

Scott River Watershed Council

Juvenile Fish Sampling Report

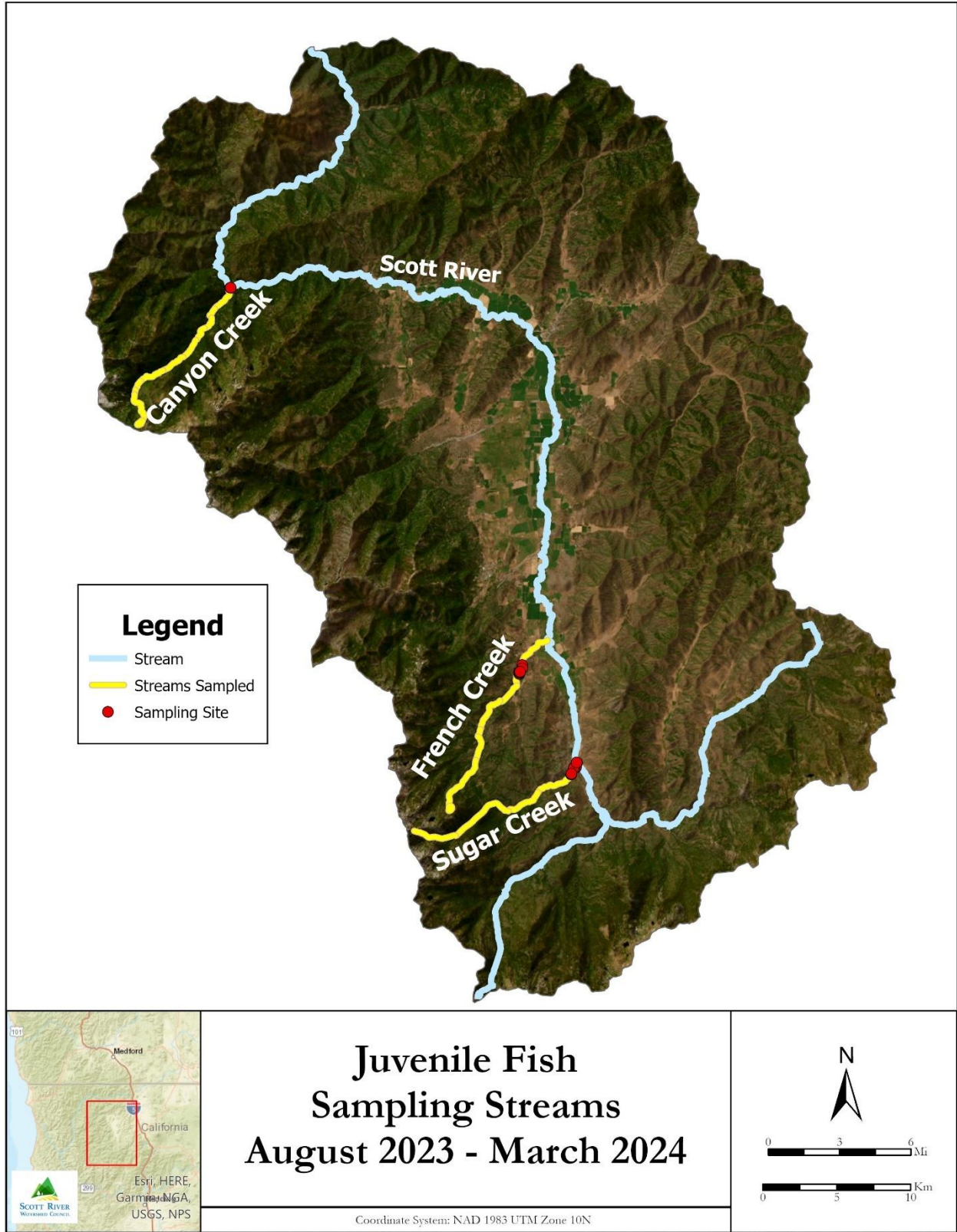
2023-2024 Season



Introduction

Between August 2023 and March 2024, Scott River Watershed Council (SRWC) staff conducted seven juvenile fish sampling efforts in four streams in the Scott River watershed: Canyon Creek, French Creek, Sugar Creek and a side channel of the mainstem Scott River. (Map 1). SRWC staff used seines and minnow traps to capture and collect data from fish inhabiting both restored and untreated habitat units in these streams. All captured salmonids were anesthetized, weighed and measured. Prior to January 1, 2024, coho salmon (*Oncorhynchus kisutch*) greater than 65 mm were eligible to receive a passive integrated transponder (PIT) tag. After January 1, only coho greater than 70 mm were eligible to be tagged. PIT-tagged coho were identified when recaptured at sampling events, in which case size comparisons were made to determine growth rates. Networks of remote PIT arrays were also operated in these streams, allowing for tagged Coho to be detected as they moved through the watershed.

Cover Photo: SRWC staff seining at the French Creek Beaver Dam Pond on October 12th, 2023.



Map 1. Watershed-level view of streams and sites sampled by SRWC during the 2023-2024 season.

French Creek

The California Department of Water Resources (DWR) operates a discharge measurement station (station ID F25650) at river kilometer (RKM) 1.1 in French Creek, just upstream of the Highway 3 bridge. For this report, the discharge data from this site was downloaded from the California Data Exchange Center (<https://cdec.water.ca.gov>) and is provisional. Between August 1, 2023 and March 28, 2024, the discharge at this site exceeded the values capable of being processed by the station’s rating curve. Daily average discharge (cfs) was calculated for all days apart from those two occasions. Daily average water temperature (°C) was calculated from 15-minute data collected by an SRWC water temperature logger at RKM 3.2 (Figure 1).

