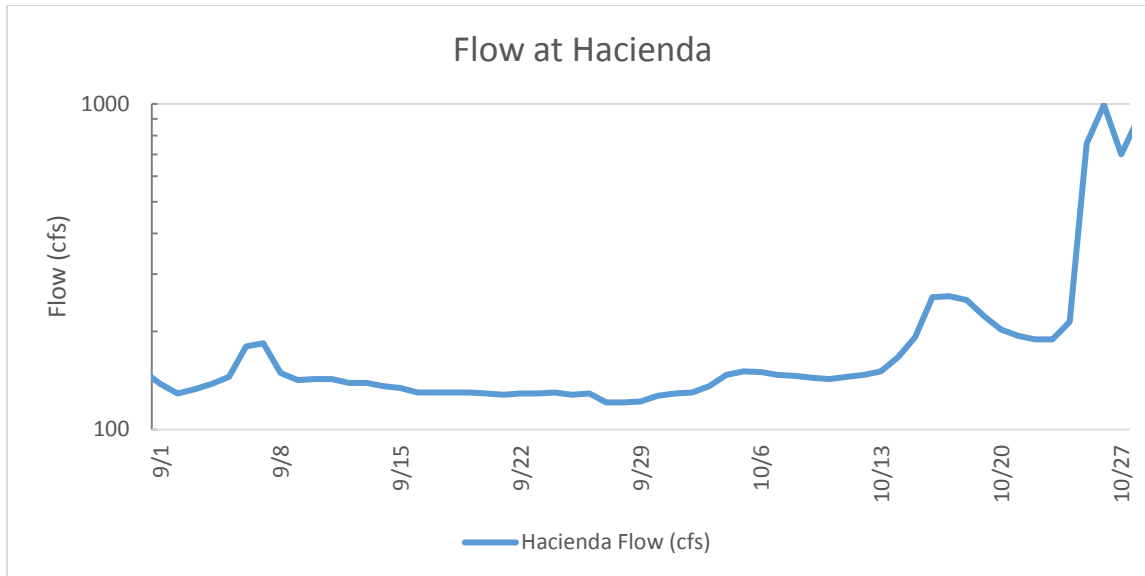


Figure 1. Flow at the USGS stream gages at Hacienda, Healdsburg, and Hopland during the period of the Order.

Adult counts

Video and DIDSON counts

The Water Agency installed a DIDSON and underwater video camera near the mouth of Dry Creek on September 1, 2016. During the Order there were 6 periods when DIDSON was not collecting images for a larger portion of the day due to technical problems (September 3 through September 6; September 18 through September 20; September 22; September 27 through September 29; October 18 through October 21; and October 26 through October 27, 2016 Figure 2). In addition to the DIDSON at Dry Creek, the Water Agency operated an underwater video camera in the Healdsburg Fish ladder from September 15 to December 9, 2015 (Figure 3). Due to technical difficulties large portions of days from September 6 through September 10; and from September 30 through October 6, 2016 were not recorded. All data at the Healdsburg fish ladder was lost from September 15 to September 29, 2016 due to technical problems. The Healdsburg video camera was removed on October 25 because the site became flooded during a storm event. In addition to the Dry Creek DIDSON and the Healdsburg fish ladder video camera required by the Order the Water Agency operated a video camera at Mirabel from September 9 to after the Order expired. Typically 2 video cameras are operated at Mirabel, one in the east fish ladder and one in the west fish ladder. However in 2016 we were unable to operate a video camera in the east fish ladder during the Order. There were three periods of significant data loss at Mirabel (September 22, September 28, and From October 5 to October 6, 2016; Figure 4)

