Sonoma Water

April 8, 2022

Attn: Mr. Erik Ekdahl
Deputy Director of Water Rights
State Water Resources Control Board
Division of Water Rights
P.O. Box 2000
Sacramento, CA 95812-2000

VIA EMAIL

RE: Reporting Requirements for Term 7 of the State Water Resources Control Board Order 2021-0056-EXEC (June 14, 2021)

Dear Mr. Ekdahl:

In accordance with the requirements of the State Water Resources Control Board Order 2021-0056-EXEC received June 14, 2021 that approved the Temporary Urgency Change Petitions for water-right Permits 12947A, 12949, 12950, and 16596 (Applications 12919A, 15736, 15737, and 19351), please accept the final submittal of the following enclosed report by Sonoma Water:

- Term 7 – Fisheries Monitoring Summary Report

If you have any questions about the report, please do not hesitate to contact me at Shiyu.Xin@scwa.ca.gov.

Sincerely,

Shiyu Xin

Shiyu Xin
Water Agency Engineer I

Enclosures

c: S. Boland-Brien, J. Ling - State Water Resources Control Board, Division of Water Rights
G. Davis, J. Jasperse, P. Jeane, D. Seymour, J. Martini-Lamb, D. Manning - Sonoma Water
C. O'Donnell, A. Brand - Sonoma County Counsel
R. Bezerra - Bartkiewicz, Kronick & Shanahan
R. Coey, J. Fuller – National Marine Fisheries Service
M. Kittel - California Department of Fish & Wildlife
M. St. John, B. McFadin – North Coast Regional Water Quality Control Board
E. Salomone – Mendocino County Russian River FCWCID

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State Water Resources Control Board
Order 6/14/2021

Term 7 – Fisheries Monitoring Summary Report

Sonoma Water

April 8, 2022

Prepared by

Sonoma County Water Agency

404 Aviation Blvd

Santa Rosa, CA 95403

Introduction

On May 14, 2021, 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 upper Russian River to address low storage in Lake Mendocino and avoid potential violations if the Incidental Take Statement contained in the 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 the date of approval of the TUCPs through a term of 180 days, the minimum instream flow requirements will be set to the Critical water supply classification criteria of 25 [cubic feet per second (cfs)] in the Upper Russian River and 35 cfs in the Lower Russian River.
2. The minimum instream flow requirement will be implemented as a 5-day running average of average daily stream flow measurements with instantaneous minimum instream flows being no less than 15 cfs on the Upper Russian River and no less than 25 cfs on the Lower Russian River.

The SWRCB issued an Order (Order) approving the Water Agency's TUCP on June 14, 2021 (SWRCB 2021).

The SWRCB's Order included fisheries monitoring and reporting tasks which are summarized in term 2 and 4 of the Order and presented in the methods section of this report.

Methods

For this report, fisheries data from June 1 to December 31 is summarized. This period encompasses the Order, which was requested on May 14, issued on June 14, and expired on December 11. At times additional fisheries information collected before June 1, and after December 31, is included in this report to put fisheries data into a broader context. In the sections that follow, we outline the monitoring methods intended under Term 4 (Fisheries Monitoring) of the Order. In some cases, an extreme weather event in late October precluded our ability to accomplish the intended monitoring. Sites monitored are depicted in Figure 1.

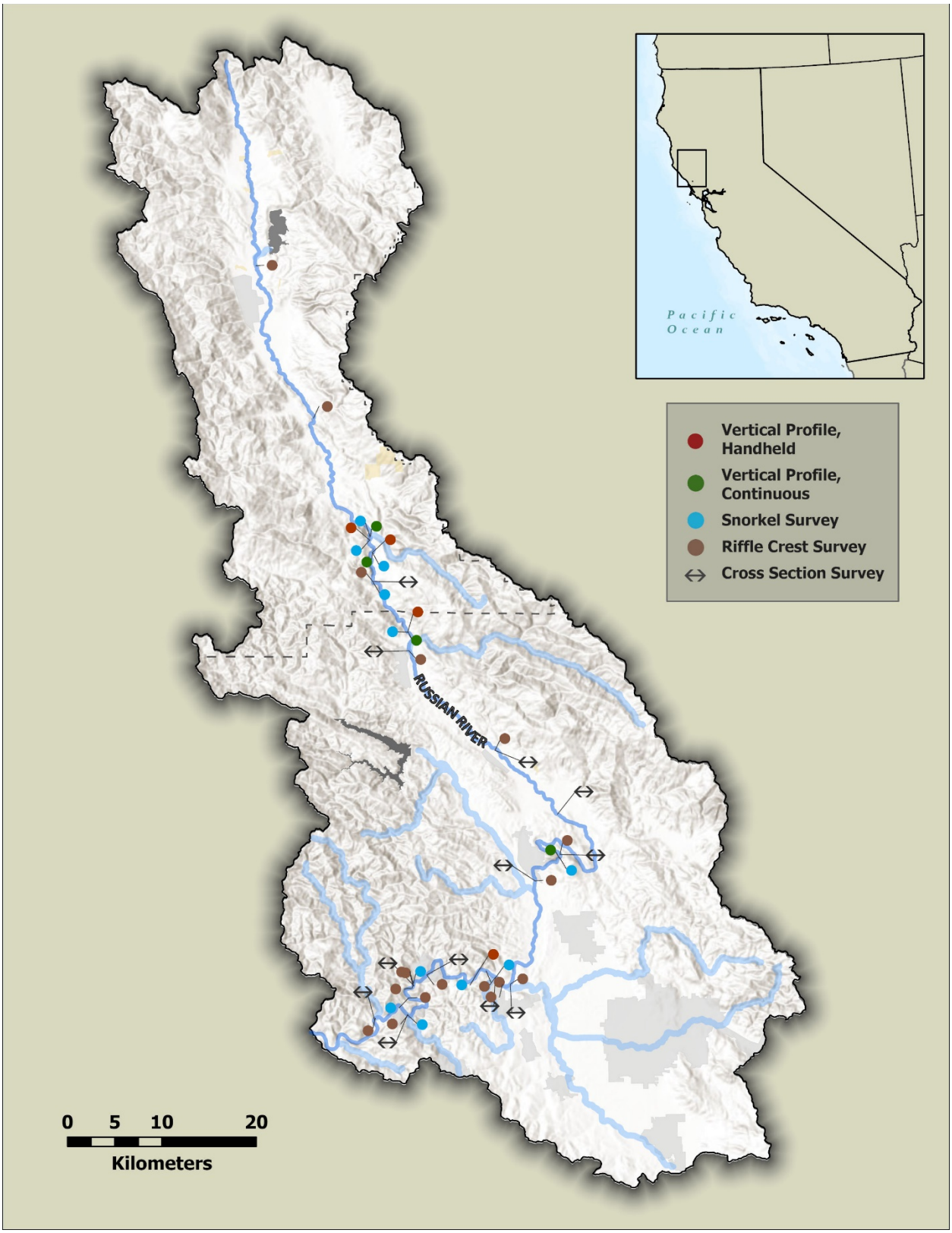


Figure 1. Fish and fish habitat survey sites for the June 2021 Russian River Temporary Urgency Change Order issued by the SWRCB.

Habitat measurements:

Upper Russian River

Transects

A total of six reaches were sampled on a biweekly basis (once every 2 weeks) from June 1, to October 1, 2012 in order to document stream conditions. Sites sampled were the confluence of the East Fork Russian River and West Fork Russian River (the Forks), Ukiah, Hopland, Commisky Station, Cloverdale, Alexander Valley and Healdsburg. Each site was approximately 500 meter long. At each site, habitat conditions and flow connectivity were documented via walking surveys and photo documentation. Measurements of width and depth at established cross-sections were also collected.

Water quality

Water temperature and dissolved oxygen measurements were collected with water quality loggers in four deep pools in the Upper Russian River. These pools were located at the mouth of Pieta Creek near Hopland, downstream of Leaping Lady Rock near Hopland, the old Highway 101 crossing near Preston (Geysers Road), and at Del Rio Woods County Park near Healdsburg. Vertical profiles were collected with a hand held water quality meter at Leaping Lady Rock and Acapulco Rock near Hopland, the old Highway 101 crossing near Preston, and at Hacienda near Forestville.

Lower Russian River

Transects

Sonoma Water visited critical riffles to assess adult salmonid passage opportunities in the lower Russian River biweekly starting during the week of October 1. Sites were based on consultation with NMFS. Sites included Monte Rio and Vacation beach, Russian River near the confluence with Hulbert Creek, Summer Crossing Road, Mom's Beach, Steelhead Beach, Mirabel. At each site riffle length, width, depth was measured, sites were documented with photographs.

Snorkel surveys

Upper Russian River:

Snorkel surveys were intended to document fish presence and species composition. Sites sampled included two pools near the mouth of Pieta Creek near Hopland, a pool near Commisky Station, the old Highway 101 crossing near Preston (Geysers Road), and at Del Rio Woods County Park near Healdsburg. Surveys were conducted once in June and once in August.

Lower Russian River:

Snorkel surveys were intended in up to six pools in the lower Russian River. These surveys were to take place between Mirabel Dam and the estuary in order to document the presence of adult salmonids. Snorkel surveys were planned to begin after adult salmonids had access to the river (i.e., when the sandbar at the mouth of the river is open) and would continue biweekly until a total of 100 adult salmonids moved past the counting station at the Mirabel fish ladder.

Video monitoring

Sonoma Water operates an underwater video camera at the Mirabel inflatable dam beginning September 1, and continuing until the Mirabel inflatable dam must be deflated to avoid damage from high flow events (in excess of 2,000 cfs). High flow events typically occur in early to mid-December. The underwater video camera is used to monitor the daily numbers of adult salmon and steelhead moving upstream through the fish ladder which provides fish passage at the Mirabel Dam.

Spawning surveys

Dry Creek

Kayak-based Chinook salmon spawning surveys have been successfully implemented in Dry Creek by Sonoma Water in previous years. For 2021 three kayak- based surveys were planned. The first was to begin on October 1, 2021 once at least 100 adult salmonids had moved past the Mirabel fish ladder and if adult salmon and steelhead could enter the Russian River estuary and if water clarity was suitable. These surveys begin at Warm Springs Dam and end at the confluence of Dry Creek with the Russian River in Healdsburg approximately 14 miles downstream. The number and location of salmon and steelhead redds and adults are recorded.

Alexander Valley and Upper Russian River

Once a total of 100 adult salmonids have moved past the Mirabel fish ladder and flows at the USGS gauge in Healdsburg exceed 100 cfs, Sonoma Water was to monitor the number of adult salmonids in representative reaches in Alexander Valley and the Upper Russian River via walk in spawner surveys. Regardless of adult salmonid counts, these surveys were to begin no later than November 1, 2021 and occur on a biweekly basis during the period of the Order.

Results:

Habitat measurements

Upper Russian River

Transect surveys

Riffle crest and cross-section measurements were taken at Ukiah, Hopland, Commisky Station, Cloverdale, Geyserville, Jimtown, Del Rio Woods, and Healdsburg (Figure 2). Riffle crest transects follow the riffle crest and are not necessarily perpendicular to flow while cross-section transects are perpendicular to flow. Measurements were taken every two weeks beginning in June and ending in September, 2021. Stream width was recorded for each transect as well as steam depth at multiple locations along each transect. In total, 53 riffle crest transects and 48 cross section transects were taken. Each sample site had a relatively small range of flow over the course of the sample period. As a result, average and maximum depths showed relatively little change over the course of the sample period (Figure 3 through Figure 14). Representative photos of each site monitored are included in the Appendix.

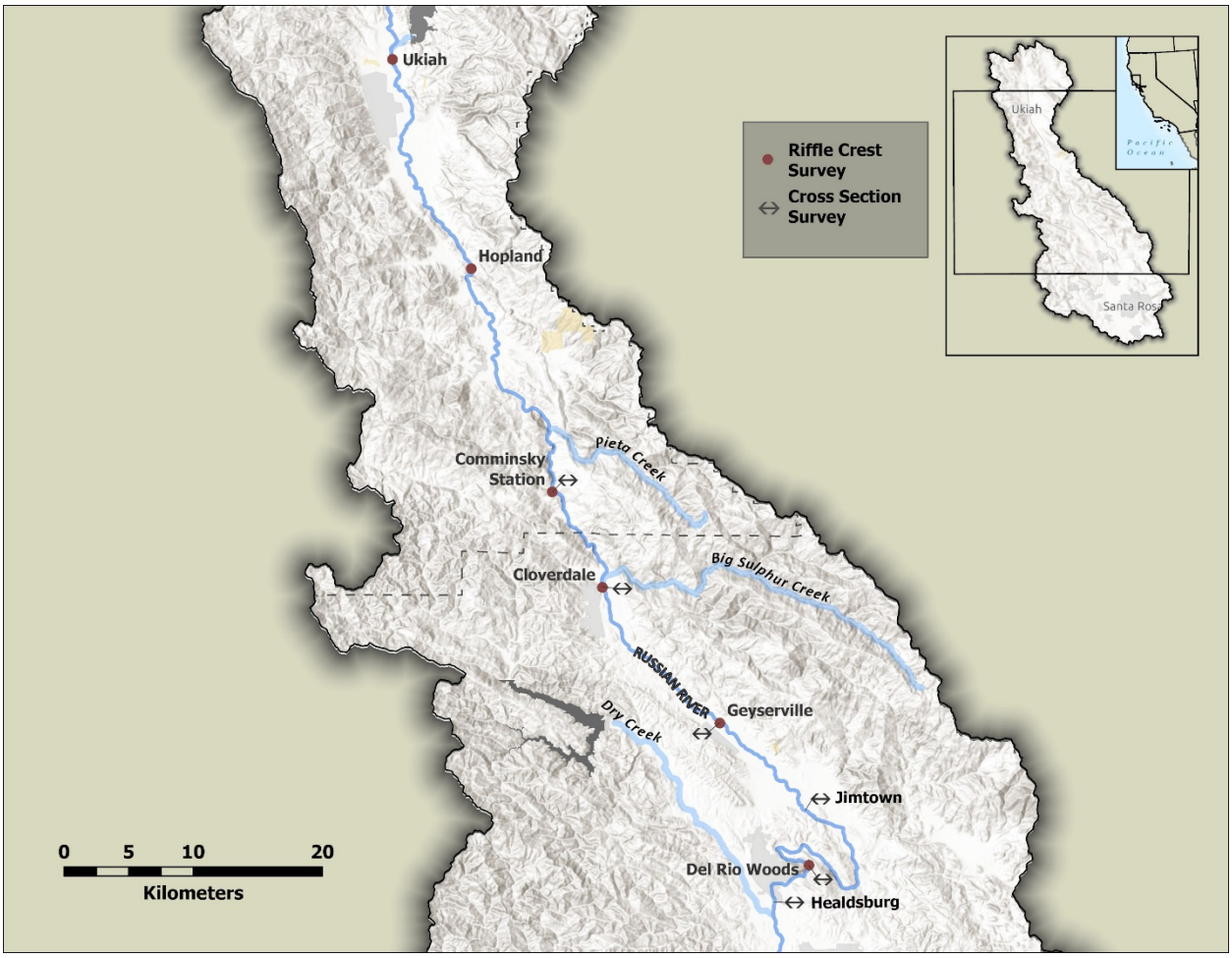
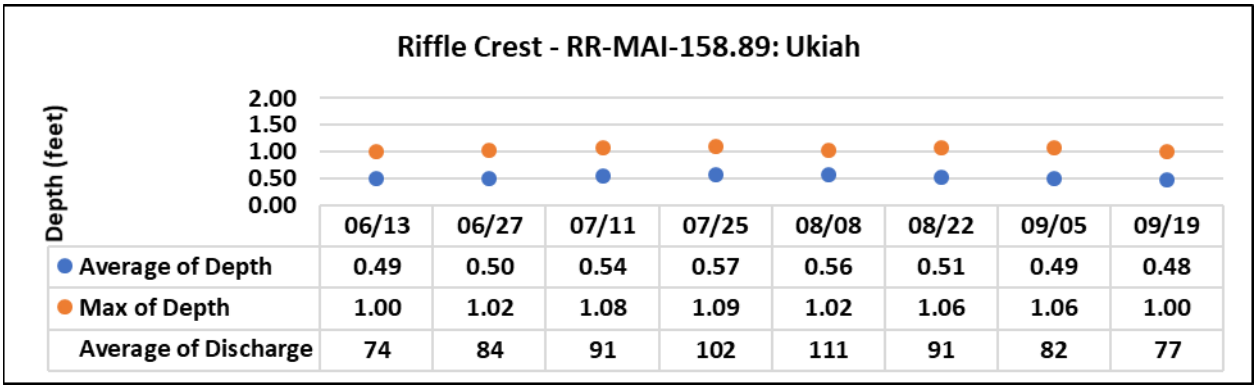
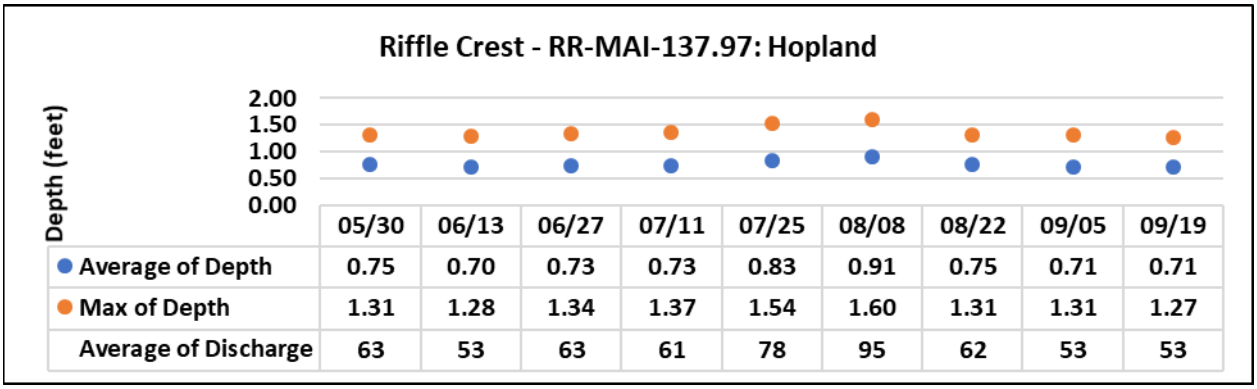


Figure 2. Riffle crest and cross-section measurements were taken at Ukiah, Hopland, Commisky Station, Cloverdale, Geyserville, Jimtown, Del Rio Woods, and at Healdsburg.