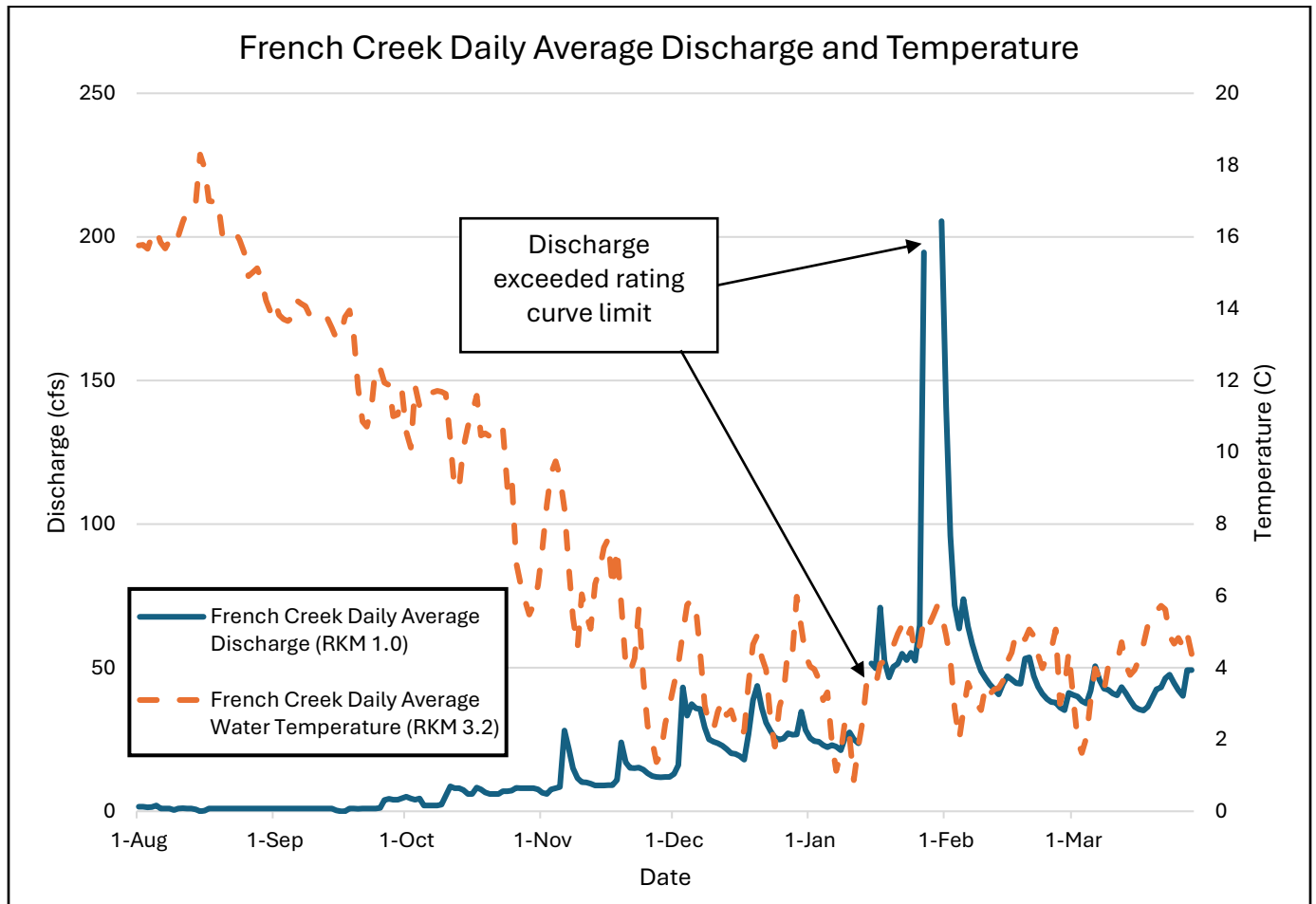
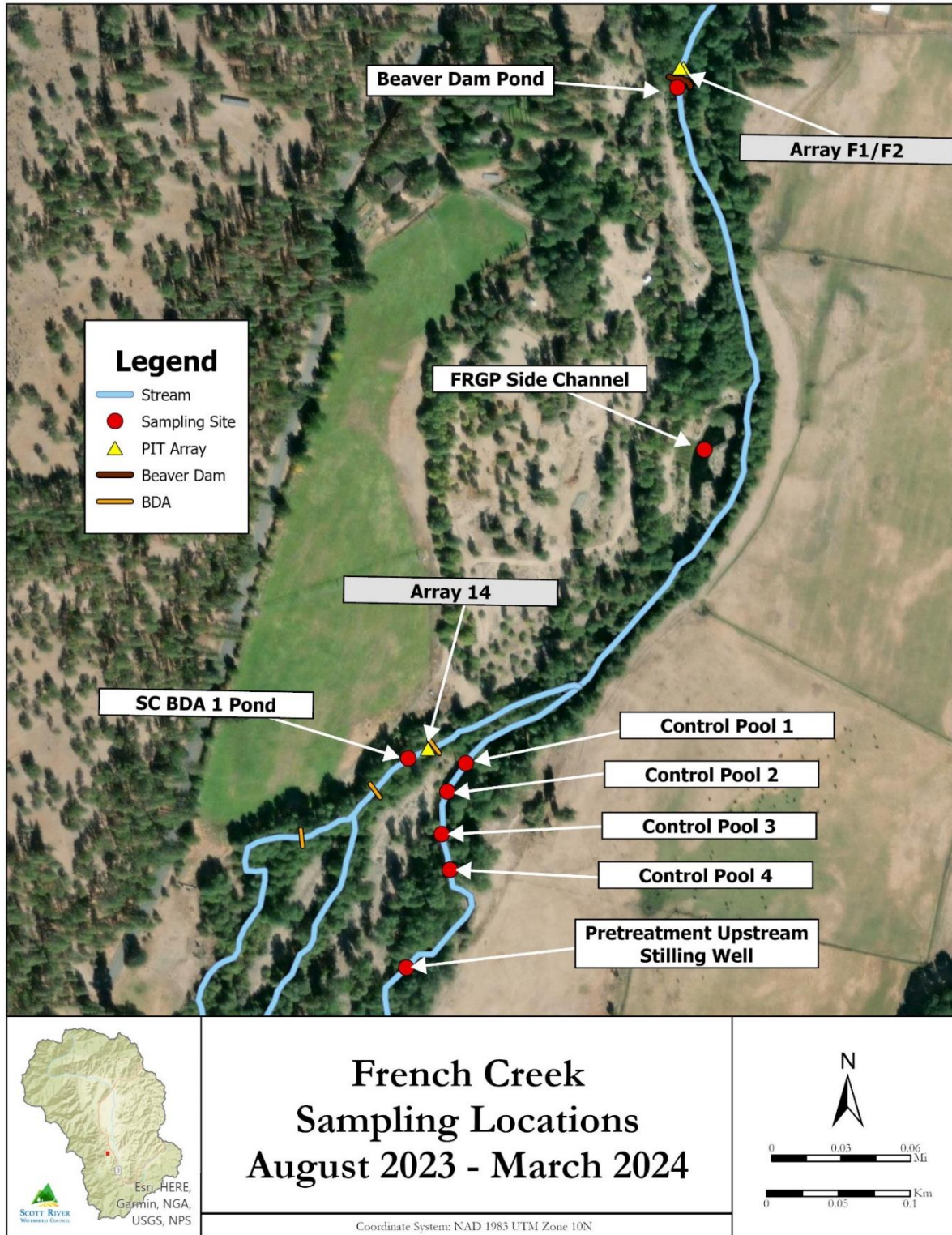


Figure 1. French Creek daily average discharge and water temperature from August 2023 through March 2024.

From August 2023 to March 2024, eight sites were sampled between RKM 2.8 and RKM 3.2 in French Creek (Map 2).



Map 2. French Creek habitats sampled during the 2023-2024 season.

Beaver Dam Pond

The beaver dam pond at French Creek was a large, deep, low velocity habitat at the downstream end of the study area (Picture 1). After having been built, blown out and rebuilt in the last two years, this dam was once again destroyed by high flows in December 2023. The habitat loss was notable in the catch data from this site. Average coho salmon catch in the August – November efforts was 172 fish, while the average catch in the January and February efforts was 16 fish. This unit was not sampled in March due to the change in habitat.