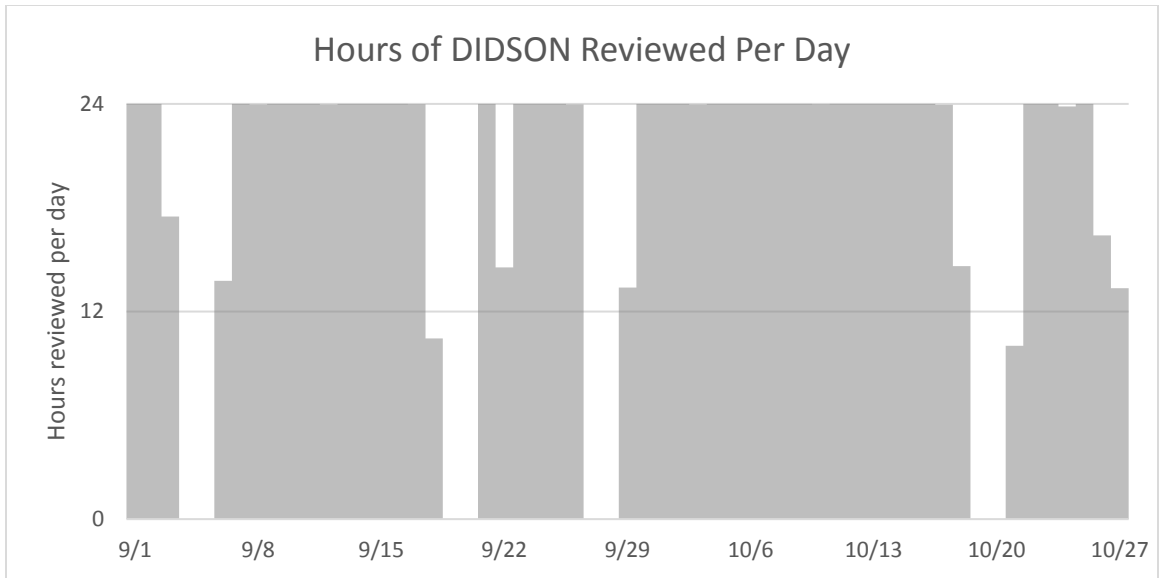


Figure 2. The number of hours of DIDSON that has been reviewed at the Dry Creek sampling site. Missing hours are due to technical difficulties.

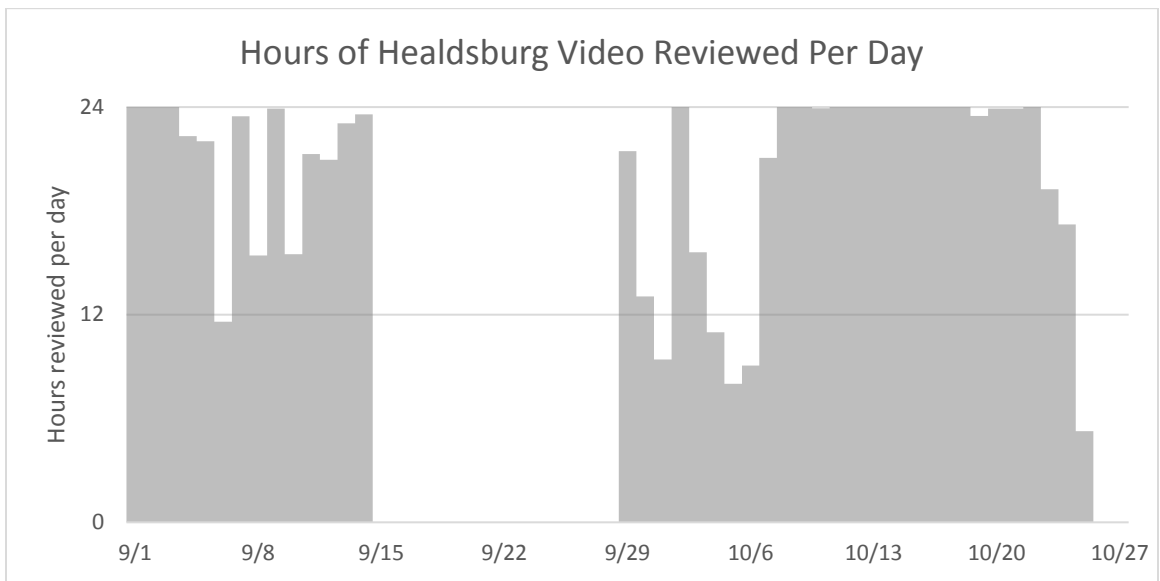


Figure 3. The number of hours of underwater video that has been reviewed per day at the Healdsburg Fish ladder on the mainstem Russian River. Missing hours are due to corrupt data and technical difficulties.