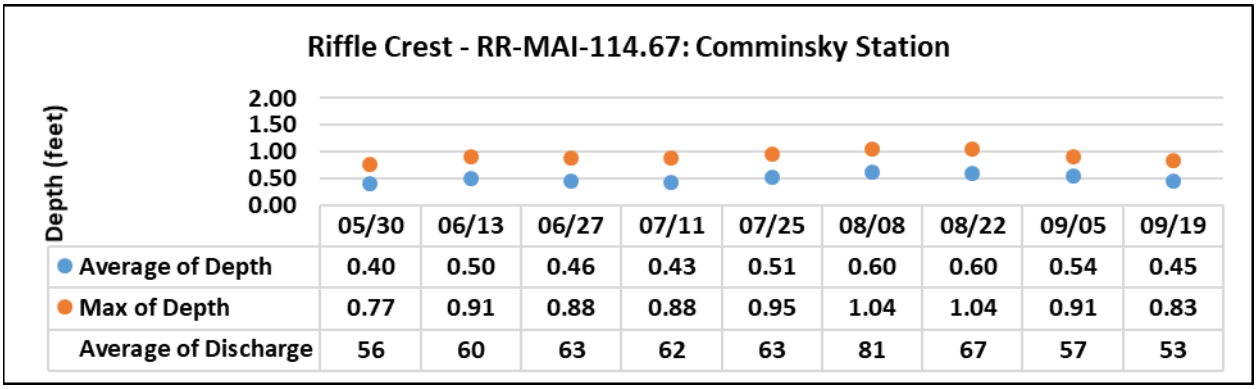
	06/13	06/27	07/11	07/25	08/08	08/22	09/05	09/19
Average of Depth	0.49	0.50	0.54	0.57	0.56	0.51	0.49	0.48
Max of Depth	1.00	1.02	1.08	1.09	1.02	1.06	1.06	1.00
Average of Discharge	74	84	91	102	111	91	82	77

Figure 3. The average depth and max depth for riffle crest surveys taken at the Ukiah sample site on the mainstem Russian River (rkm 158.89). Flow is the combination of the release from Coyote Valley dam and the flow in the West Fork of the Russian River (USGS gage number 11461000).



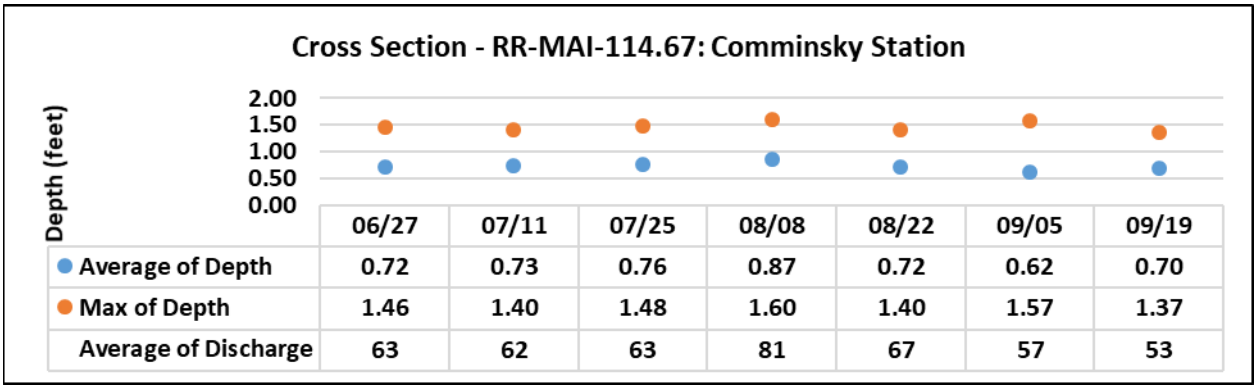
	05/30	06/13	06/27	07/11	07/25	08/08	08/22	09/05	09/19
Average of Depth	0.75	0.70	0.73	0.73	0.83	0.91	0.75	0.71	0.71
Max of Depth	1.31	1.28	1.34	1.37	1.54	1.60	1.31	1.31	1.27
Average of Discharge	63	53	63	61	78	95	62	53	53

Figure 4. The average depth and max depth for riffle crest surveys taken at the Hopland sample site on the mainstem Russian River (rkm 137.97). Flow is from the USGS Hopland stream gage (gage number 11462500).



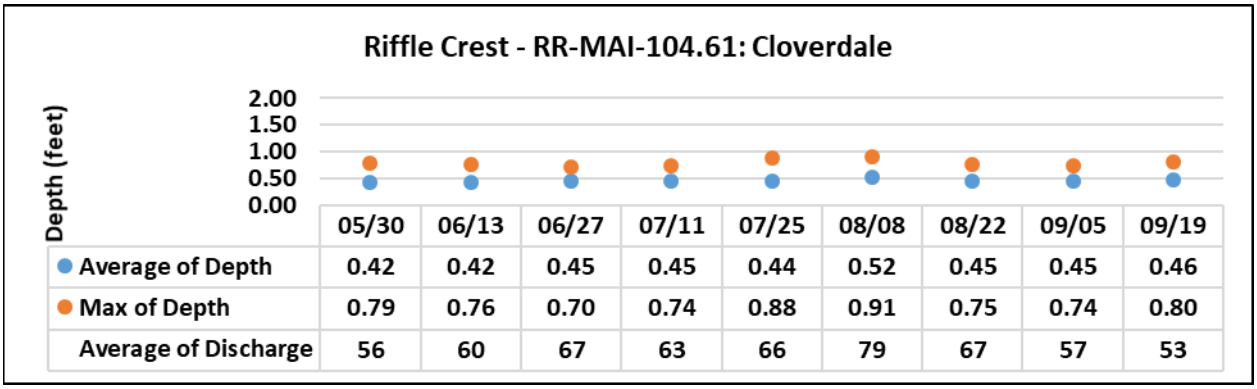
	05/30	06/13	06/27	07/11	07/25	08/08	08/22	09/05	09/19
Average of Depth	0.40	0.50	0.46	0.43	0.51	0.60	0.60	0.54	0.45
Max of Depth	0.77	0.91	0.88	0.88	0.95	1.04	1.04	0.91	0.83
Average of Discharge	56	60	63	62	63	81	67	57	53

Figure 5. The average depth and max depth for riffle crest surveys taken at the Commisky Station sample site on the mainstem Russian River (rkm 114.67). Discharge is from the USGS Cloverdale stream gage (gage number 11463000).



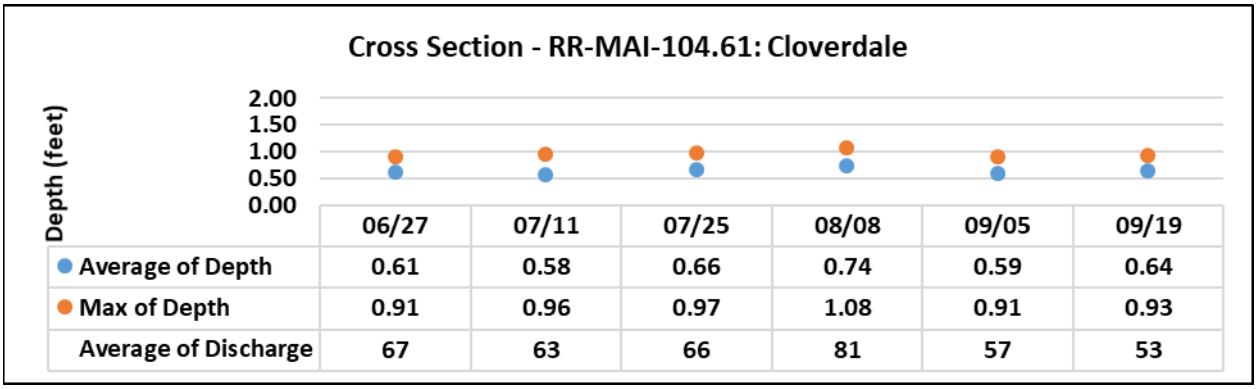
	06/27	07/11	07/25	08/08	08/22	09/05	09/19
Average of Depth	0.72	0.73	0.76	0.87	0.72	0.62	0.70
Max of Depth	1.46	1.40	1.48	1.60	1.40	1.57	1.37
Average of Discharge	63	62	63	81	67	57	53

Figure 6. The average depth and max depth for cross section surveys taken at the Commisky Station sample site on the mainstem Russian River (rkm 114.67). Discharge is from the USGS Cloverdale stream gage (gage number 11463000).



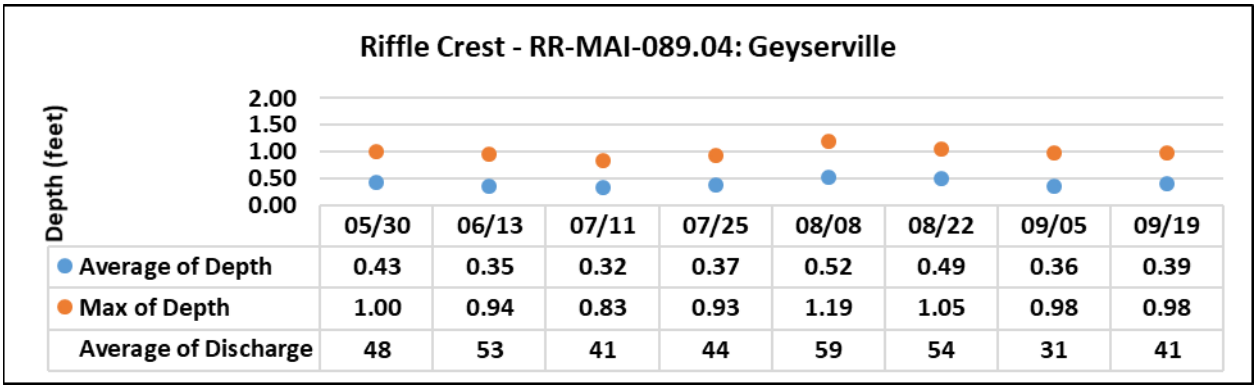
	05/30	06/13	06/27	07/11	07/25	08/08	08/22	09/05	09/19
Average of Depth	0.42	0.42	0.45	0.45	0.44	0.52	0.45	0.45	0.46
Max of Depth	0.79	0.76	0.70	0.74	0.88	0.91	0.75	0.74	0.80
Average of Discharge	56	60	67	63	66	79	67	57	53

Figure 7. The average depth and max depth for riffle crest surveys taken at the Cloverdale sample site on the mainstem Russian River (rkm 104.61). Discharge is from the USGS Cloverdale stream gage (gage number 11463000).



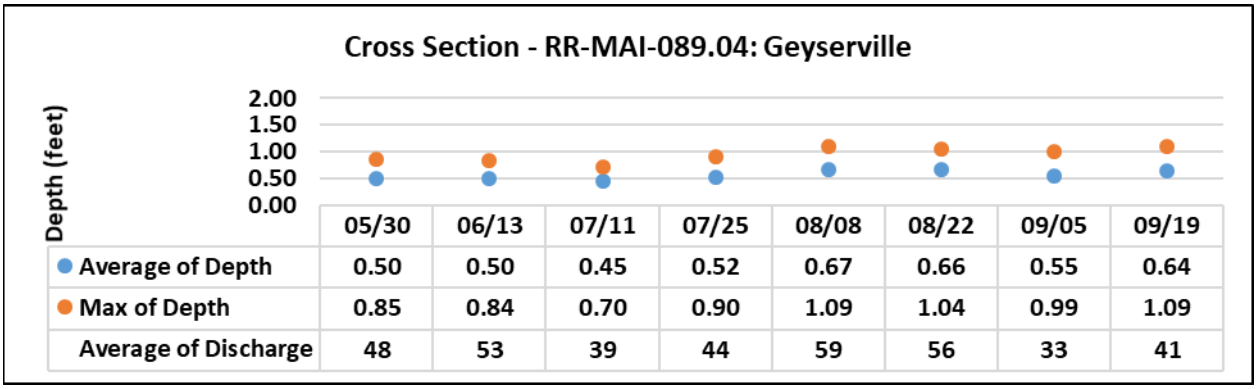
	06/27	07/11	07/25	08/08	09/05	09/19
Average of Depth	0.61	0.58	0.66	0.74	0.59	0.64
Max of Depth	0.91	0.96	0.97	1.08	0.91	0.93
Average of Discharge	67	63	66	81	57	53

Figure 8. The average depth and max depth for cross section surveys taken at the Cloverdale sample site on the mainstem Russian River (rkm 104.61). Discharge is from the USGS Cloverdale stream gage (gage number 11463000).



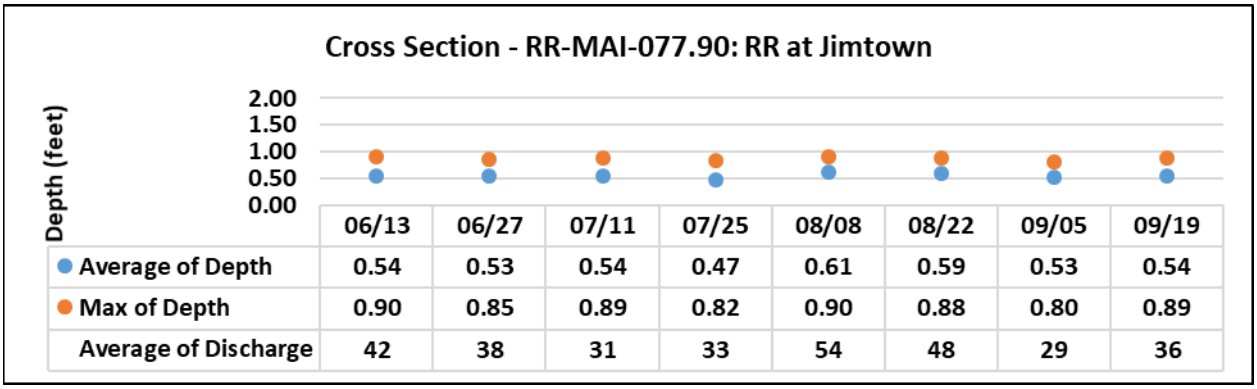
	05/30	06/13	07/11	07/25	08/08	08/22	09/05	09/19
Average of Depth	0.43	0.35	0.32	0.37	0.52	0.49	0.36	0.39
Max of Depth	1.00	0.94	0.83	0.93	1.19	1.05	0.98	0.98
Average of Discharge	48	53	41	44	59	54	31	41

Figure 9. The average depth and max depth for riffle crest surveys taken at the Geyserville sample site on the mainstem Russian River (rkm 89.04). Discharge is from the USGS Geyserville stream gage (gage number 11463500).



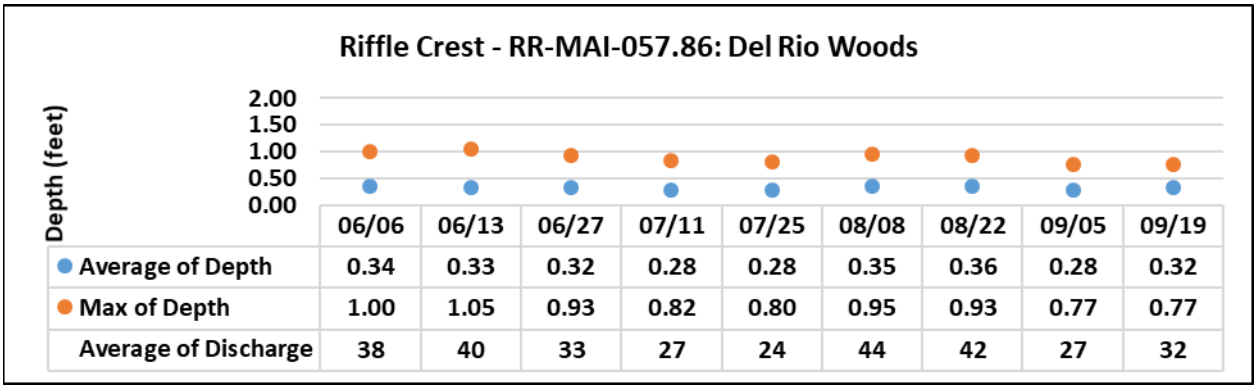
	05/30	06/13	07/11	07/25	08/08	08/22	09/05	09/19
Average of Depth	0.50	0.50	0.45	0.52	0.67	0.66	0.55	0.64
Max of Depth	0.85	0.84	0.70	0.90	1.09	1.04	0.99	1.09
Average of Discharge	48	53	39	44	59	56	33	41

Figure 10. The average depth and max depth for cross section surveys taken at the Geyserville sample site on the mainstem Russian River (rkm 89.04). Discharge is from the USGS Geyserville stream gage (gage number 11463500).