Picture 1. French Creek beaver dam pond before (left) and after (right) dam blow out.

FRGP Side Channel

This is a large, deep side channel habitat constructed in 2018 with funding from the California Department of Fish and Wildlife (CDFW) Fisheries Restoration Grant Program (FRGP) (Picture 2). This unit provides excellent refuge for juvenile fish during high winter flows but can experience low dissolved oxygen concentrations in the summer and fall. Sampling did not occur in September due to concerns over fish health during the August effort. This habitat was also heavily altered during the 2023-2024 winter, as a large amount of decomposed granite was deposited here, significantly reducing the depth in certain areas of the side channel. Minnow traps are the only method of sampling employed at this site due to the water depth.



Picture 2. French Creek FRGP Side Channel above (left) and below (right) water surface.

SC BDA 1 Pond

This is a pond created by a beaver dam analogue (BDA) in a side channel (SC) of French Creek (Picture 3). Groundwater influence in this pond keeps water temperatures within the acceptable range for juvenile coho salmon rearing year-round. This habitat was also significantly altered by decomposed granite input this winter.



Picture 3. French Creek SC BDA 1 Pond above (left) and below (right) water surface.

Control Pools

The control pools are a series of four pools between river kilometer (RKM) 3.4 and 3.6 (Picture 4). These habitats have not experienced any concentrated restoration activity and have been used for several years to compare fish population metrics to treated habitats. The four pools vary significantly in physical characteristics, with the two upstream units providing the most habitat for juvenile salmonids.



Picture 4. French Creek Control Pool 3 (left) and Control Pool 4 (right).

Pretreatment Upstream of Stilling Well Pool

This is another untreated pool habitat at a bend in French Creek (Picture 5). This is a high-quality habitat with deep water, an undercut bank and plentiful overhanging vegetation. It is the furthest upstream sampling site in French Creek.



Picture 5. French Creek Pretreatment Upstream of Stilling Well Pool habitat.

Sugar Creek/Scott River

DWR operates a discharge measurement station (station ID F25890) at RKM 2.5 in Sugar Creek. For this report, the discharge data from this site was downloaded from the California Data Exchange Center (<https://cdec.water.ca.gov>) and is provisional. Daily average discharge (cfs) was calculated using the 15-minute data at this site. Daily average water temperature (°C) was calculated from 15-minute data collected by an SRWC water temperature logger at RKM 0.13, in a BDA-influenced section of stream (Figure 2).

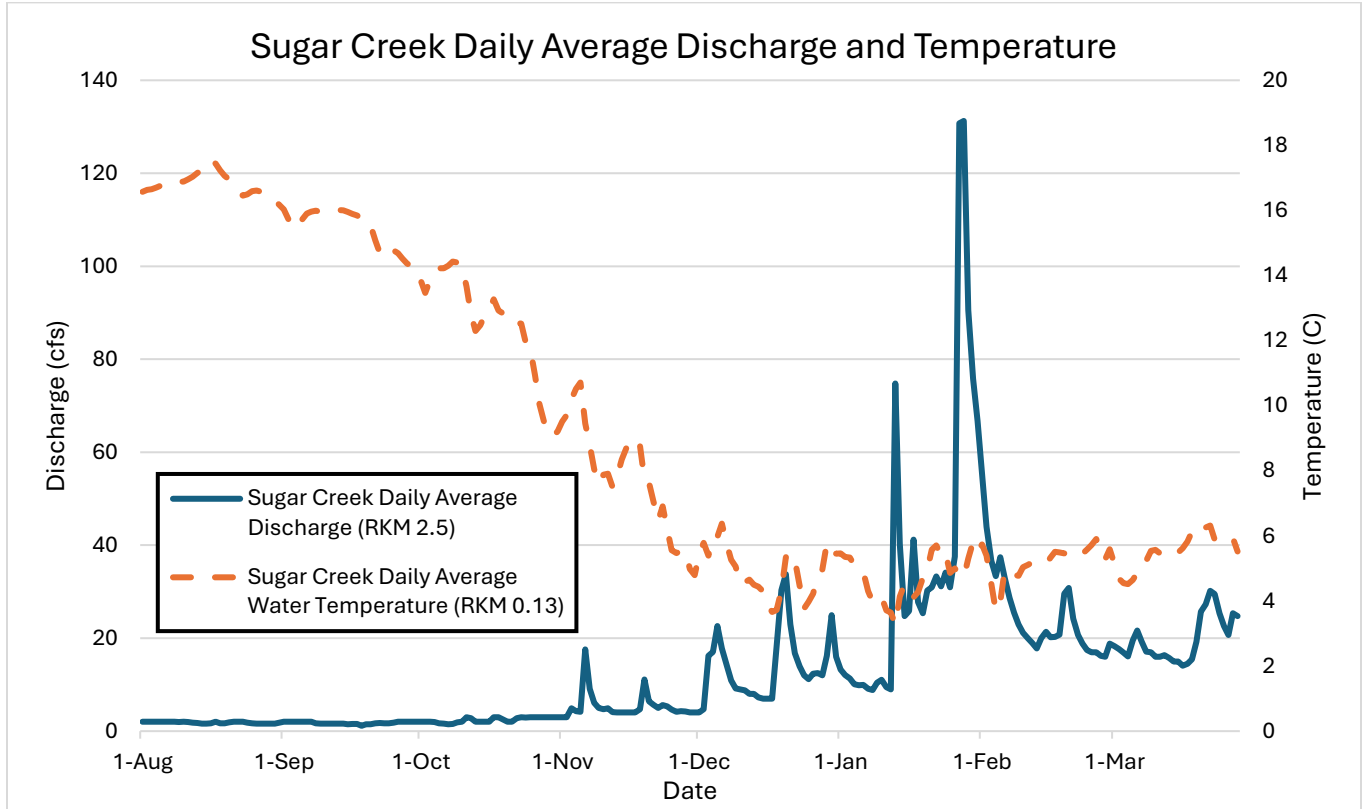
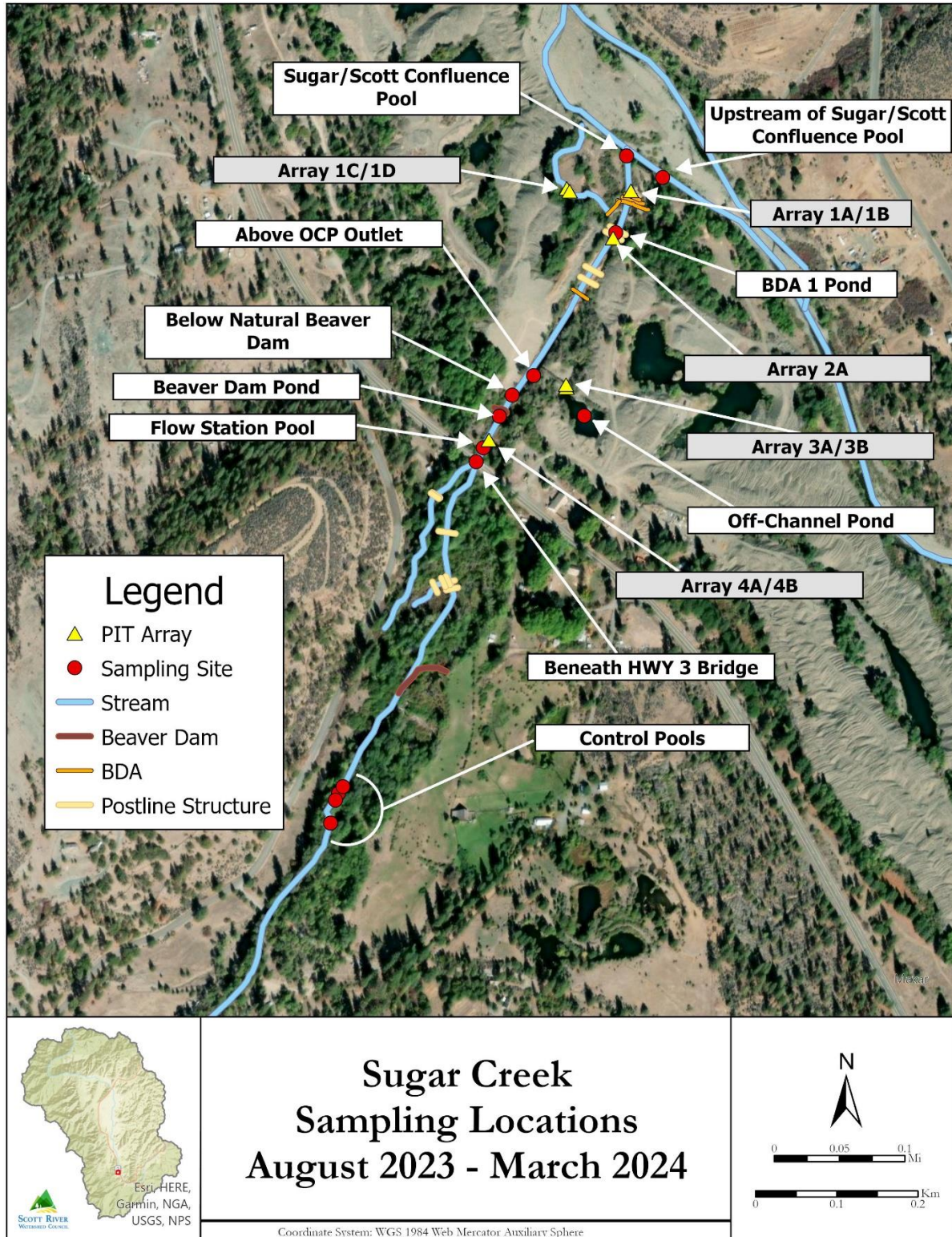