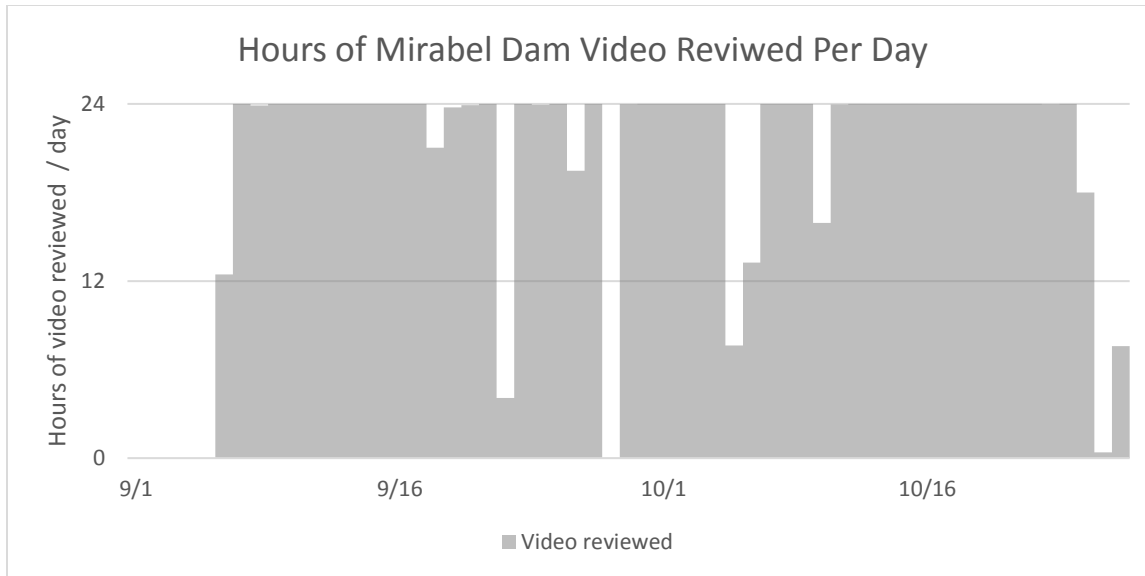


Figure 4. The number of hours of underwater video that has been reviewed per day at the Mirabel Fish ladder on the mainstem Russian River. Missing hours are due to corrupt data and technical difficulties.

During the period of the Order, 1,642 adult salmonids were observed when combining the Mirabel, Dry Creek and Healdsburg counts. However, this includes double counting since fish passing Healdsburg or Dry Creek would have first passed and been counted at Mirabel. At Mirabel 826 Chinook, 7 fish that had coho characteristics, 2 steelhead adults, 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 vast majority are presumed to be Chinook based on run timing). The river mouth was closed for much of September (Figure 5). With the exception of 2 fish all adult salmonids observed at our counting stations were observed after September 30, 2016. The reason that adult salmonids were not observed in September is likely due to a barrier beach at the river mouth limited fish entry for much of September. The barrier beach formed at the mouth of the Russian River on September 10, 2016 precluding fish entry and remained intact until September 29, 2016.

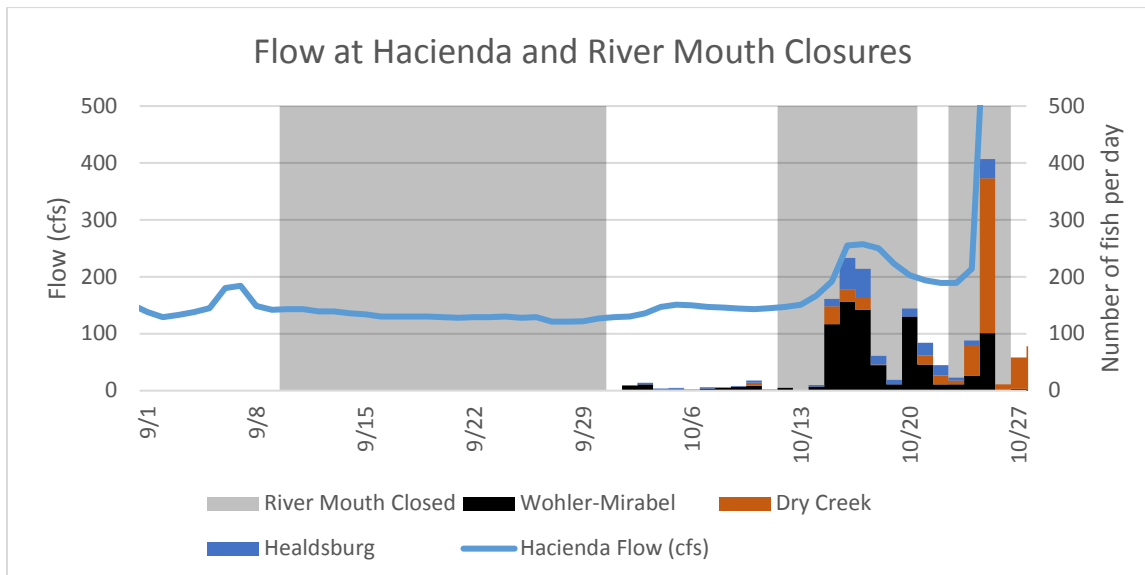


Figure 5. The period of time that the mouth of the Russian River was closed, the flow in the Russian River from the USGS Hacienda gage, and the number of adult salmonids observed at the Dry Creek DIDSON, Healdsburg underwater video, and Mirabel underwater video during the period of the Order.