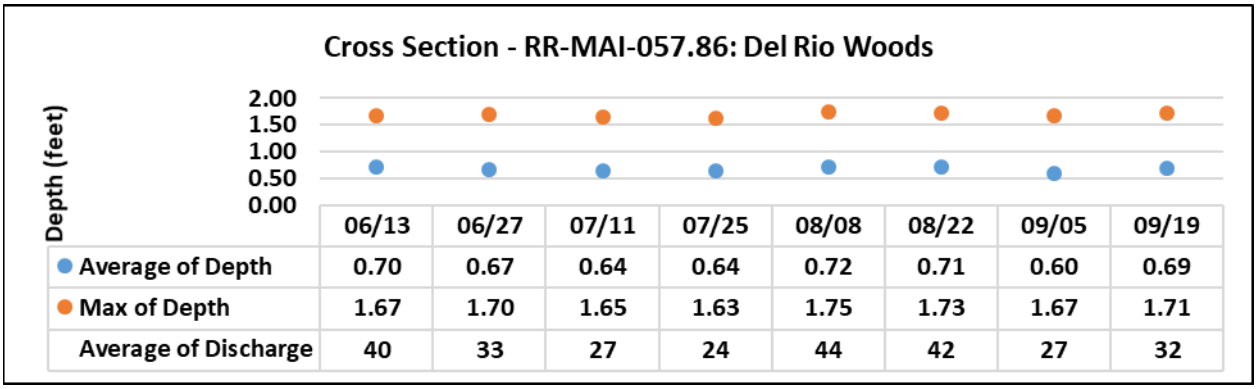
	06/13	06/27	07/11	07/25	08/08	08/22	09/05	09/19
Average of Depth	0.54	0.53	0.54	0.47	0.61	0.59	0.53	0.54
Max of Depth	0.90	0.85	0.89	0.82	0.90	0.88	0.80	0.89
Average of Discharge	42	38	31	33	54	48	29	36

Figure 11. The average depth and max depth for cross section surveys taken at the Jimtown sample site on the mainstem Russian River (rkm 77.90). Discharge is from the USGS Jimtown stream gage (gage number 1163682).



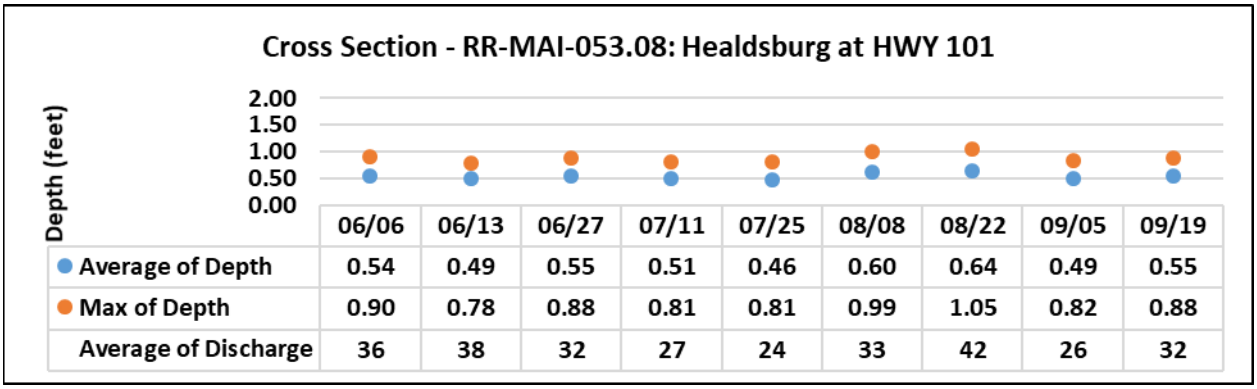
	06/06	06/13	06/27	07/11	07/25	08/08	08/22	09/05	09/19
Average of Depth	0.34	0.33	0.32	0.28	0.28	0.35	0.36	0.28	0.32
Max of Depth	1.00	1.05	0.93	0.82	0.80	0.95	0.93	0.77	0.77
Average of Discharge	38	40	33	27	24	44	42	27	32

Figure 12. The average depth and max depth for riffle crest surveys taken at the Del Rio Woods sample site on the mainstem Russian River (rkm 57.86). Discharge is from the USGS Digger Bend stream gage (gage number 11463980).



	06/13	06/27	07/11	07/25	08/08	08/22	09/05	09/19
Average of Depth	0.70	0.67	0.64	0.64	0.72	0.71	0.60	0.69
Max of Depth	1.67	1.70	1.65	1.63	1.75	1.73	1.67	1.71
Average of Discharge	40	33	27	24	44	42	27	32

Figure 13. The average depth and max depth for cross section surveys taken at the Del Rio Woods sample site on the mainstem Russian River (rkm 57.86). Discharge is from the USGS Digger Bend stream gage (gage number 11463980).



	06/06	06/13	06/27	07/11	07/25	08/08	08/22	09/05	09/19
Average of Depth	0.54	0.49	0.55	0.51	0.46	0.60	0.64	0.49	0.55
Max of Depth	0.90	0.78	0.88	0.81	0.81	0.99	1.05	0.82	0.88
Average of Discharge	36	38	32	27	24	33	42	26	32

Figure 14. The average depth and max depth for cross section surveys taken at the Healdsburg sample site on the mainstem Russian River (rkm 53.08). Discharge is from the USGS Healdsburg stream gage (gage number 11465350).

Supplemental water quality

On June 15, and June 16, 2021 we measured water temperature at visited seven sites, two of which had temperature stratification. We deployed continuous water temperature monitoring arrays at four sites in order to evaluate temperature stratification. Three of these water quality arrays included continuous measurements of dissolved oxygen. Sites were at the mouth of Pieta Creek near Hopland, downstream of Leaping Lady Rock near Hopland, the old Highway 101 crossing near Preston, and at Del Rio Woods County Park near Healdsburg (Figure 15). We had planned to put a water temperature monitoring array at Commisky Station. However, after diving that site we chose not to, as the pools were shallow and not stratified. Water quality loggers were recovered on October 20, 2021. The surface water quality sonde at Del Rio Woods was not recovered. While there was some stratification in pools sampled, the vertical temperature differential was minimal (Figure 16- Figure 19).

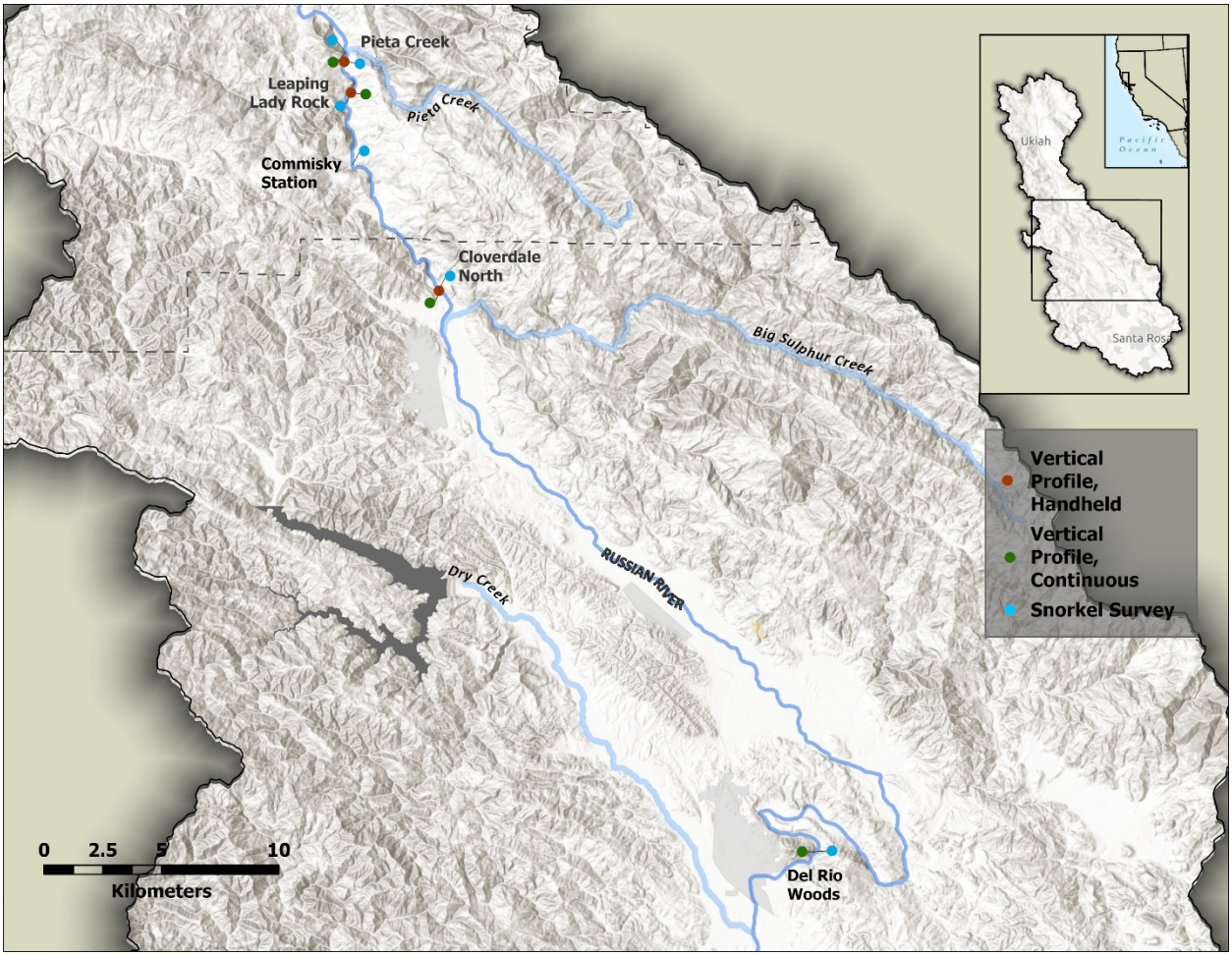


Figure 15. Upper Russian River water quality and snorkel survey sties sampled in summer 2021 for the SWRCB Russian River Temporary Urgency Change Order.

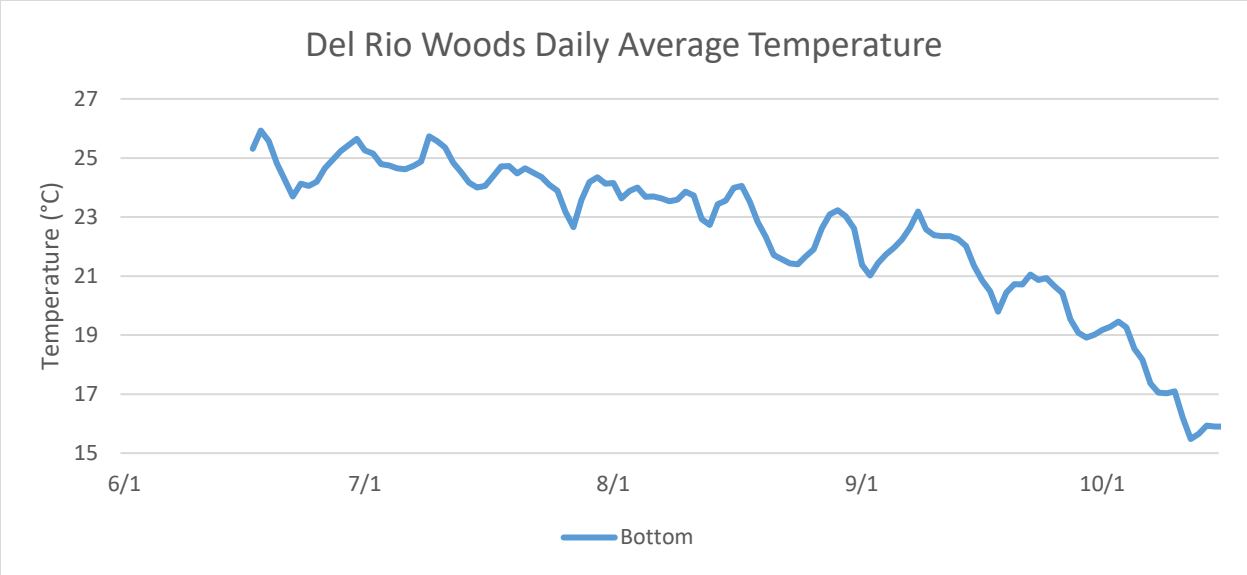


Figure 16. Daily Average temperature from water quality loggers deployed at Del Rio Woods (rKm 57.8).

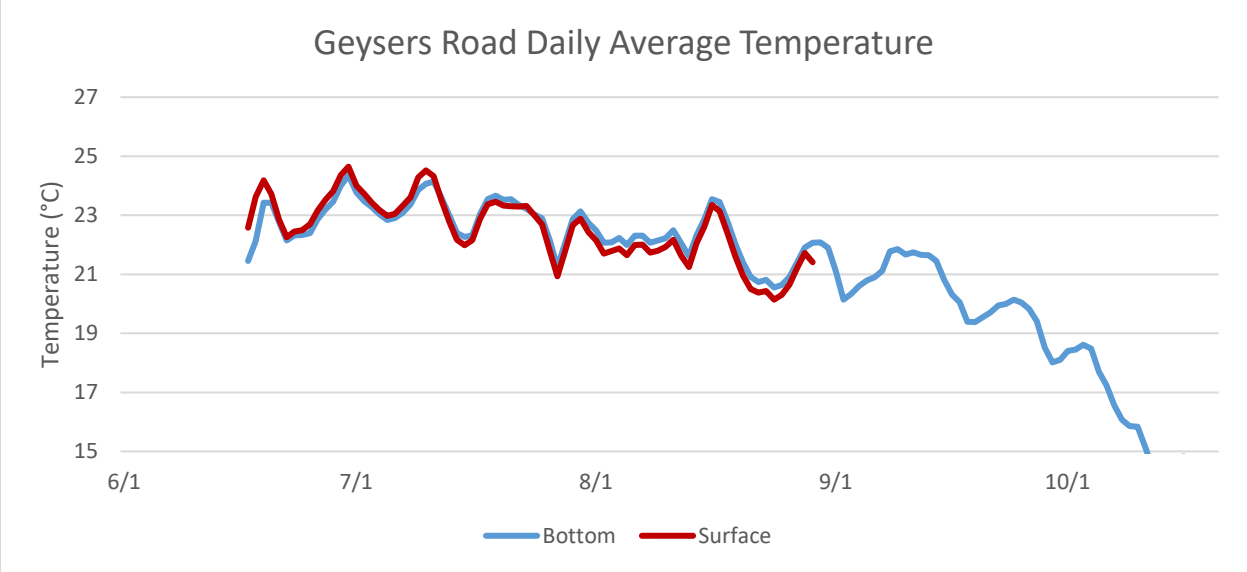


Figure 17. Daily average temperature from water quality loggers deployed at Geysers Road (rKm 107.0).

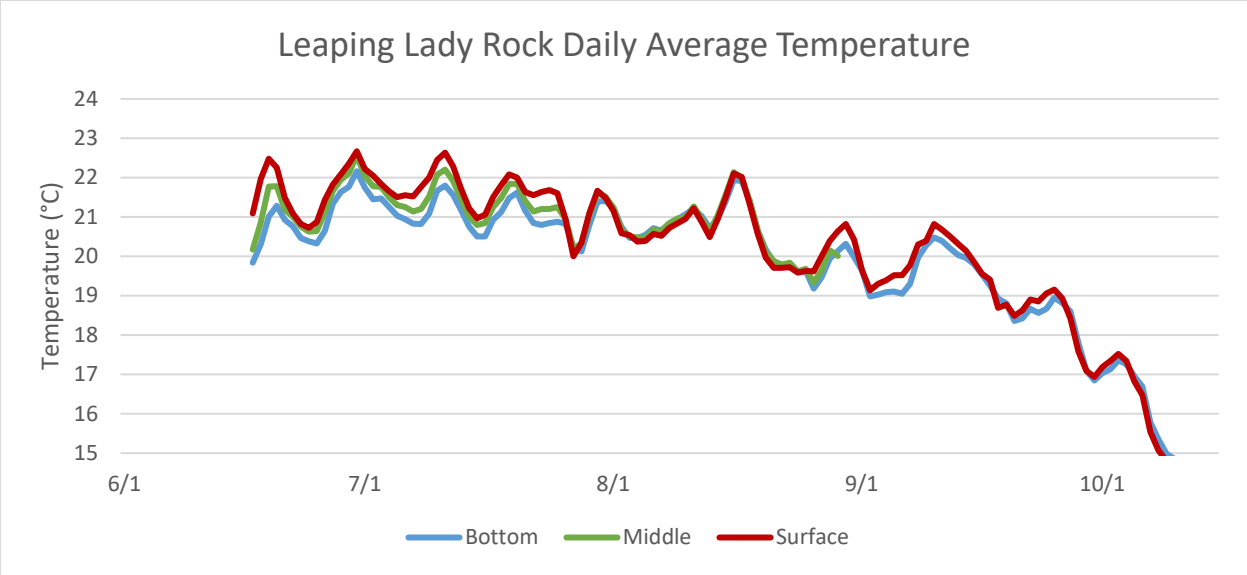


Figure 18. Daily average temperature from water quality loggers deployed downstream of Leaping Lady Rock (rKm 118.1).