Figure 2. Sugar Creek daily average discharge and water temperature from August 2023 through March 2024.

Between August 2023 and March 2024, 13 sites were repeatedly sampled in Sugar Creek and the Scott River adjacent to the Sugar Creek confluence (Map 3).



Map 3. Sugar Creek habitats sampled during the 2023-2024 season.

Upstream of Sugar/Scott Confluence Pool

This habitat is in a side channel of the mainstem Scott River, approximately 0.05 RKM upstream from the mouth of Sugar Creek (Picture 6). There is a dense riparian canopy and undercut bank, which was formerly a beaver bank den. This site is heavily influenced by groundwater input, with water temperatures in summer being much lower than in the surrounding stream. Due to high velocities in the mainstem Scott River, sampling did not occur at this location in January.



Picture 6. Scott River Upstream of Sugar/Scott Confluence habitat above (left) and below (right) water surface.

Sugar/Scott Confluence Pool

This is a deep pool at the confluence of Sugar Creek and the Scott River (Picture 7). There is a large amount of overhanging and submerged woody material. Sampling only occurred at this site in August.



Picture 7. Sampled pool habitat at the confluence of Sugar Creek and the Scott River. This photo was taken from the Scott River, looking at the mouth of Sugar Creek (left).

BDA 1 Pond

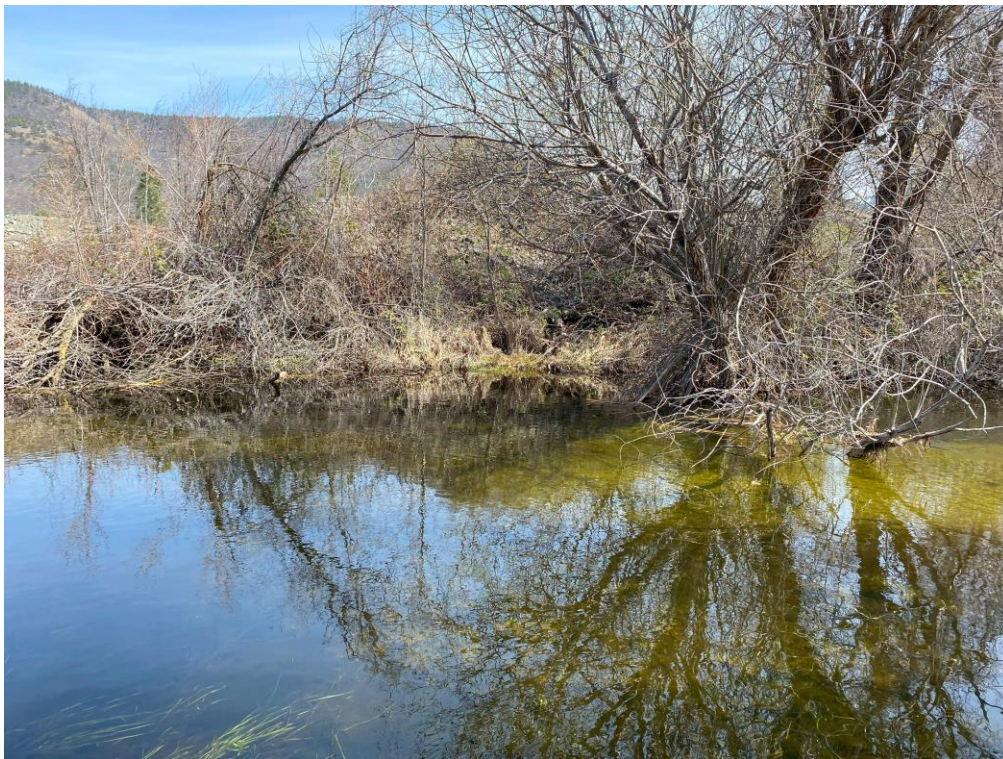
This habitat is formed by three BDAs in Sugar Creek approximately 0.06 RKM upstream from the confluence with the Scott River (Picture 8). In addition, there are two porous post line structures (PLS) in the BDA pond. The PLSs themselves rack up material and provide instream cover, in addition to a considerable amount of aquatic vegetation and submerged woody debris. This unit was sampled during all efforts this season, although the coho salmon catch declined precipitously in the winter events.



Picture 8. Sugar Creek BDA 1 Pond habitat above (left) and below (right) water surface.