Snorkel Surveys

As in previous years few adult salmonids were observed during snorkel surveys conducted by the Water Agency. The mouth of the Russian River remained closed for much of the fall and limited salmonids from entering the river from the ocean. The river mouth closed on September 10, 2016 and opened on September 30, 2016. The river mouth closed again on October 12, 2016 and remained closed until October 21, 2016. The Mouth closed again on October 23, 2016 and remained closed until October 26, 2016 when it opened and remained open for the duration of the Order. The Water Agency conducted the first snorkel survey on October 5, 2016. Snorkel surveys were conducted on a weekly basis until October 24, 2015 when flow and turbidity in the River became too high to safely conduct snorkel surveys. Snorkel survey sites were located at: Northwood, Vacation Beach, Guerneville, Forestville, and Mirabel. Visibility ranged from 1 foot to 6 feet during the surveys. Only one adult salmonid (a Chinook at Mirabel on October 18, 2016) was observed during these surveys (Table 1).

Table 1. Dates when Snorkel surveys were conducted by the Water Agency, locations of survey sites, and the number of salmonids observed.

Date surveyed	Visibility (ft)	Site	Chinook	Steelehad	Coho
5-Oct	6	Northwood	0	0	0
		Vacation beach	0	0	0
		Guerneville	0	0	0
		Forestville	0	0	0
13-Oct	1-6	Vacation beach	0	0	0
		Forestville	0	0	0
		Mirabel	0	0	0
18-Oct	1-6	Vacation beach	0	0	0
		Forestville	0	0	0
		Mirabel	1	0	0
24-Oct	0	Not Surveyed	-	-	-

Discussion

Flow

Flow in the Russian River was influenced by natural run off and tributary inflow during the end of the Order. Storm events in October of 2016 influenced our ability to monitor adult salmonids as it created unsafe conditions for snorkel surveys, and increased turbidity which made the underwater video cameras less effective. A sand bar formed at the mouth of the Russian River in early September and again in October. The September closure event limited adult salmonids from entering the Russian River from the ocean for much of the month of September.

Adult Counts

Video and DIDSON counts

The bulk of the adult Chinook migration occurred after the end of the Order. The mouth of the Russian River was closed for much of the month of September and part of October. During these closures, salmon were not able to enter the Russian River from the Ocean. Many adult salmon entered the Russian River after the River mouth opened at the end of September and were observed at our counting stations. Many adult salmonids were observed at the Dry Creek counting station (the only station that can be operated during high winter flow) after the Order expired. From when the Order expired to January 31, 2016 a total of 2,739 unidentified salmonids were observed on the Dry Creek DIDSON alone.

Snorkel Surveys

Due to generally poor water visibility in the lower river during the Order, snorkel surveys failed to account for many fish likely present during the surveys. Water visibility was typically less than 2 meters at the lower river sample sites. The sample sites were often at least 3-5 meters deep and over 30 meters wide. These conditions allow for adult salmonids to easily avoid divers. When combining all sites and surveys only 1 salmonid was observed during snorkel surveys. During the same time period (October 5, 2016 through October 18, 2016) a total of 589 Chinook were observed on the underwater video at Mirabel. Snorkel surveys in the mainstem Russian River may detect the presence of fish but limited visibility restricts the use of these data.

Consultations with NMFS and CDFW

Adjustments of flow

The Order required that the Water Agency consult with the NMFS and CDFW about the possibility of increasing flow for adult passage once the combined count for the Dry Creek DIDSON and Healdsburg Fish ladder reach 100 adult salmonids. One hundred adult salmonids were observed passing the Dry Creek DIDSON and Healdsburg Fish ladder on October 21, 2016 (the day that the data was reviewed not recorded). At this time flow at Hacienda was already above 135 cfs and a significant storm was forecast to arrive on October 24, 2016. Using this information the Water Agency chose not to contact NMFS and CDFW since flow was already above 135 cfs and would likely remain above 135 cfs for the duration of the Order.

References

State Water Board, 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 change permit terms and conditions. May 04, 2016. State Water Resource Control Board. Sacramento Ca.