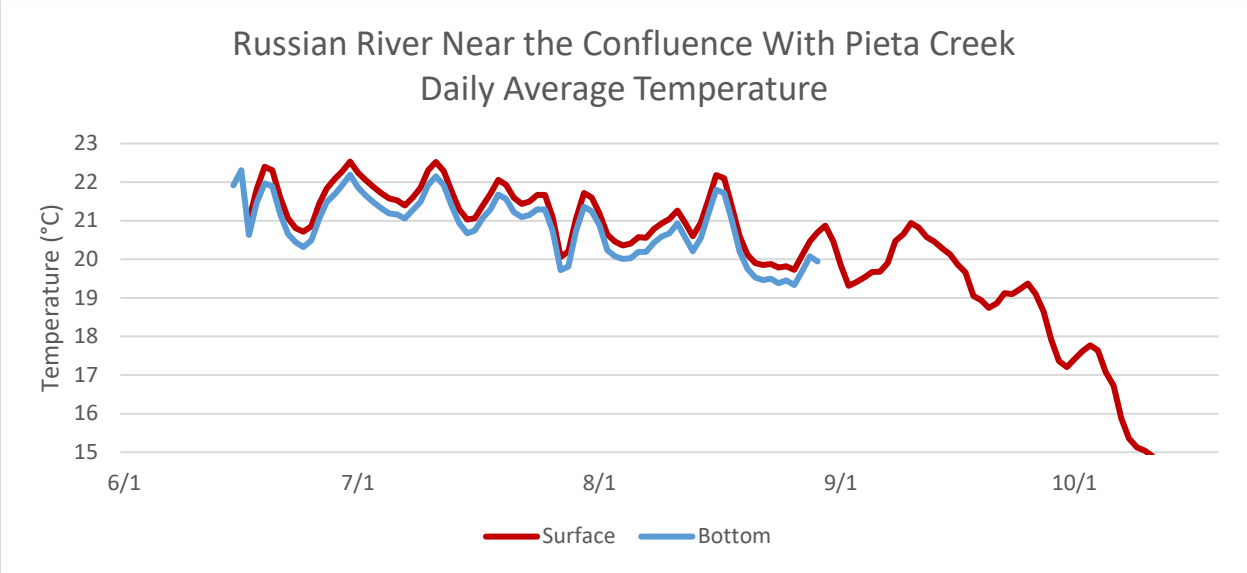


Figure 19. Daily average temperature from water quality loggers deployed in the Russian River at the confluence with Pieta Creek (rKm 120.4).

Data collected from dissolved oxygen loggers at Geysers Road, Leaping Lady Rock, and in the Russian River at the confluence with Pieta Creek showed that dissolved oxygen near the bottom of these pools was generally poor (Figure 20 - Figure 22). It is possible that the water quality loggers at Geysers Road and at Leaping Lady Rock were placed too close to the sediment and gave false dissolved oxygen readings or the dissolved oxygen probes themselves were failing. Dissolved oxygen measured with a handheld water quality device shows that dissolved oxygen was suitable on the day that vertical profiles were collected.

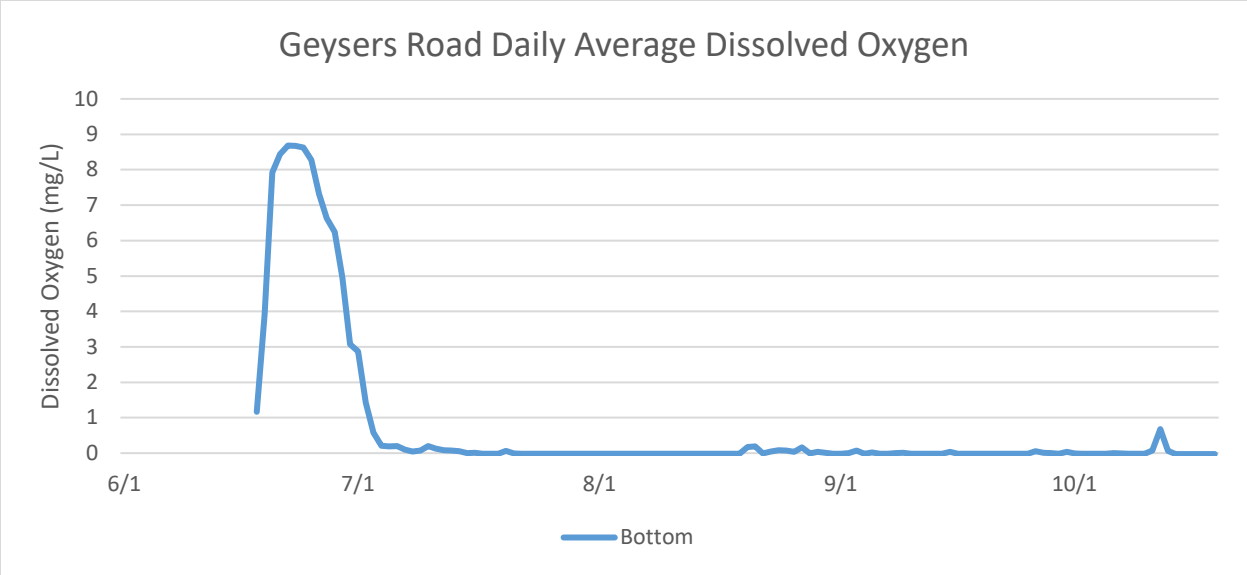


Figure 20. Daily average dissolved oxygen from water quality loggers deployed at Geysers Road (rKm 107.0).

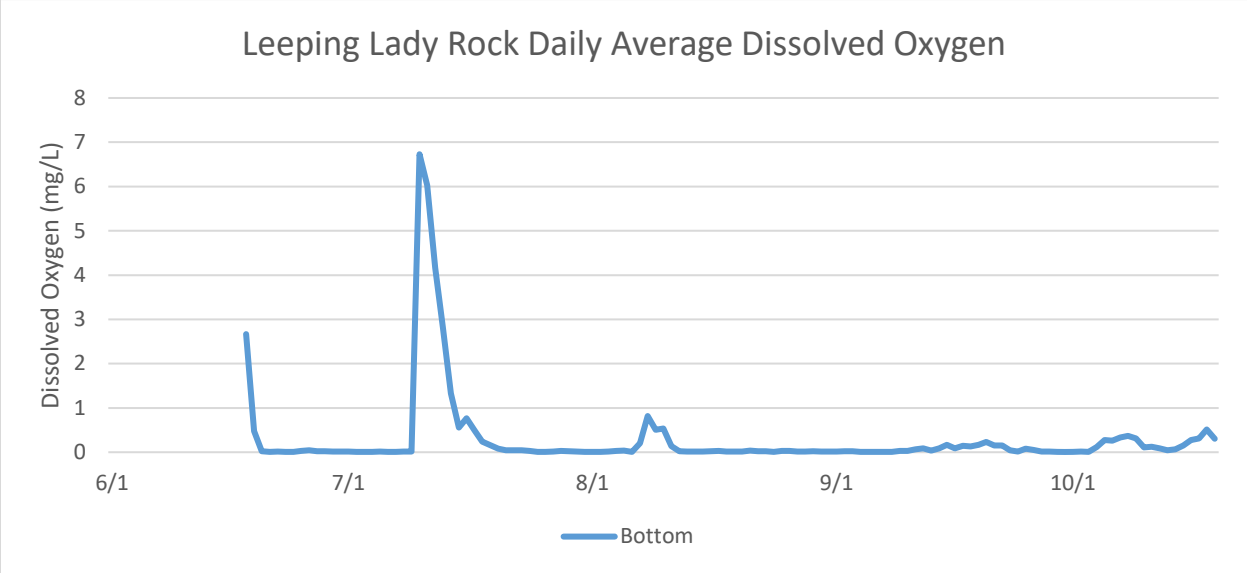


Figure 21. Daily average dissolved oxygen from water quality loggers deployed at Leaping Lady Rock (rKm 118.1).

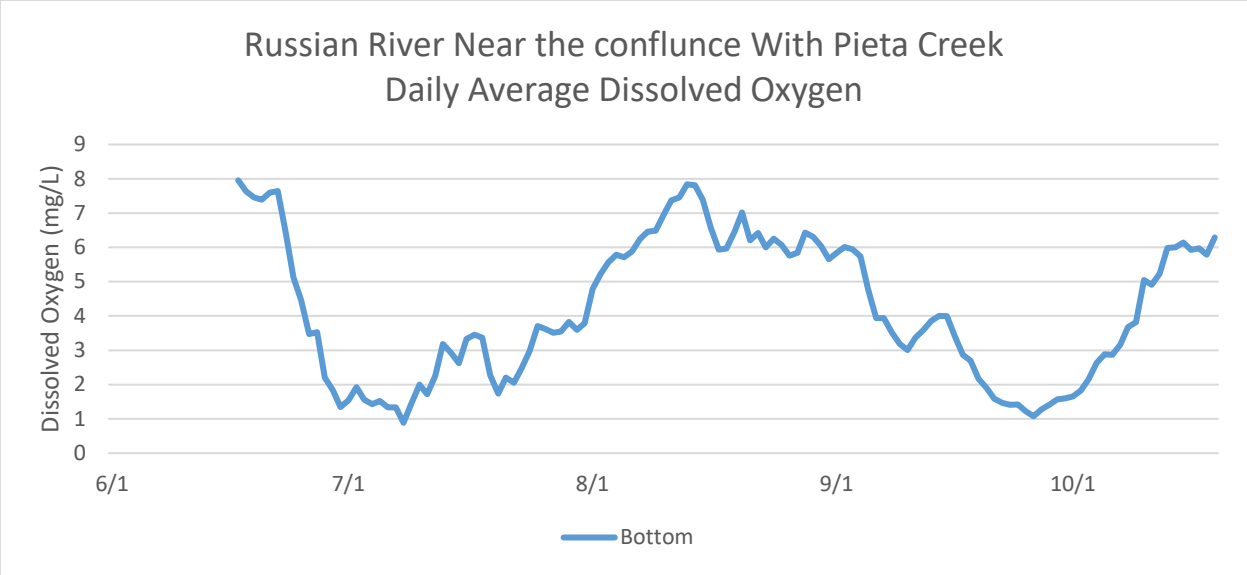


Figure 22. Daily average dissolved oxygen from water quality loggers deployed in the Russian River at the confluence with Pieta Creek (rKm 120.4).

During the week of July 18, 2021 water quality profiles were taken in a pool downstream of Leaping Lady Rock near Hopland, in a pool downstream of the confluence of Pieta Creek at Acapulco Rock, and in a pool at the old Highway 101 crossing off Geysers Road near Preston (Figure 13). Temperature ranged from 21.0°C to 23.9°C depending on the site and depth sampled. Water temperature was weakly stratified at all sites except Acapulco Rock (Figure 23). Dissolved oxygen ranged from 7.8 mg/l to 9.72 mg/L (Figure 24).

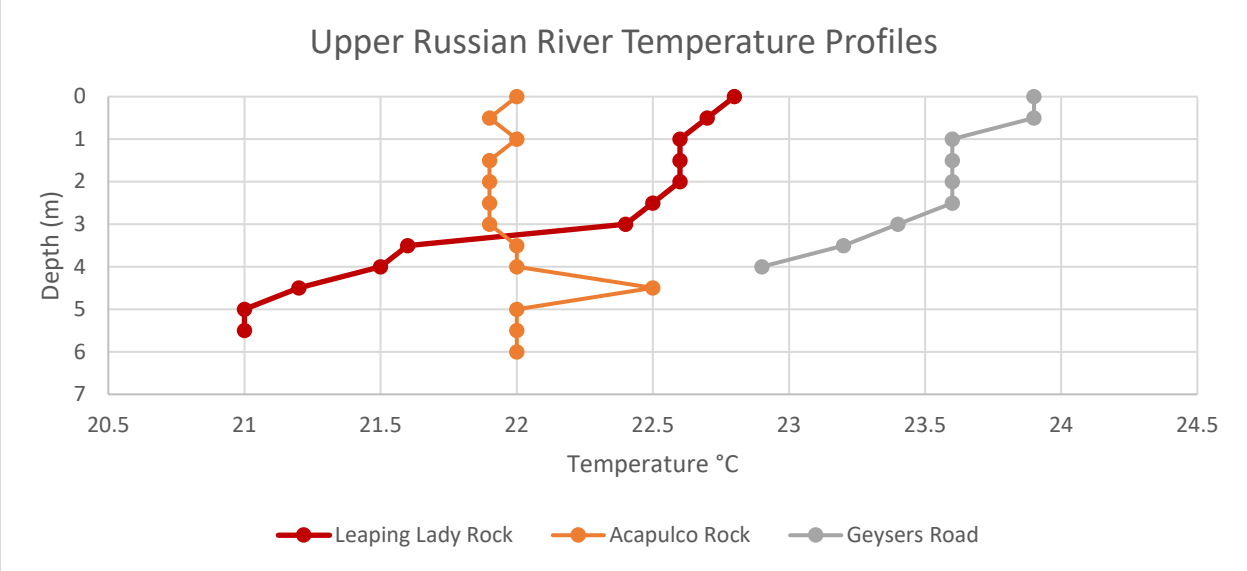


Figure 23. Water temperature profiles for a pool downstream of Leaping Lady Rock near Hopland, downstream of the confluence of Pieta Creek at Acapulco Rock, at the old Highway 101 crossing off Geysers Road near Preston, and at Hacienda Bridge near Forestville. Profiles were taken during the week of July 18, 2021.

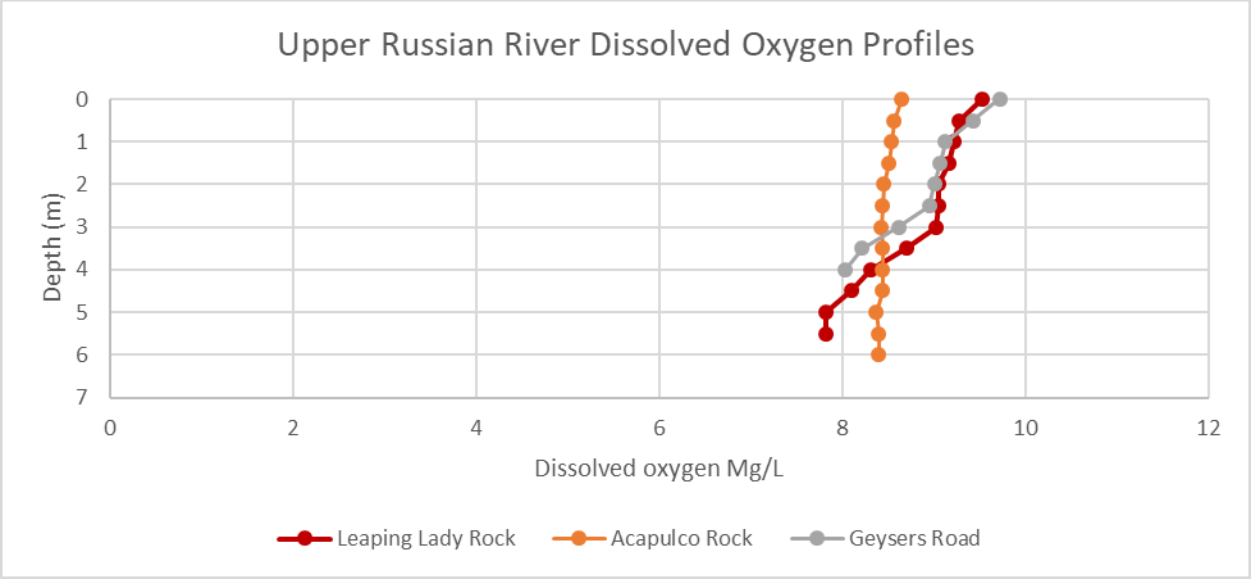


Figure 24. Dissolved oxygen profiles for a pool downstream of Leaping Lady Rock near Hopland, downstream of the confluence of Pieta Creek at Acapulco Rock, at the old Highway 101 crossing off Geysers Road near Preston, and at Hacienda Bridge near Forestville. Profiles were taken during the week of July 18, 2021.

Lower Russian River

Riffle Crest transects and longitudinal profiles were taken at Monte Rio and Vacation beach on September 30, 2021 and at Monte Rio, Vacation beach, Russian River near the confluence with Hulbert Creek, Summer Crossing Road, Mom's Beach, Steelhead Beach, Mirabel at collector 3, and Mirabel at collector 5 on October 5, 2021 (Figure 25). Figure 26-Figure 46 show transect and longitudinal depths for each site on these dates. Browns riffle near the confluence with Austin Creek was not surveyed because it was inundated due to the increase in stage in the estuary from a river mouth closure. Additional lower river surveys were canceled due to high flow following an atmospheric river which resulted in several inches of rain falling in a short time period in late October. Flow was 45 cfs and 37 cfs on September 30, and October 5, 2012, respectively, at the USGS Hacienda stream gage (gage number 11467000). Riffles with a maximum depth of less than 0.8 ft can cause fish passage issues for adult Chinook salmon (Thompson 1972). Many sites had maximum depths greater or equal to 0.8 feet; however, riffles at Vacation Beach, the Mainstem Russian river near the confluence with Hulbert Creek, and Steelhead Beach had maximum depths of 0.6 ft, 0.5 ft, and 0.7 ft respectively. In addition to these shallow riffles, the dam sill at vacation beach had a maximum depth of 0.4 ft across its width.