Above OCP Outlet

This is a deep flatwater section of Sugar Creek directly upstream of the off-channel pond (OCP) outlet (Picture 9). This site is approximately 0.12 RKM upstream from a BDA that influences the depth and velocity of this habitat. This habitat has been referred to as the BDA 2 Pond in the past. Along the river right bank there is plentiful overhanging vegetation and submerged woody material.



Picture 9. Sugar Creek Above OCP Outlet habitat.

Off-Channel Pond

This habitat is a large pond formed during the period of heavy mining activity the Scott watershed experienced (Picture 10). In fall 2015, this groundwater fed slow water habitat was connected to mainstem Sugar Creek via the excavation of a channel. The off-channel pond (OCP) is extremely deep, consistently exceeding 10 feet at some locations, and experiences relatively mild water temperature fluctuations due to groundwater influence. This habitat is very difficult to sample effectively (only minnow traps are used), and it is likely that the most optimal coho salmon rearing areas are not being targeted. Coho catch did not exceed 10 fish in the OCP during any sampling event, although a paired PIT array setup in the channel connecting to Sugar Creek indicates a large influx of coho into the pond during winter.



Picture 10. Sugar Creek Off-Channel Pond habitat.

Below Natural Beaver Dam

Immediately downstream of the natural beaver dam on mainstem Sugar Creek is this habitat consisting of a pool and small marsh area (Picture 11). Along the river left edge of this unit there is a small section of pool with overhanging vegetation and a larger, shallow area with dense aquatic vegetation.



Picture 11. Sugar Creek Below Natural Beaver Dam habitat.

Beaver Dam Pond

This habitat consists of a pool formed by a natural beaver dam with a large amount of submerged woody material (Picture 12). Along the river right edge of the pond are several dead standing trees that provide some shade. This habitat is difficult to seine effectively due to the high amount of submerged wood. As such, coho catch in the summer and fall surveys in this pond was lower than expected in light of the high counts reported during summer direct observation surveys.



Picture 12. Sugar Creek Beaver Dam Pond habitat above (left) and below (right) water surface.

Flow Station Pool

Approximately 60 meters upstream from the beaver dam pond is the flow station pool, a naturally occurring habitat with deep, slow water and dense cover from overhanging vegetation (Picture 13). During low flow conditions, there is a riffle that forms between this unit and the beaver dam pond. However, as flows rise that separation disappears and juvenile coho move freely between the two habitats.



Picture 13. Sugar Creek Flow Station Pool habitat above (left) and below (right) water surface.

Beneath HWY 3 Bridge

This untreated habitat lies directly beneath the Highway 3 bridge over Sugar Creek (Picture 14). There is a small area of deeper water, but high velocities appear to be a limiting factor here. During winter flows the potential separation between this unit, the flow station pool and the beaver dam pond is not present. Sampling did not occur at this location after the January event.



Picture 14. Sugar Creek Beneath Hwy 3 Bridge habitat.

Control Pools

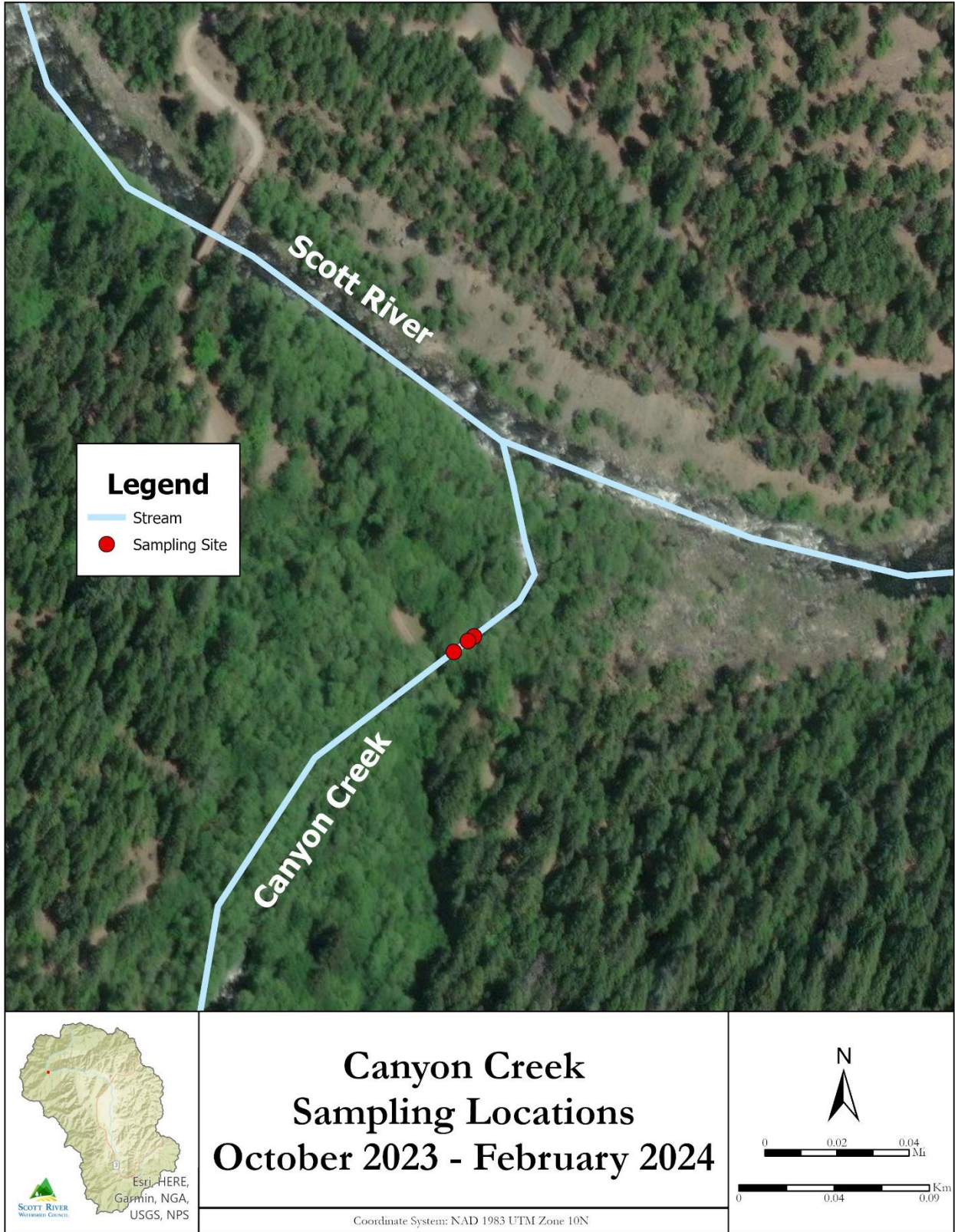
This unit consists of a series of four pools between RKM 0.9 and RKM 1.0 in Sugar Creek - Map 3 (Picture 15). These habitats have not experienced any restoration activity and have been used for several years to compare fish population metrics to treated habitats. Winter flows altered these habitats significantly, especially the most downstream pool which saw a large amount of wood recruitment.



Picture 15. Sugar Creek Control Pool 4 above (left) and below (right) water surface.

Canyon Creek

Three pools were sampled in Canyon Creek between RKM 0.08 and RKM 0.11 (Map 4). None of these sites have experienced restoration activity. Sampling occurred at this site during the October, November and February efforts. Sampling in January was not attempted due to high flows in Canyon Creek. Sampling in March was not attempted after zero coho salmon were encountered during then February effort. Canyon Creek is a higher gradient stream than the other three sampled streams, and as such may experience greater reductions in rearing habitat during winter.



Map 4. Canyon Creek habitats sampled during the 2023-2024 season.

83% of the Canyon Creek coho salmon catch came from one of these pools. This habitat has deep water, plentiful riparian shade and instream cover in the form of boulder crevices (Picture 16).



Picture 16. Canyon Creek Pool 2.

Catch

Coho salmon were encountered at all sampling sites apart from the pool at the confluence of Sugar Creek and the Scott River. In total, the greatest number of coho were captured in the French Creek control pools, while the highest coho catch in Sugar Creek was in the BDA 1 Pond. Rainbow trout/steelhead (*Oncorhynchus mykiss*) were encountered at all sampling sites. The habitats with the highest cumulative catch numbers of *O. mykiss* were the same as with coho salmon. Chinook salmon (*Oncorhynchus tshawytscha*) were only encountered in Canyon Creek (Table 1). This catch data is not a reliable representation of abundance, as there is wide variation in the ease and efficacy of sampling these units.

Location	Chinook Captured	Coho Captured	Coho PIT-Tagged	<i>O. mykiss</i> Captured	<i>O. mykiss</i> PIT-Tagged
Canyon Creek Pools	2	151	109	76	2
French - Beaver Dam Pond		717	403	24	2
French - Control Pools		829	327	246	2
French - FRGP SC		148	120	10	1
French - Pretreatment Upstream Stilling Well		166	60	41	
French - SC BDA 1 Pond		529	180	16	2
Scott River - At Sugar/Scott Confluence				141	
Scott River - Upstream of Sugar/Scott Confluence		239	132	288	2
Sugar - Above OCP Outlet		134	55	60	
Sugar - BDA 1 Pond		657	404	571	10
Sugar - Beaver Dam Pond		242	88	19	
Sugar - Below Natural Beaver Dam		218	95	76	
Sugar - Beneath Hwy 3 Bridge		93	29	29	
Sugar - Control Pools		181	103	96	
Sugar - Flow Station Pool		373	167	7	
Sugar - OCP		27	21	23	1
Total	2	4,704	2,293	1,723	22

Table 1. Count of salmonids captured and PIT-tagged during the 2023-2024 sampling season.

Growth

Calculations of growth rates of individual fish were able to be made when PIT-tagged coho salmon were encountered multiple times. Relative growth was calculated by dividing the millimeters (mm) of growth between encounters by the forklength (mm) at the earlier encounter event, then dividing that value by the number of days between encounters (mm/mm/day). This analysis only includes fish recaptured in the same location as the previous encounter, with no recaptures at different habitats between those encounters. It is possible that a fish may have spent time in a different unit between recaptures in the same unit without being encountered. Relative growth was calculated for two periods: fall and winter. The fall period includes fish encountered in August, September and/or October and recaptured in September, October and/or November. The winter period includes fish encountered in November, January, and/or February and recaptured in January, February and/or March (Table 2). Many fish were recaptured at multiple sampling events during each period; in these cases, only the growth between the first and last encounter was included in the analysis. For example, if a coho was tagged in August and recaptured in September and November, the growth was calculated between the August and November encounters.

Avg mm/mm/day (n>3)						
Location	Fall	Fall Count	Fall Standard Deviation	Winter	Winter Count	Winter Standard Deviation
Canyon Creek - Pools	0.0013	20	0.00040			
French - Beaver Dam Pond	0.0022	99	0.00085			
French - Control Pools	0.0018	151	0.00081	0.0017	27	0.00135
French - FRGP SC				0.0013	4	0.00050
French - Pretreatment Upstream Stilling Well	0.0017	21	0.00089	0.0025	5	0.00037
French - SC BDA 1 Pond	0.0024	81	0.00101	0.0022	62	0.00079
Scott River - Upstream of Sugar/Scott Confluence	0.0016	46	0.00059			
Sugar - Above OCP Outlet				0.0006	4	0.00048
Sugar - BDA 1	0.0026	131	0.00097	0.0011	6	0.00045
Sugar - Beaver Dam Complex	0.0015	50	0.00101	0.0011	56	0.00047
Sugar - Below Natural Beaver Dam	0.0026	20	0.00064	0.0010	15	0.00033
Sugar - Control Pools	0.0013	11	0.00118	0.0015	20	0.00052

Table 2. Coho salmon relative growth data in fall 2023 and winter 2023-2024. Growth rates are color coded from green (highest) to red (lowest) for each period. Blank cells indicate less than four recaptures in that period.

Average forklength was calculated for habitat units in months where more than three juvenile coho salmon were captured during a sampling event (Table 3). These results are potentially influenced by seasonal movement in and out of units, differences in ability of individuals to avoid capture and differences in sampling techniques (the French Creek FRGP Side Channel and Sugar Creek OCP were only sampled with minnow traps). Nonetheless, it is interesting to note that the Sugar Creek Control Pools and French Creek Pretreatment Upstream Stilling Well Pool habitats had the highest average forklengths during the August sampling event and the lowest and third lowest average forklengths, respectively, during the final sampling event in March.

Location	August Avg FL	September Avg FL	October Avg FL	November Avg FL	January Avg FL	February Avg FL	March Avg FL
Sugar - Control Pools	77.1	78.9	85.5	77.4	83.0	84.8	89.2
French - Pretreatment Upstream Stilling Well	73.3	75.3	85.8		92.7	87.6	92.9
Sugar - BDA 1 Pond	72.1	78.1	85.3	86.5	96.7	98.9	100.6
French - SC BDA 1 Pond	71.0	73.6	79.6	85.0	99.2	94.4	95.4
French - Control Pools	69.3	70.1	73.8	78.3	89.1	89.6	92.3
Sugar - Beaver Dam Complex	68.1	72.0	77.5	88.0	93.4	95.0	92.9
Scott River - Upstream of Sugar/Scott Confluence	67.5	70.7	73.6	76.6		97.0	
French - Beaver Dam Pond	63.1	66.3	72.6	76.0	82.2	92.0	
Sugar - Above OCP Outlet	61.8	71.5	80.2	91.1	97.9	102.8	98.3
Sugar - Below Natural Beaver Dam	60.6	67.2	73.8	85.5	94.5	92.5	95.6
Canyon Creek Pools			73.3	78.2			
French - FRGP SC			80.0	85.9	89.5	96.2	
Sugar - OCP				101.7	118.8	110.5	

Table 3. Coho salmon average forklength at each sampling site where n>3. Sorted from highest August average forklength to lowest.