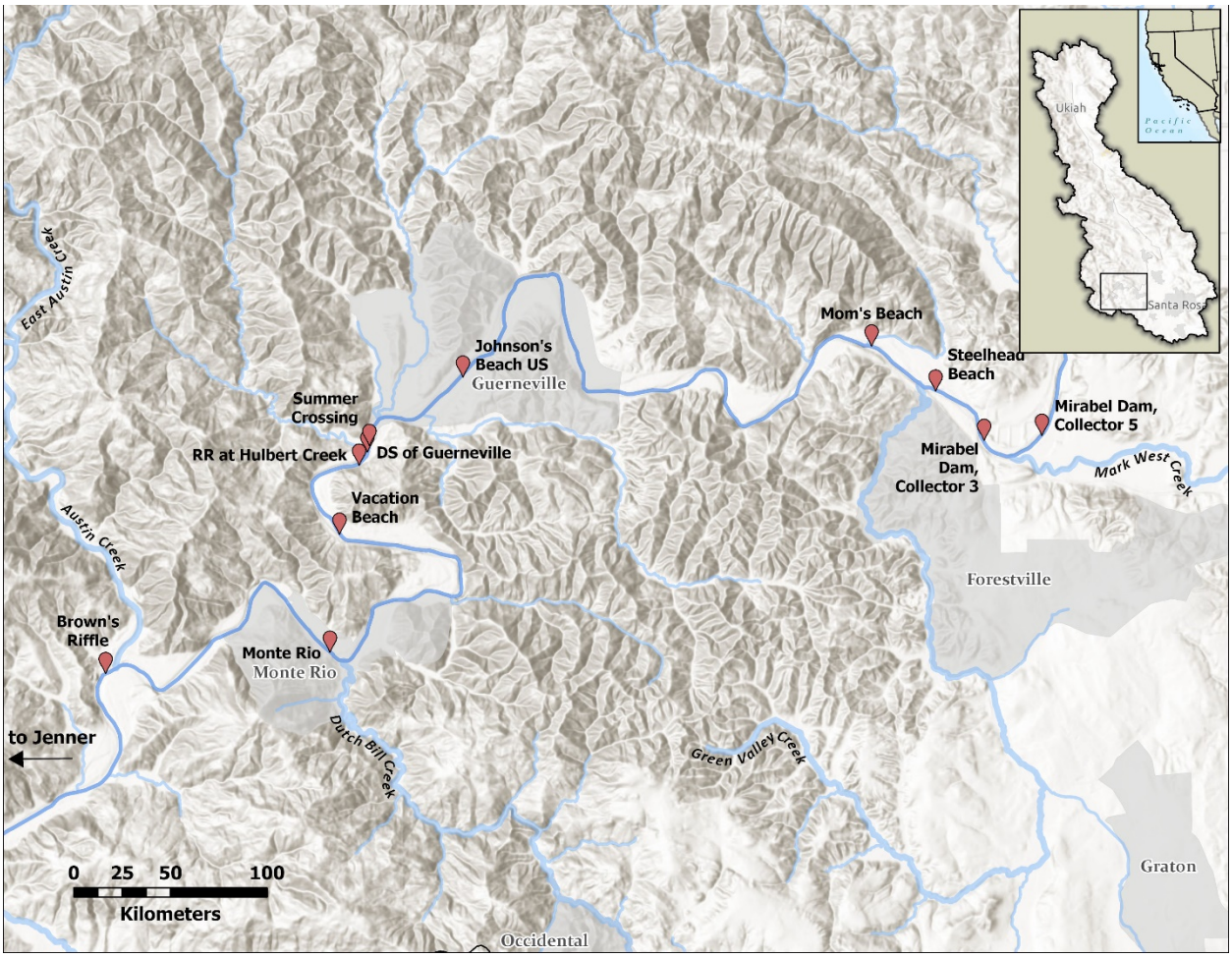


Figure 25. The sample sites at Brown's riffle, Monte Rio, Vacation beach, Russian River near the confluence with Hulbert Creek, Summer Crossing Road, Mom's Beach, Steelhead Beach, Mirabel.

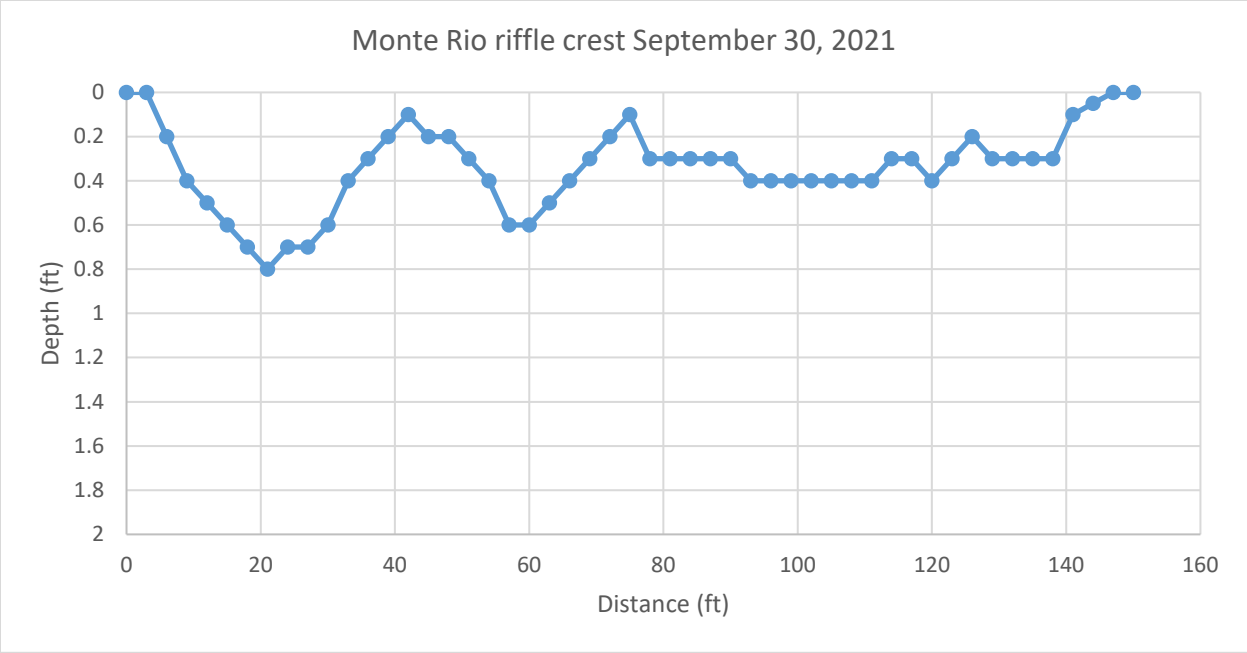


Figure 26. Riffle crest transect depths at Monte Rio on September 30, 2021. Flow at the USGS Hacienda stream gage (gage number 11467000) was 45 cfs.

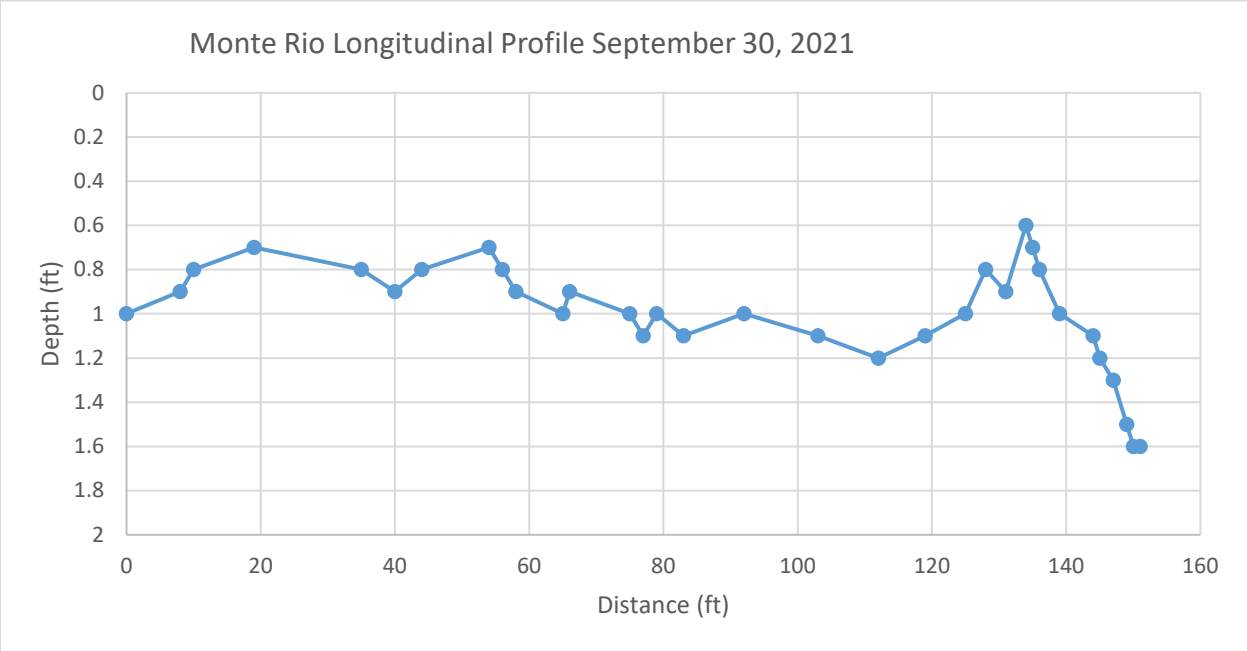


Figure 27. Longitudinal profile depths at Monte Rio on September 30, 2021. Flow at the USGS Hacienda stream gage (gage number 11467000) was 45 cfs.

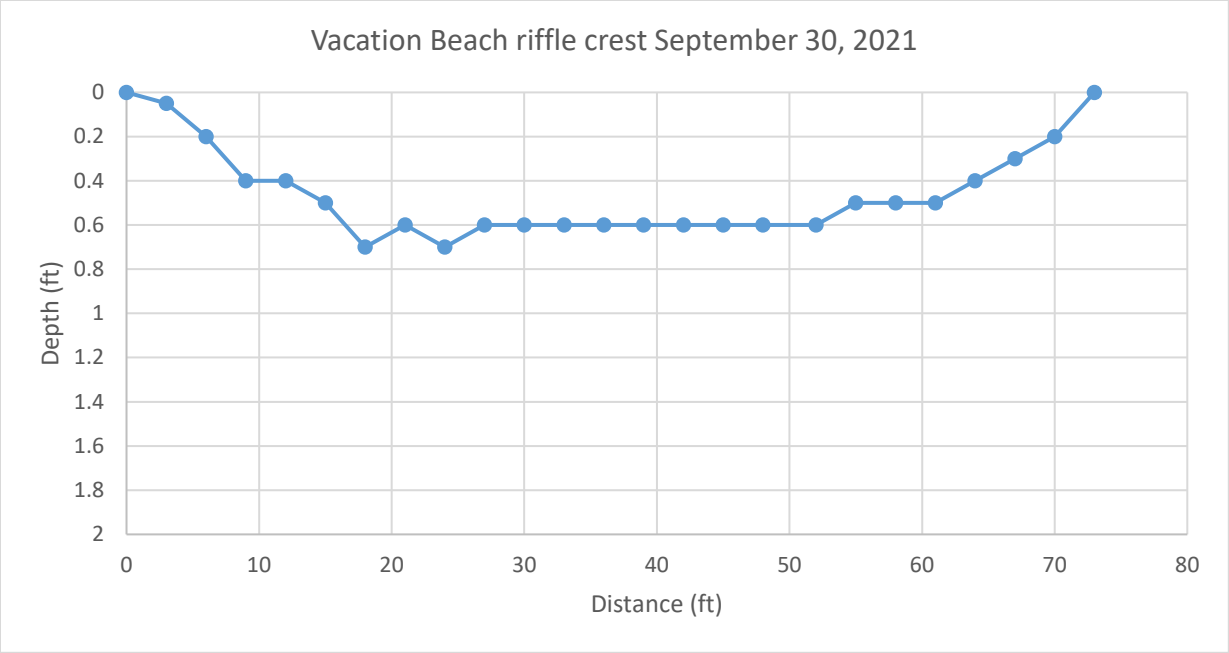


Figure 28. Riffle crest transect depths at vacation beach on September 30, 2021. Flow at the USGS Hacienda stream gage (gage number 11467000) was 45 cfs.

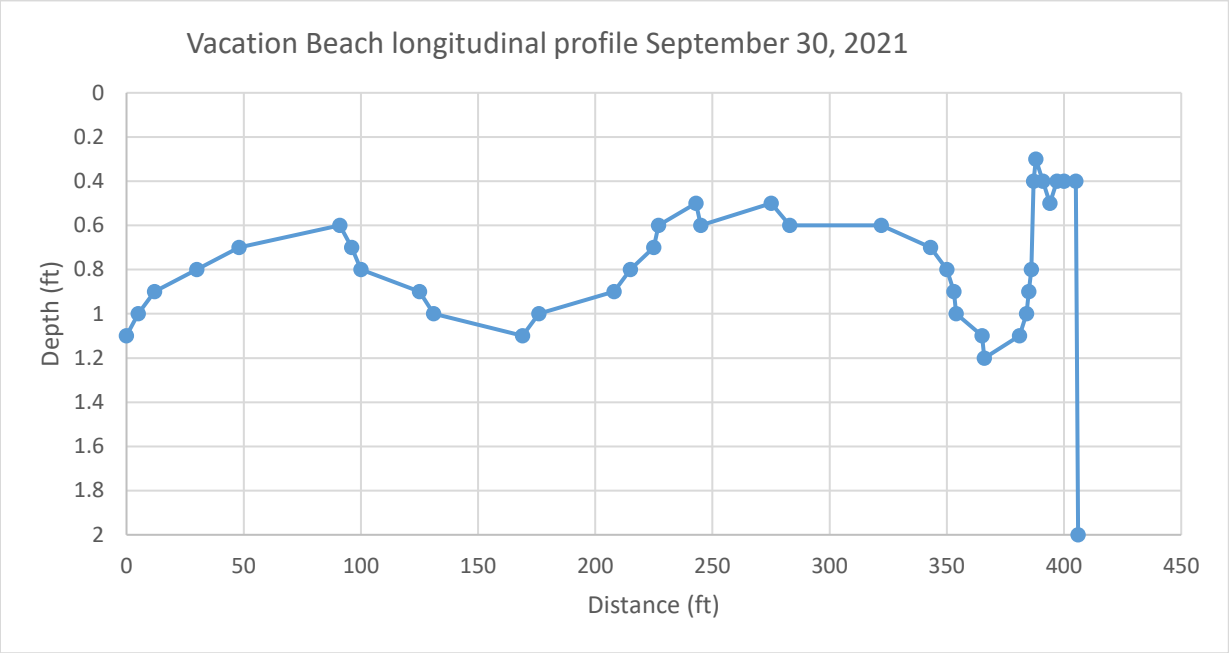


Figure 29. Longitudinal profile depths at Vacation Beach on September 30, 2021. Flow at the USGS Hacienda stream gage (gage number 11467000) was 45 cfs.

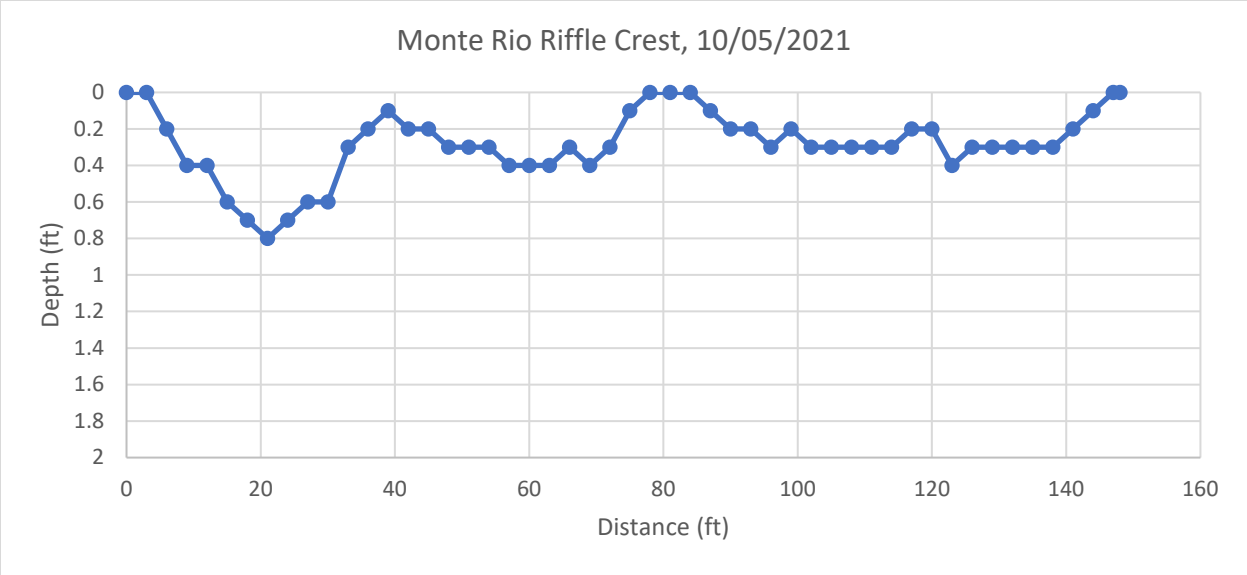


Figure 30. Riffle crest transect depths at Monte Rio on October 5, 2021. Flow at the USGS Hacienda stream gage (gage number 11467000) was 37 cfs.