Movement

While coho salmon recaptured in a different location from a prior encounter were not able to be used for the growth analysis, these encounters provide important insight into how the fish are moving throughout the study reaches. In addition to in-hand recaptures, remote detections at stationary PIT arrays were included in this analysis (Table 4). In order to try to separate rearing/exploring fish from migrating fish, a tag detected at an antenna downstream from the location in which the tag was implanted must have been detected for at least two consecutive days at that antenna to be included in these results.

Some individuals were detected rearing in several different habitats. Each instance of a fish rearing in a different habitat from the one in which it received its tag is presented here. For example, of the 53 coho tagged in the Sugar Creek BDA 1 pond and detected at array 4A/4B, 24 were also detected entering the Off-Channel Pond via array 3A/3B and are a part of the 128 fish shown in the table ([Map 3](#)).

The PIT array network in Sugar Creek is currently much more robust than the network in French Creek, which may give the impression that Sugar Creek coho are moving more than French Creek coho.

The vast majority of this movement occurred in the winter period. Of the 209 coho recaptured in a different habitat, only 3% of them moved prior to the November sampling event.

		Coho Recaptured/Detected in Location Different from Mark Location								
		Mark Location								
		French - Control Pools	French - Pretreatment Upstream Stilling Well	Scott River - Upstream of Sugar/Scott Confluence	Sugar - Above OCP Outlet	Sugar - BDA 1	Sugar - Beaver Dam Complex*	Sugar - Below Natural Beaver Dam	Sugar - OCP	Sugar - Control Pools
Recapture/Detection Location	French - FRGP SC	9 (0.36 RKM)	1 (0.47 RKM)							
	French - Control Pools		2 (0.12 RKM)							
	French - Pretreatment Upstream Stilling Well	5 (0.12 RKM)								
	French - SC BDA 1 Pond (including array 14)	6 (0.24 RKM)	1 (0.36 RKM)							
	Sugar - Above OCP Outlet			1 (0.36 RKM)		11 (0.22 RKM)	3 (0.11 RKM)	3 (0.08 RKM)		2 (0.67 RKM)
	Sugar - BDA 1 (including array 2A)			31 (0.16 RKM)	2 (0.22 RKM)		26 (0.28 RKM)	1 (0.25 RKM)	1 (0.30 RKM)	1 (0.89 RKM)
	Sugar - Beaver Dam Complex (including array 4A/4B)				2 (0.11 RKM)	53 (0.28 RKM)		8 (0.03 RKM)	1 (0.19 RKM)	14 (0.56 RKM)
	Sugar - Below Natural Beaver Dam				1 (0.08 RKM)	14 (0.25 RKM)	5 (0.03 RKM)			
	Sugar - OCP (including array 3A/3B)			9 (0.46 RKM)	40 (0.12 RKM)	128 (0.30 RKM)	75 (0.19 RKM)	60 (0.16 RKM)		7 (0.75 RKM)

Table 4. Counts of coho salmon recaptured or detected in a habitat different from the one in which they were PIT-tagged. August 2023 through March 2024.

The sampled habitats varied in the percentage of total marked fish that were detected in different units. The percentages of coho detected moving out of French Creek habitats were lower than all Sugar Creek habitats apart from the Off-Channel Pond. However, as mentioned above, an expansion of the French Creek array network would likely result in the detection of more movement in that stream. The highest percentages of “movers” were seen in two Sugar Creek habitats: Below Natural Beaver Dam and Above Off-Channel Pond Outlet (Figure 3). This is perhaps not surprising as these habitats are in the mainstem creek and very close to off-channel, slow-water areas where juvenile fish can find refuge from high winter flows.

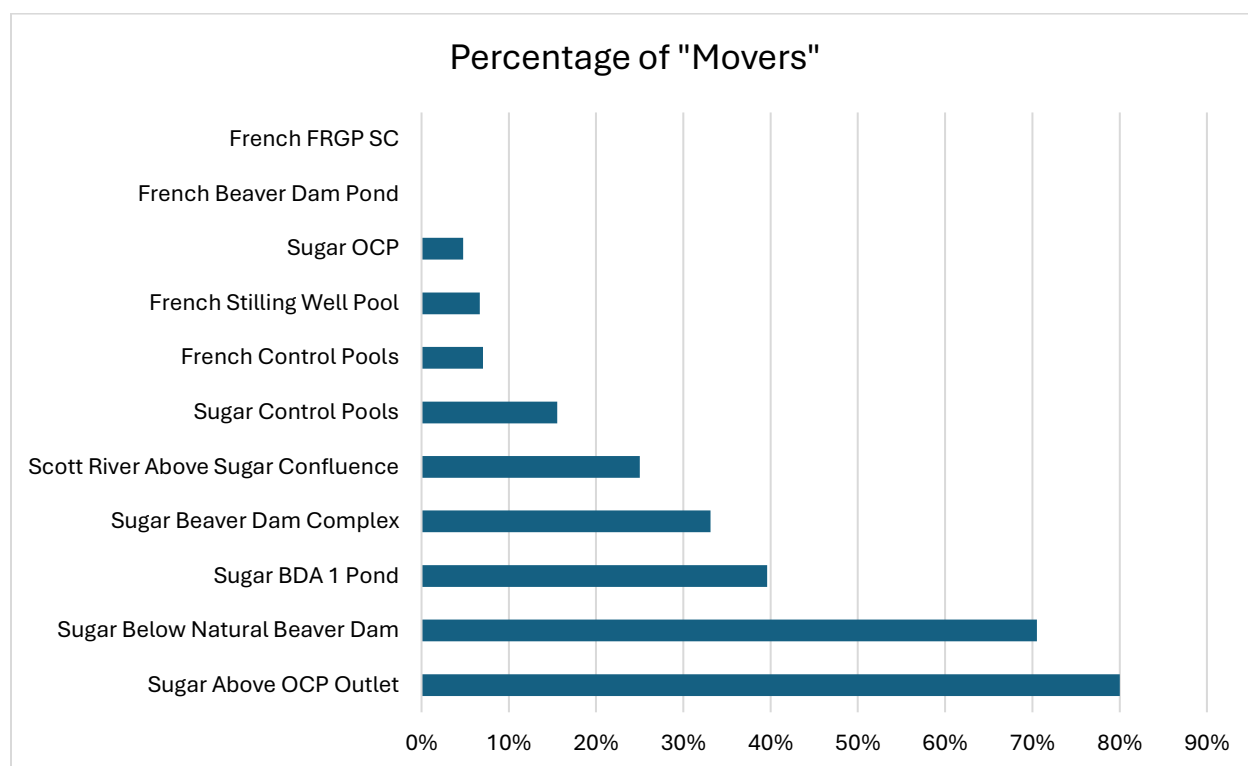


Figure 3. Percentage of total PIT-tagged fish in a habitat that were detected in a different location. August 2023 through March 2024.