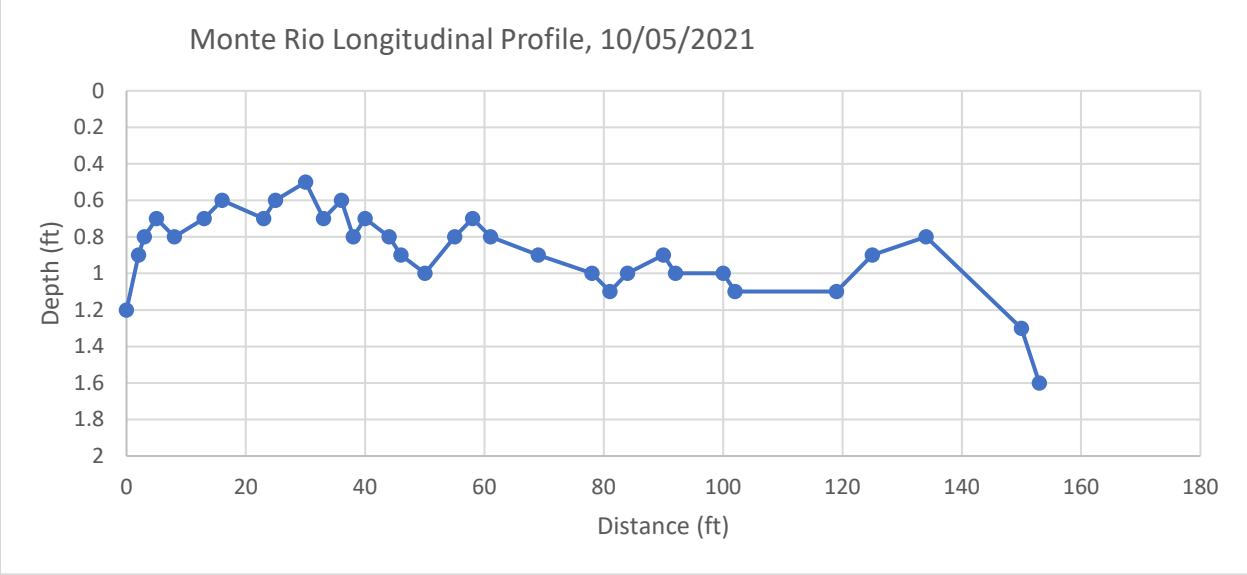


Figure 31. Longitudinal profile depths at Monte Rio on October 10, 2021. Flow at the USGS Hacienda stream gage (gage number 11467000) was 37 cfs.

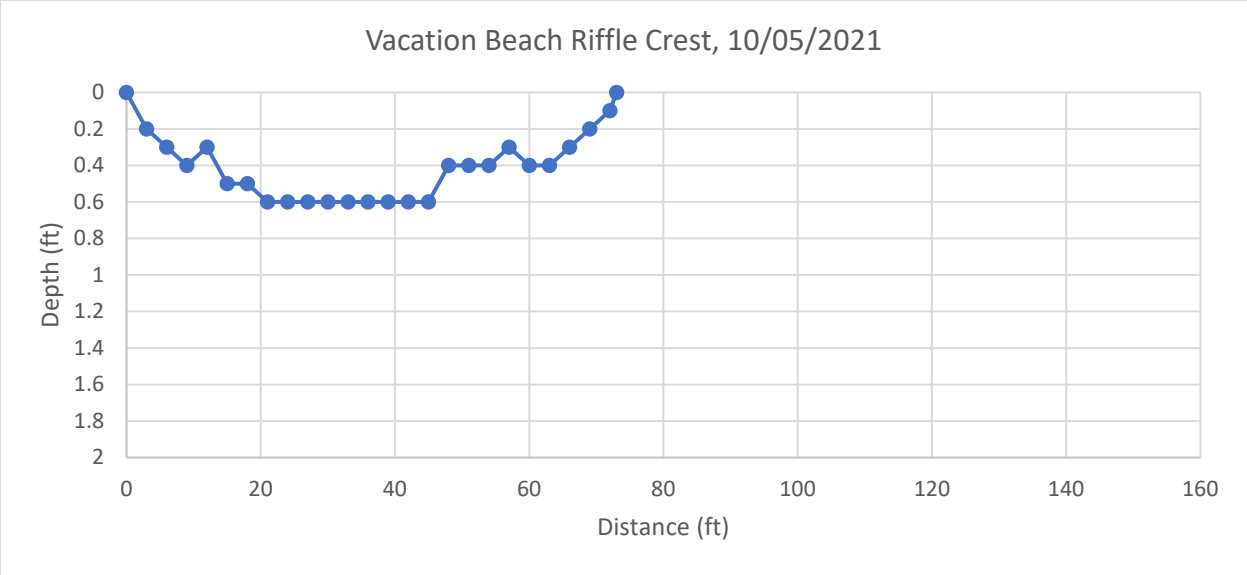


Figure 32. Riffle crest transect depths at Vacation Beach on October 5, 2021. Flow at the USGS Hacienda stream gage (gage number 11467000) was 37 cfs.

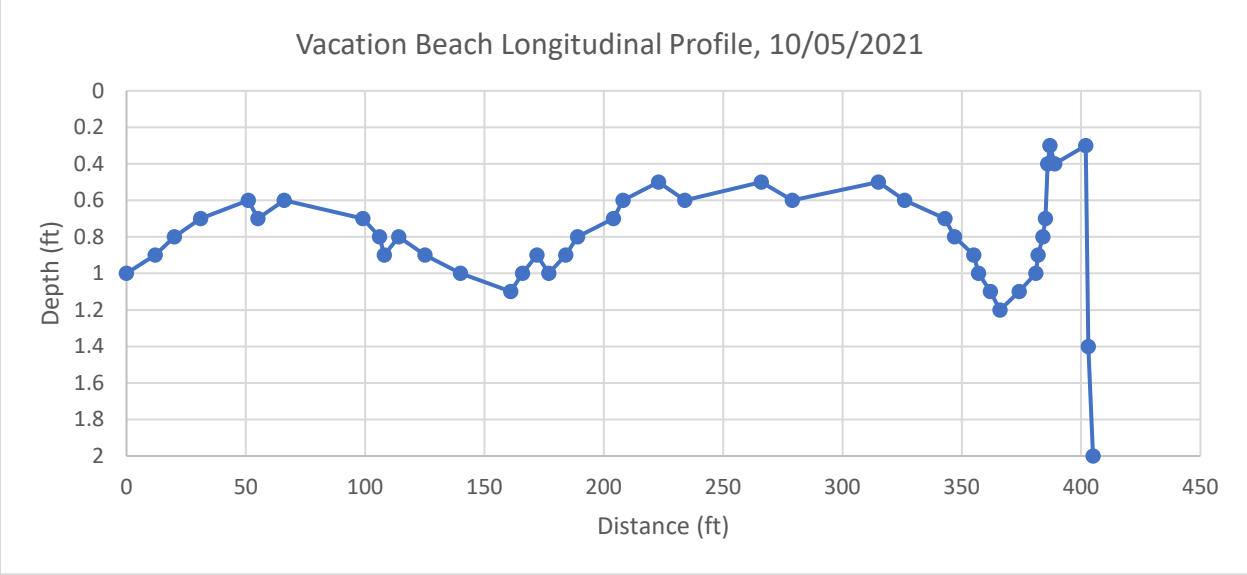


Figure 33. Longitudinal profile depths at Vacation Beach on October 10, 2021. Flow at the USGS Hacienda stream gage (gage number 11467000) was 37 cfs.

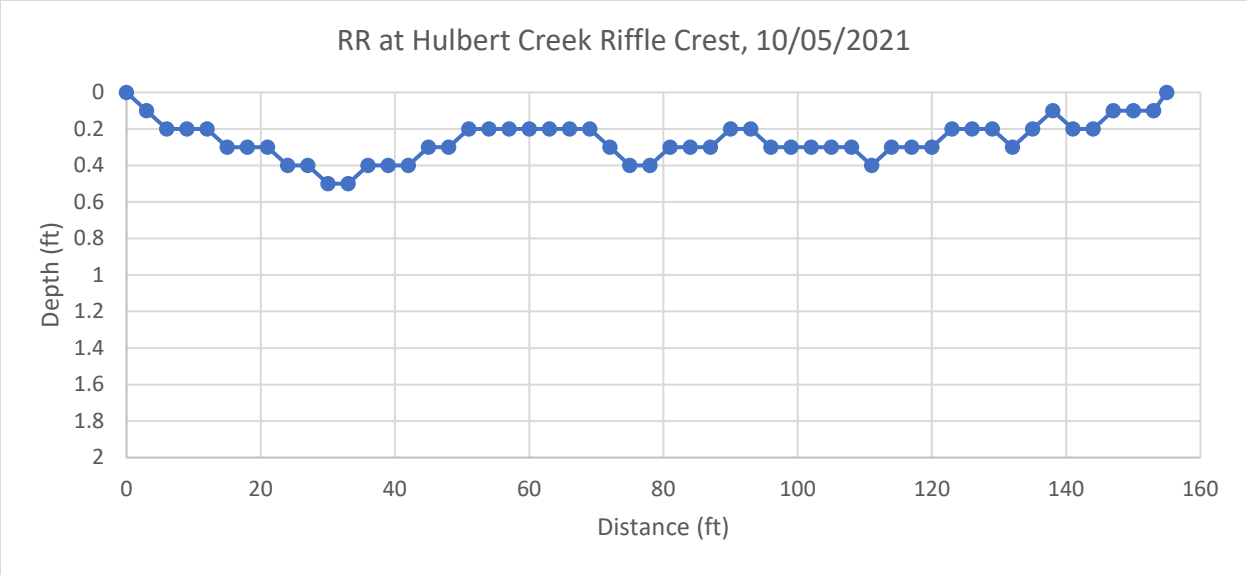


Figure 34. Riffle crest transect depths near the confluence with Hulbert Creek on October 5, 2021. Flow at the USGS Hacienda stream gage (gage number 11467000) was 37 cfs.

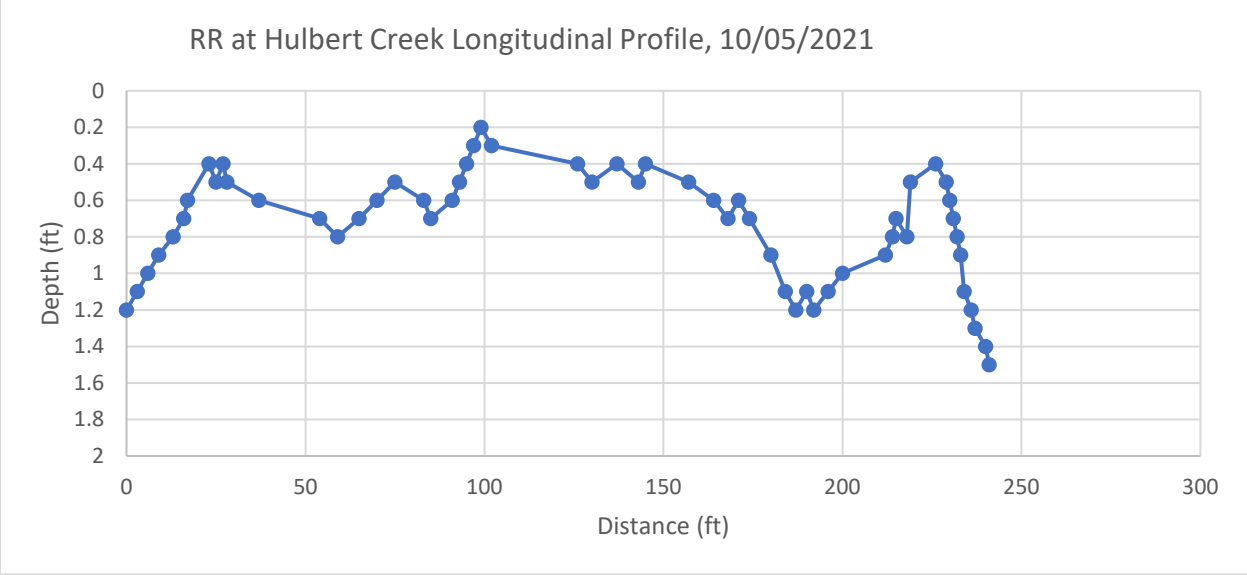


Figure 35. Longitudinal profile depths near the confluence with Hulbert Creek on October 10, 2021. Flow at the USGS Hacienda stream gage (gage number 11467000) was 37 cfs.

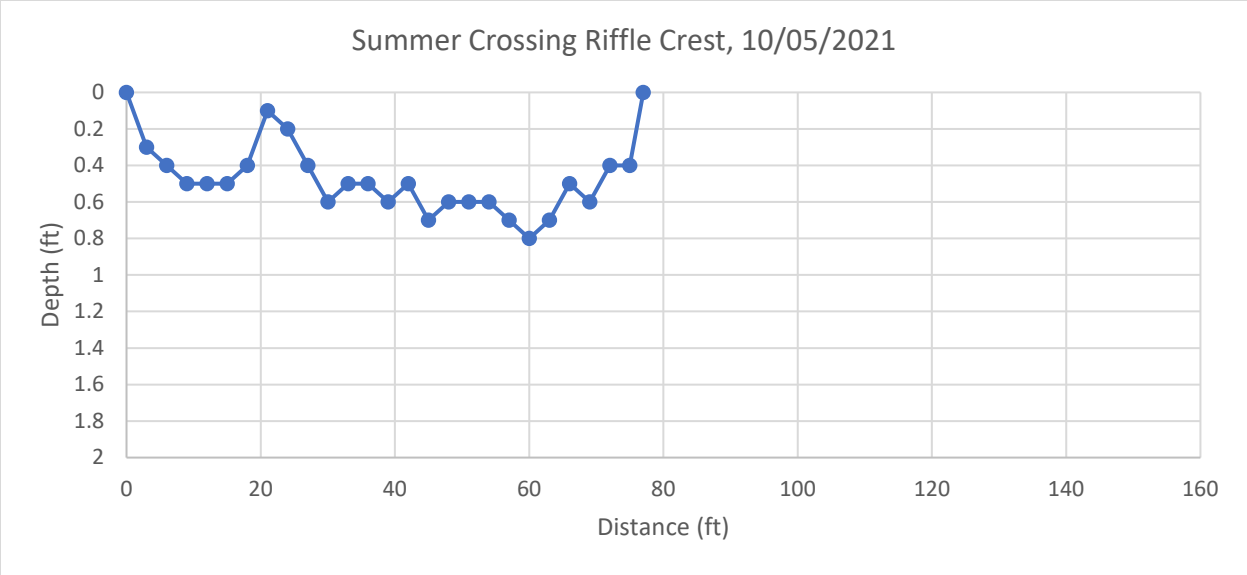


Figure 36. Riffle crest depths at Summer Crossing Road on October 5, 2021. Flow at the USGS Hacienda stream gage (gage number 11467000) was 37 cfs.

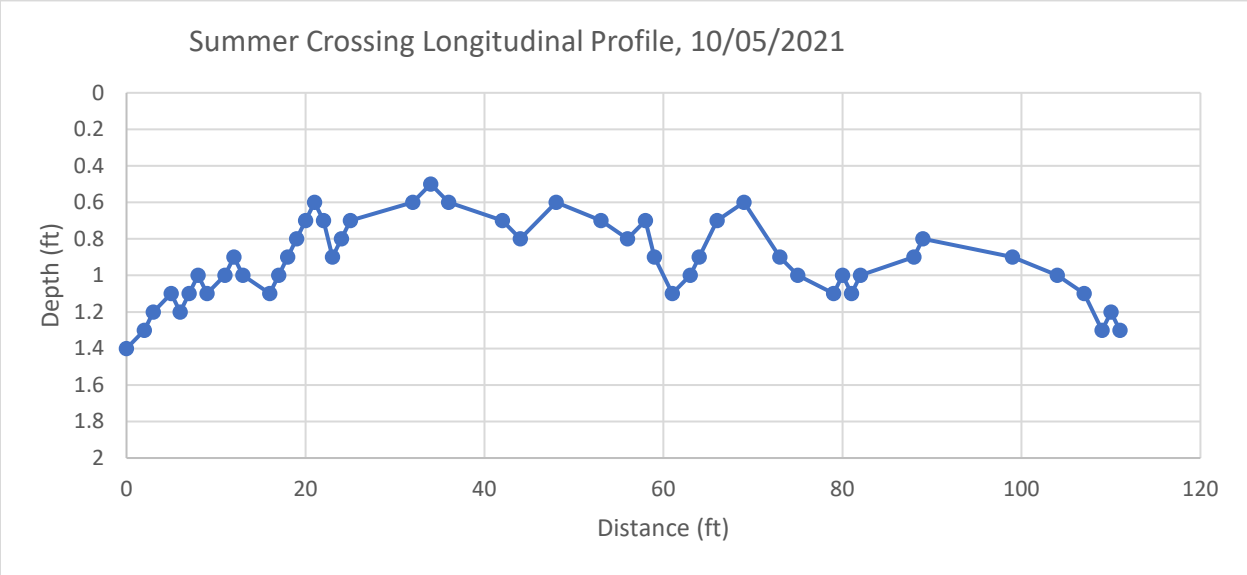


Figure 37. Longitudinal profile depths at Summer Crossing Road on October 10, 2021. Flow at the USGS Hacienda stream gage (gage number 11467000) was 37 cfs.

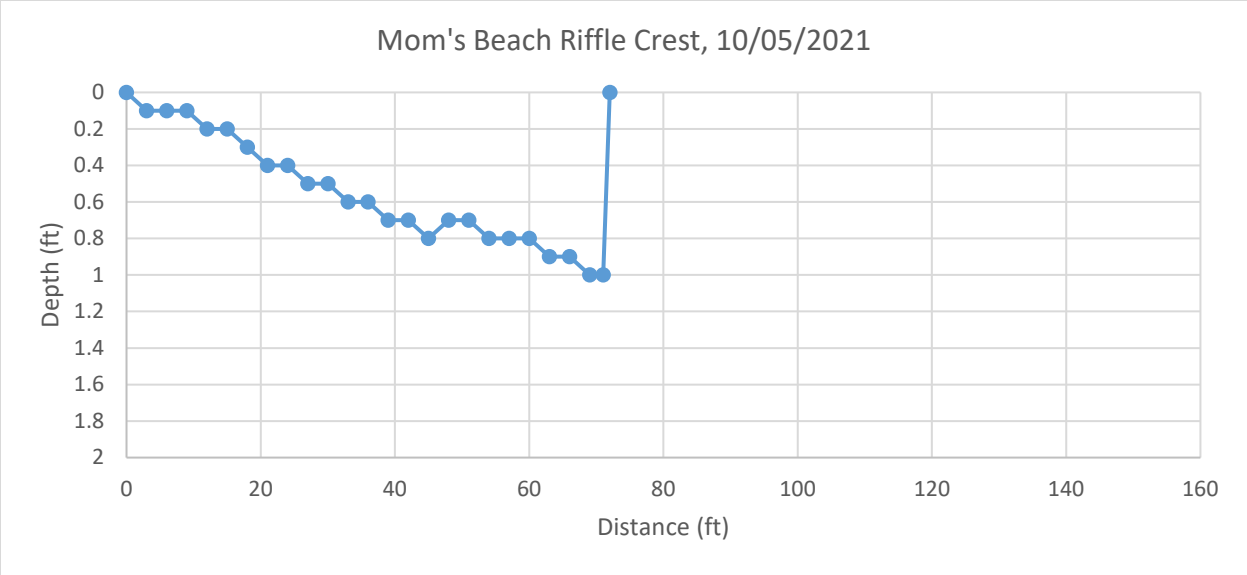


Figure 38. Riffle crest transect depths at Mom's Beach on October 5, 2021. Flow at the USGS Hacienda stream gage (gage number 11467000) was 37 cfs.

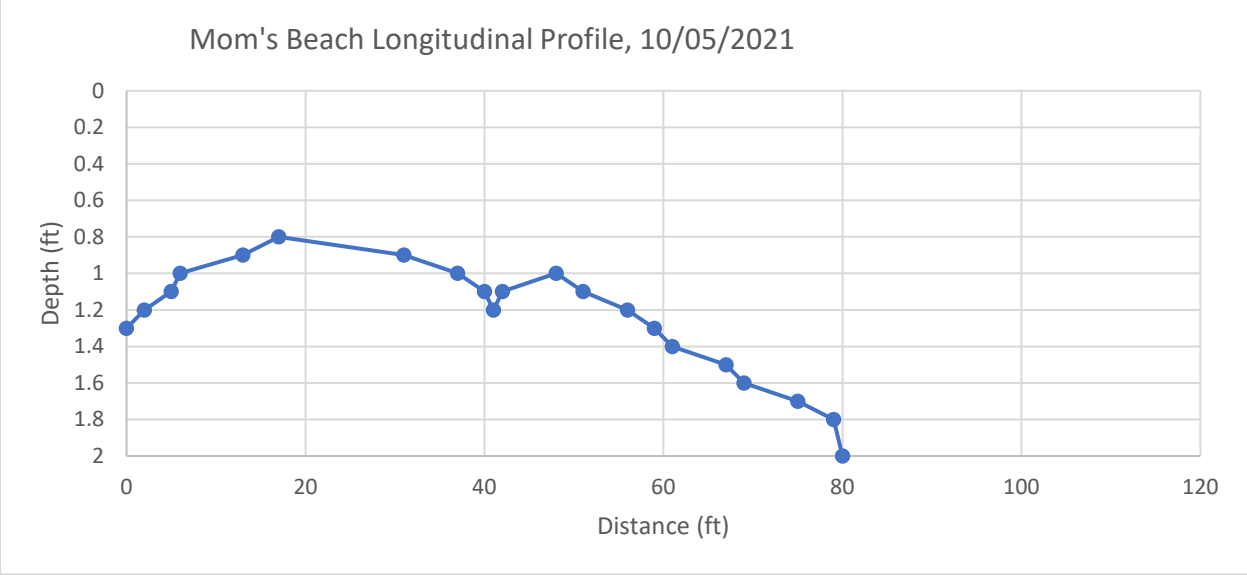


Figure 39. Longitudinal profile depths at Mom's Beach on October 10, 2021. Flow at the USGS Hacienda stream gage (gage number 11467000) was 37 cfs.

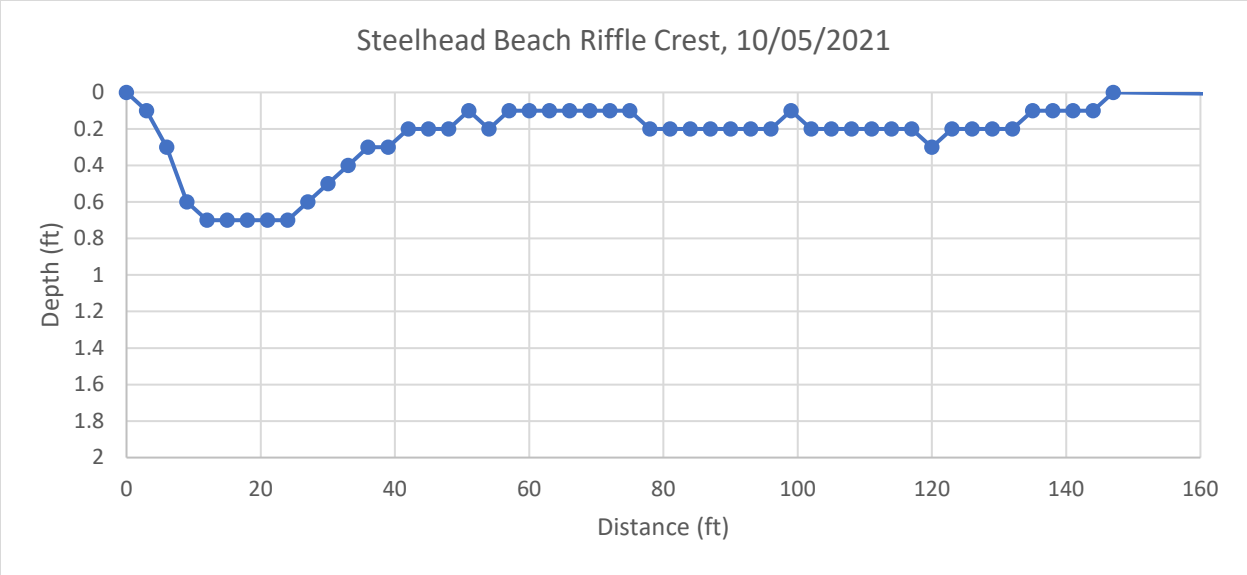


Figure 40. Riffle crest transect depths at Steelhead beach on October 5, 2021. Flow at the USGS Hacienda stream gage (gage number 11467000) was 37 cfs.

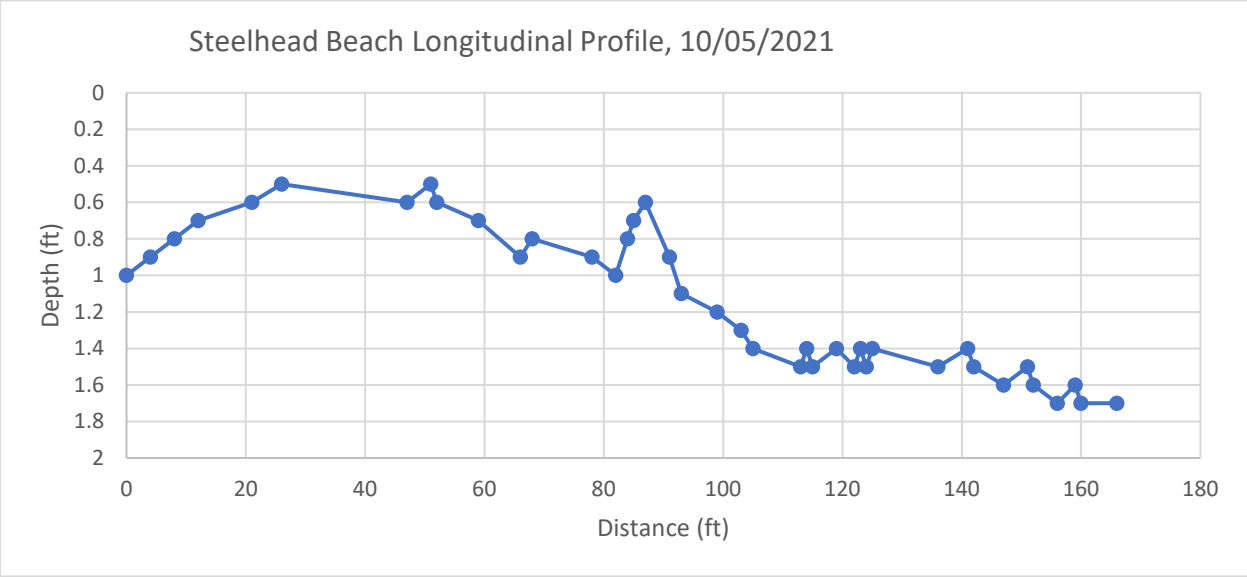


Figure 41. Longitudinal profile depths at Steelhead Beach on October 10, 2021. Flow at the USGS Hacienda stream gage (gage number 11467000) was 37 cfs.

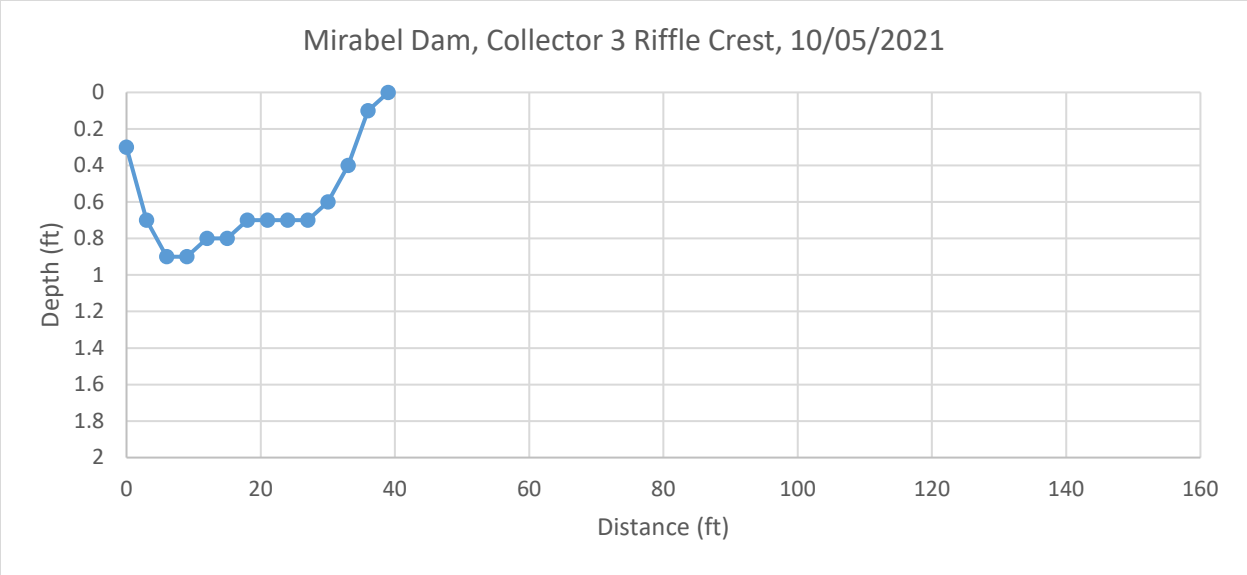


Figure 42. Riffle crest transect depths at Mirabel near collector well number 3 on October 5, 2021. Flow at the USGS Hacienda stream gage (gage number 11467000) was 37 cfs.

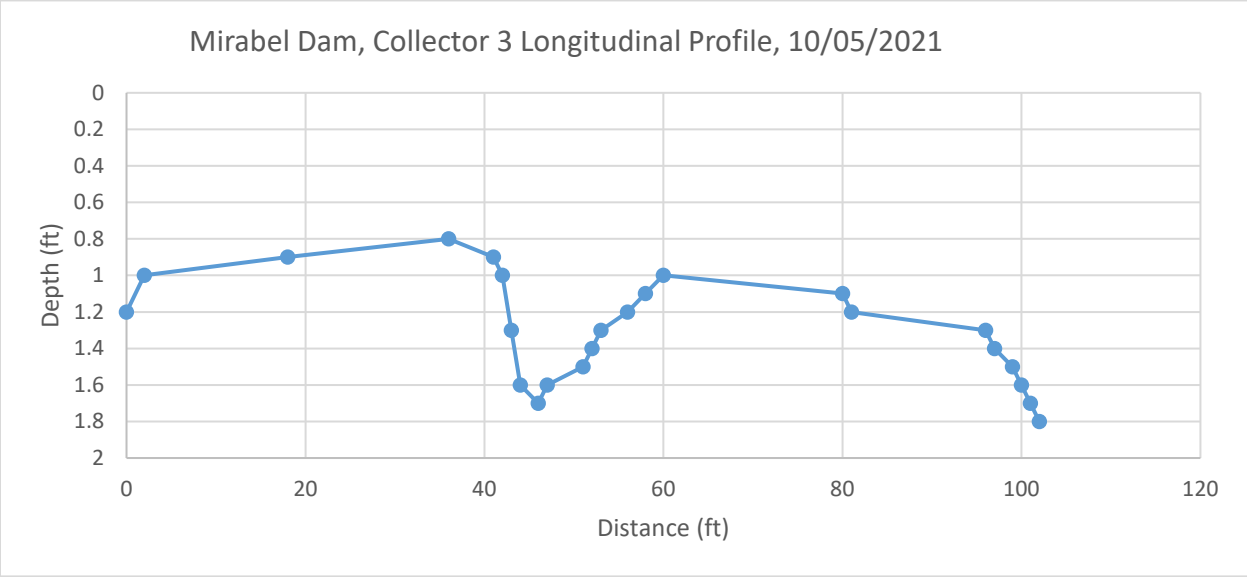


Figure 43. Longitudinal profile depths at Mirabel near collector well number 3 on October 10, 2021. Flow at the USGS Hacienda stream gage (gage number 11467000) was 37 cfs.

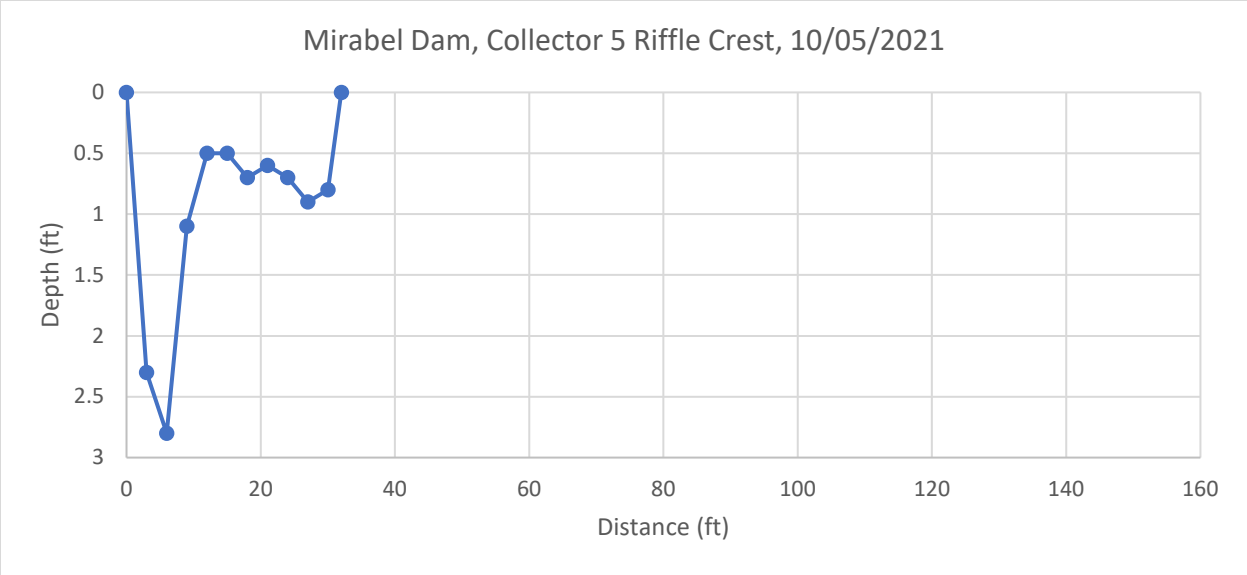


Figure 44. Riffle crest depths taken at Mirabel near collector well number 5 on October 5, 2021. Flow at the USGS Hacienda stream gage (gage number 11467000) was 37 cfs.

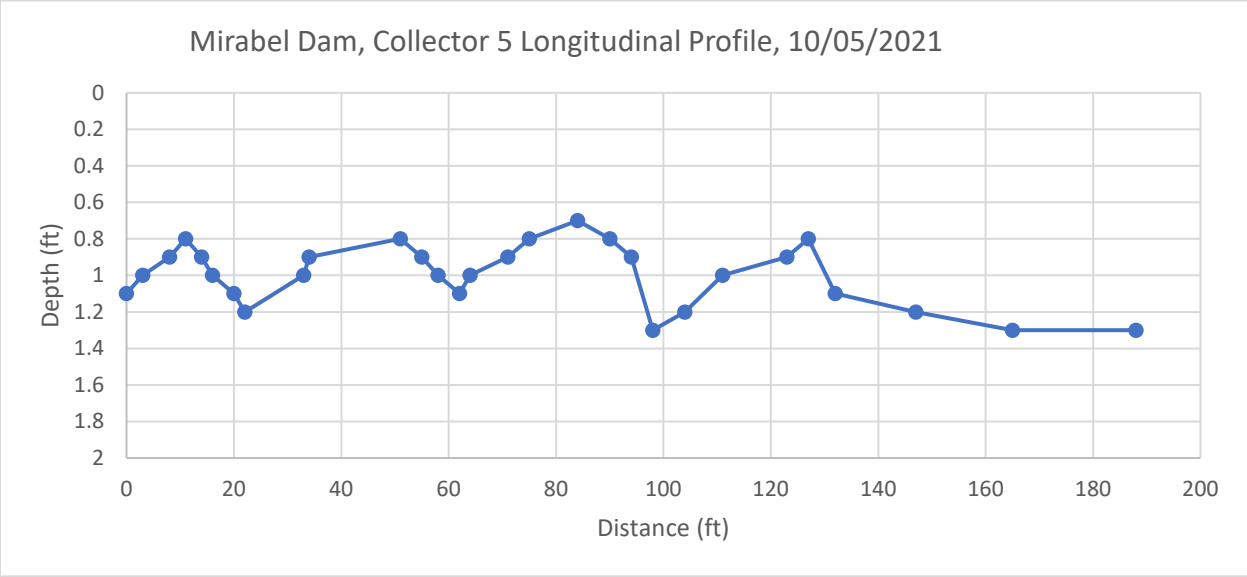


Figure 45. Longitudinal profile depths at Mirabel near collector well number 5 on October 10, 2021. Flow at the USGS Hacienda stream gage (gage number 11467000) was 37 cfs.

Snorkel surveys

Upper Russian River

On June 15, and June 16, 2021 snorkel surveys were conducted in the upper Russian River to document fish assemblages. Two pools near the mouth of Pieta Creek near Hopland were surveyed, as well as sites near Commisky Station, the old Highway 101 crossing near Preston, and at Del Rio Woods County Park near Healdsburg. A snorkel survey downstream of Leaping Lady Rock near Hopland was not conducted because visibility below the thermocline was poor. In total, 944 fish which were comprised of eight species, six of which are native to the Russian River were observed. A total of 4 steelhead parr at one sample site (Pieta Creek) were observed.

On August 22 a second snorkel survey was conducted in the mainstem Russian River near Pieta Creek, near Acapulco rock, and near Leaping Lady Rock. These sites are located near Hopland. An additional site was surveyed near Geyserville. In total 759 fish were observed comprised of 7 species (Table 2). Direct comparisons of fish counts should not be made between sites, sample events or between years as the sizes of reaches and water visibility differ between sample events.

Lower Russian River

A snorkel survey in the lower Russian River was conducted during the week of October 10. Sites sampled were Monte Rio, Vacation Beach, the Russian River at Hulbert Creek, Steelhead Beach, and Hacienda Bridge. A total of 287 fish were observed including 4 steelhead (3 hatchery and one of unknown origin, Table 1). Additional surveys were planned, but a large rain event in late October raised stream flow and turbidity to the point that snorkel surveys were no longer feasible.

Table 1. The number of fish observed at lower river sites sampled during the week of October 10, 2021

Species	Monte Rio	Vacation Beach	R.R. at Hulbert Creek	Steelhead beach	Hacienda Bridge
Channel Catfish					1
Common carp					4
Hardhead			1		
Largemouth bass					3
Sacramento Pikeminnow		5	2		5
Sacramento Sucker		150	20	30	50
Smallmouth Bass	5	2			5
Steelhead		4			

Table 2. The number of fish observed by size in upper river snorkel surveys conducted during the week of June 13 and August 22, 2021.

Date	Site	Bluegill	Cyprinid spp		Hardhead			Russian River Tule Perch		Sacramento Pikeminnow		Sacramento Sucker		Smallmouth Bass			Steelhead		Western Pond Turtle
06/13	Comminsky Station	<100 mm	<100 mm	<200 mm	<100 mm	>100 mm	>200 mm	<100 mm	>100 mm	<200 mm	>200 mm	<100 mm	>200 mm	<100 mm	<200 mm	>200 mm	<100 mm	<200 mm	>200
	RR at Pieta		20					30					50				4		
	D/S of Pieta at Acapulco Rock	10	300			20		50			10	50	50	5					1
	Comminsky Station		1									3	20						
	Geysers Road						100	50			10		100	5		5			1
	Del Rio Woods				10		13		7		4	5			10				
08/22	RR at Pieta		19																
	D/S of Pieta at Acapulco Rock	4	50	75			30	8		50	55		125					5	
	D/S of Leaping Lady Rock		160					30			10		50						
	Geysers Road		25				10	8			4		25	16					

Video monitoring

The video camera system was installed in the fish ladder at the Mirabel dam on September 1, 2021. Video was recorded continuously until an atmospheric river in late October increased stream flow (Figure 46). The Mirabel dam cannot be operated at flows above 2,000 cfs without risk of damaging the dam. In preparation of the impending atmospheric river the dam was deflated and the camera system was removed for the remainder of the season on October 23, 2021. Because of the early timing of this atmospheric river, few adult salmonids had passed upstream of the dam prior to the removal of the video camera. As a result, adult salmonid counts are not reported because doing so would misrepresent the number of fish that actually passed upstream of the dam.

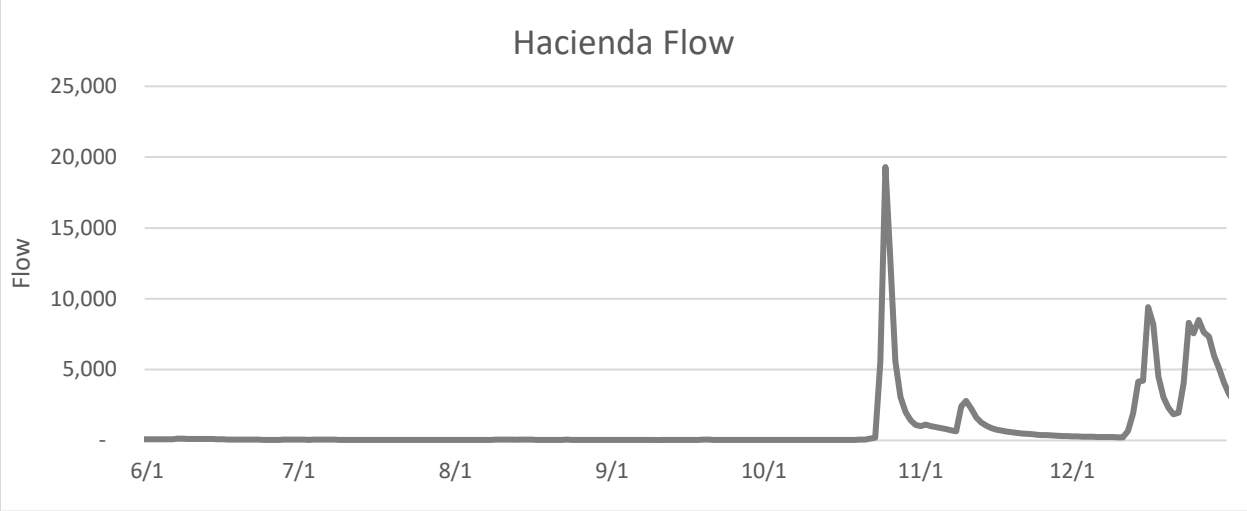


Figure 46. Flow in the Russian River at the USGS Hacienda stream gage (USGS gage number 11467000).

Spawning surveys

Dry Creek, Alexander Valley, and Upper Russian River

Spawner surveys in Dry Creek, Alexander Valley, upper Russian River were to begin after 100 adult salmonids passed through the video monitoring station at Mirabel. Spawner surveys were not conducted during the period of the Order because the dam was deflated and the camera system removed before 100 adult salmonids passed through the video monitoring station at Mirabel.

Summary

Other than a few exceptions, Sonoma water implemented the fisheries studies required by the Order. A large storm event in late October increased stream flow to the point that some studies could not be implemented. These included the upper river spawner surveys and, to a lesser degree, the underwater video camera, lower river critical riffle surveys, and lower river dive surveys.

In the upper Russian River, cross sections and riffle crest measurements were used to describe depths that fish might experience in representative riffles. During summer months, stream flow in the

mainstem Russian River is controlled by reservoir releases and, therefore, showed little variation in depth over the period covered by the Order.

During the summer of 2021, additional water quality loggers were deployed to augment water quality data collected at more permanent water quality monitoring sites operated by USGS and Sonoma Water. The additional data showed that some pools thermally stratified during the summer, although the temperature differential was small (typically less than 1 °C). It is important to note that these the pools where this supplemental monitoring occurred were chosen because of their greater depth as compared to other pools typical of the upper mainstem Russian. Therefore, it is unlikely that the small amount of thermal stratification observed at these sites was widespread. Furthermore, temperature below the thermocline was often above 21 °C, which is relatively warm for juvenile salmonids. It is interesting to note that thermal stratification was not present at Leaping Lady Rock from late July to late August and that the pool at Acapulco Rock lacked thermal stratification when the vertical profile was taken. The lack of thermal stratification in these pools may be related to the bed topography and resulting water velocity at these sites. It is also possible that high recreational use of these two site caused vertical mixing in these pools.

Dissolved oxygen was generally poor where dissolved oxygen monitors were present. It is possible that these were false readings due to the water quality monitors being placed too close to the silt located on the bottom of the pool or from failing equipment. However, there was evidence of low dissolved oxygen in the upper Russian River from the USGS permanent stream gages as well (SCWA 2022). It is worth noting that the vertical profiles taken with a handheld water quality device showed that dissolved oxygen was suitable when those measurements were taken indicating that a large portion of the pools had suitable dissolved oxygen.

Riffle depths for upstream migration were suitable at most locations despite the historically low flows present during the fall. On the days surveys were conducted, flow was less than 50 cfs yet most of the riffles had maximum depths that were equal to or greater than 0.8 ft. Some riffles in the lower mainstem Russian were shallower than 0.8 ft including riffles at Vacation Beach, near the confluence with Hulbert Creek, and at Steelhead Beach. Riffles with a maximum depth of less than 0.8 ft can cause fish passage issues for adult Chinook salmon (Thompson 1972). The dam sill at Vacation Beach was particularly shallow at 0.4 ft for its entire width. Riffles downstream of vacation beach became inundated and deepened due to lagoon formation following a river mouth closure. Without the river mouth being closed it is likely that there would have been additional riffles that had a maximum depth less than 0.8 ft in this section of river. Lower river surveys were canceled following an atmospheric river in late October that raised stream flow to nearly 20,000 cfs and made conditions unsafe for field surveys and certainly allowed free passage of adult salmonids.

Snorkel surveys documented the presence of fish in the upper and lower Russian River during the Order. In the upper Russian River, native and introduced fish were observed in large numbers both in the beginning and end of the summer. Native warm water fish have adapted to the local conditions and are able to take advantage of places that are too warm for salmonids. Juvenile steelhead rear in the upper Russian River by occupying the portion of the river that receives cool water releases from the bottom of Lake Mendocino. A few juvenile steelhead were observed in the upper Russian River and a few adult steelhead were observed in the lower Russian River during snorkel surveys, but the majority of fish observed were native warm water species.

The atmospheric river in late October caused problems for our adult salmon video monitoring system. The Mirabel dam cannot be operated at flows above 2,000 cfs without risk of damaging the dam. In preparation of the impending atmospheric river, the dam was deflated and the camera system was removed for the season. Few adult salmonids returned prior to the removal of the video camera. As a result, adult salmonid counts are not reported because doing so would misrepresent the number of fish that actually passed upstream of the dam.

Stream flow conditions did not allow spawner surveys in Dry Creek, Alexander Valley, and in the Upper Russian River. These surveys were to be started once 100 adult salmonids passed through the Mirabel under water video system, but the atmospheric river in late October increased stream flow to unsafe levels before 100 adult salmonids were counted at the Mirabel underwater video system. Furthermore, access to spawning habitat was no longer a concern once steam flows were elevated due to run off from the storm.

References

State Water Resources Control Board. 2021. Order WR 2021-0056-EXEC in the matter of permits 12947A, 12949, 12950, and 16596 (applications 12919A, 15736, 15737, 19351) Sonoma County Water Agency order approving temporary urgency change. Sacramento California.

Sonoma County Water Agency. 2016. Fish Habitat Flows and Water Rights Project Draft Environmental Impact Report. July 2016

Sonoma County Water Agency 2022. Russian River Water Quality Summary for the 2021 Temporary Urgency Change. March 2022.

Thompson, K. 1972. Determining stream flows for fish life. Pages 31-50 in Proceedings, instream flow requirements workshop. Pacific Northwest River Basins Commission, Vancouver, Washington.Water quality report

Appendix. Photographs of habitat conditions in the Russian River.

Upper Russian River Cross-Section Photo Documentation

Figure A 1. A photo of the Ukiah sample site on the mainstem Russian River (rkm 158.89) taken on June 13, 2021 when flow was 74 cfs. Flow is the combination of the release from Coyote Valley dam and the flow in the west fork of the Russian River (USGS gage number 11461000).

Figure A 2. A photo of the Hopland sample site on the mainstem Russian River (rkm 137.97) taken on June 13, 2021 when flow was 53 cfs. Flow is from the USGS Hopland stream gage (gage number 11462500).

Figure A 3. A photo of the Comminsky Station sample site on the mainstem Russian River (rkm 114.67) taken on June 13, 2021 when flow was 58 cfs. Discharge is from the USGS Cloverdale stream gage (gage number 11463000).

Figure A 4. A Photo of the Comminsky Station sample site on the mainstem Russian River (rkm 114.67) taken on July 12, 2021 when flow was 63 cfs. Discharge is from the USGS Cloverdale stream gage (gage number 11463000).

Figure A 5. A photo of the Cloverdale sample site on the mainstem Russian River (rkm 104.61) taken on June 13, 2021 when flow was 60 cfs. Discharge is from the USGS Cloverdale stream gage (gage number 11463000).

Figure A 6. A photo taken at the Geyserville sample site on the mainstem Russian River (rkm 89.04) taken on June 13, 2021 when flow was 53 cfs. Discharge is from the USGS Geyserville stream gage (gage number 11463500).

Figure A 7. A photo of the Jimtown sample site on the mainstem Russian River (rkm 77.90) taken on June 13, 2021 when flow was 38 cfs. Discharge is from the USGS Jimtown stream gage (gage number 1163682).

Figure A 8. A photo of the Del Rio Woods sample site on the mainstem Russian River (rkm 57.86) taken on July 12, 2021 when flow was 27 cfs. Discharge is from the USGS Digger Bend stream gage (gage number 11463980).

Figure A 9. A photo of the Healdsburg sample site on the mainstem Russian River (rkm 53.08) taken on July 12, 2021 when flow was 27 cfs. Discharge is from the USGS Healdsburg stream gage (gage number 11465350).

Lower Russian River Cross-Section Photo Documentation

Figure A 10. Brown's riffle located near the confluence with Austin Creek on September 30, 2021 showing inundation from the ponding effect when the mouth of the Russian River closed. Flow at the USGS Hacienda stream gage (gage number 11467000) was 45 cfs.

Figure A 11. A photo of the Monte Rio riffle crest cross section taken on September 30, 2021.

Figure A 12. Looking upstream from the Vacation Beach temporary crossing on September 30, 2021.

Figure A 13. Looking across the Vacation Beach dam sill on September 30, 2021.

Figure A 14. A photo of the riffle crest transect taken at Vacation Beach on October 5, 2021

Figure A 15. A photo of the longitudinal profile taken at Vacation Beach on October 10, 2021.

Figure A 16. A photo of the longitudinal profile taken at Monte Rio on October 10, 2021.

Figure A 17. A photo of the riffle crest transect taken on the Russian River near the confluence with Hulbert Creek on October 5, 2021.

Figure A 18. A photo of the longitudinal profile taken the Russian River near the confluence with Hulbert Creek on October 10, 2021.

Figure A 19. A photo of the riffle crest transect taken at Summer Crossing Road on October 5, 2021.

Figure A 20. A photo of the longitudinal profile taken at Summer Crossing Road on October 10, 2021.

Figure A 21. A photo of the riffle crest transect taken at Mom’s Beach on October 5, 2021.

Figure A 22. A photo of the riffle crest transect taken at Steelhead beach on October 5, 2021.

Figure A 23. A photo of the longitudinal profile taken at Steelhead Beach on October 10, 2021.

Figure A 24. A photo of the riffle crest transect taken at Mirabel near collector well number 3 on October 5, 2021.

Figure A 25. A photo of the longitudinal profile taken at Mirabel near collector well number 3 on October 10, 2021.