The third highest percentage was seen in the Sugar Creek BDA 1 Pond, with just under 40% of the coho salmon tagged in this habitat moving upstream toward the Off-Channel Pond and Beaver Dam Complex. It is unclear what prompted the exodus from the BDA 1 Pond as this is a deep, low velocity habitat with lots of aquatic vegetation. Coho movers that were tagged in the Sugar BDA 1 Pond in August, September, October and November were, on average, slightly larger than the total population of coho marked or recaptured in those sampling events. BDA 1 Pond movers tagged in January and February were, on average, smaller than the total population of marked or recaptured coho, although sample sizes shrunk significantly in these months (Table 5). Further research is needed to determine the

cause of this behavior; a multiyear comparison of habitat-specific movement percentage would shed light on whether this is a response to instream conditions.

Sugar BDA 1 Pond				
Month	Total Average FL	Total FL Count	Mover Avg FL	Mover FL Count
Aug	76.0	107	77.2	50
Sep	78.2	163	79.5	54
Oct	85.3	194	86.2	45
Nov	86.5	69	89.4	5
Jan	96.7	16	94.5	2
Feb	98.9	27	96.8	4
Total	83.1	592	81.6	160

Table 5. Average forklength of Sugar Creek BDA 1 Pond "movers" tagged in a given month compared to the average forklength of all coho salmon tagged or recaptured in the BDA 1 Pond in that month.

Tagged Fish of Interest

Several coho salmon tagged by SRWC were detected exhibiting uncommon behaviors during the 2023-2024 season:

989001045427032

This tag was implanted into a 71 mm coho salmon on September 5th, 2023 in the Sugar Creek BDA 1 Pond (Table 6). In addition to being recaptured on October 10th, this tag was detected 104 times between September and March in the BDA Pond via Array 2A (not included in the table). On March 1st, 2024, this fish was detected moving upstream in Sugar Creek, entering and exiting the Off-Channel Pond (Array 3A/3B) and the Flow Station Pool (Array 4A/4B). In the same day, this fish was detected moving downstream and out of Sugar Creek (via Array 1A/1B). Around 20 hours after leaving Sugar Creek, this tag was detected in French Creek at RKM 2.9 (Array F1/F2). The distance between the Sugar Creek Flow Station Pool and French Creek Array F1/F2 is approximately 13.7 RKM.

Date & Time	Stream	Location	Encounter Type	FL (mm)
9/5/2023	Sugar Creek	BDA 1 Pond (RKM 0.10)	Mark	71
10/10/2023	Sugar Creek	BDA 1 Pond (RKM 0.10)	Recapture	78
3/1/2024 10:33	Sugar Creek	Array 2A (RKM 0.10)	Remote Detection	
3/1/2024 11:23	Sugar Creek	Array 3B (RKM 0.29)	Remote Detection	
3/1/2024 11:24	Sugar Creek	Array 3A (RKM 0.29)	Remote Detection	
3/1/2024 11:37	Sugar Creek	Array 3A (RKM 0.29)	Remote Detection	
3/1/2024 11:37	Sugar Creek	Array 3B (RKM 0.29)	Remote Detection	
3/1/2024 11:47	Sugar Creek	Array 4B (RKM 0.42)	Remote Detection	
3/1/2024 11:51	Sugar Creek	Array 4A (RKM 0.42)	Remote Detection	
3/1/2024 11:53	Sugar Creek	Array 4B (RKM 0.42)	Remote Detection	
3/1/2024 12:17	Sugar Creek	Array 2A (RKM 0.10)	Remote Detection	
3/1/2024 12:25	Sugar Creek	Array 1A (RKM 0.045)	Remote Detection	
3/1/2024 12:26	Sugar Creek	Array 1B (RKM 0.045)	Remote Detection	
3/2/2024 8:10	French Creek	Array F2 (RKM 2.9)	Remote Detection	

Table 6. Encounter history of PIT tag 989001045427032.

989001045427350

This tag was implanted into a 69 mm coho salmon on September 7th, 2023 in the French Creek Beaver Dam Pond (Table 7). On October 12th, this fish was recaptured in the same habitat, having grown 5mm in the 35 days between encounters. No detections or encounters occurred for almost six months before, on April 1, 2024, this tag was detected moving upstream into the Sugar Creek Off-Channel Pond. This would indicate that this fish swam 10.8 RKM upstream in the mainstem Scott River and Sugar Creek during winter baseflow conditions. It would also indicate that this tag passed by Array F1/F2, Array 1A/1B and Array 2A without being detected. At the time of the generation of this report, SRWC array data has been processed up until May 13th, 2024, and no additional detections of this tag have occurred.

Date & Time	Stream	Location	Encounter Type	FL (mm)
9/7/2023	French Creek	Beaver Dam Pond (RKM 2.9)	Mark	69
10/12/2023	French Creek	Beaver Dam Pond (RKM 2.9)	Recapture	74
4/1/2024 10:48	Sugar Creek	Array 3B (RKM 0.29)	Remote Detection	
4/1/2024 10:48	Sugar Creek	Array 3A (RKM 0.29)	Remote Detection	

Table 7. Encounter history of PIT tag 989001045427350.

989001045428630

This tag was implanted into a 73mm coho salmon on October 16th, 2023 in one of the sampled pools in Canyon Creek (Table 8). On December 21st, it was detected at the CDFW

adult salmon counting weir (Array 93) at RKM 29 in the mainstem Scott River (Table 8). Canyon Creek enters the Scott River at approximately RKM 25.7, meaning that this tag was detected in the Scott River over three RKM upstream from the mouth of Canyon Creek. The weir concentrates the movement of adult salmonids through a small opening in the center of the channel, where a 36-inch x 44-inch rectangular PIT antenna is located. However, the gaps in this fence-like structure are wide enough that juvenile fish would not be forced to pass through the antenna. The channel width at this location on December 21st, 2023, was likely over 100 feet. This tag just happened to pass through the three-foot-wide section of river in which it could be detected. It is unknown when this tag moved upstream and whether it was moving up or down the Scott River when it was detected at the weir antenna.

Date & Time	Stream	Location	Encounter Type	FL (mm)
10/16/2023	Canyon Creek	Pool 2 (RKM 0.11)	Mark	73
12/21/2023 0:45	Scott River	Array 93 (RKM 29)	Remote Detection	

Table 8. Encounter history of PIT tag 989001045428630.

989001041195274

On August 14, 2023, a 102 mm PIT-tagged coho salmon was recaptured in French Creek Control Pool 3 (Table 9). As August was the first tagging event of the season, this recapture immediately indicated that this fish had been tagged in the 2022-2023 sampling season. This tag had, in fact, been implanted into this fish on October 24th, 2022, when it was 67 mm long. Unlike the vast majority of Scott River watershed coho salmon that outmigrate after only one summer in fresh water, this fish stayed in French Creek for a second summer rearing period.

Date & Time	Stream	Location	Encounter Type	FL (mm)
10/24/2022	French Creek	Control Pool 3	Mark	67
8/14/2023	French Creek	Control Pool 3	Recapture	102
9/1/2023 12:23	French Creek	Array 14 (Side Channel BDA Pond)	Remote Detection	

Table 9. Encounter history of PIT tag 989001041195274.

Non-Salmonid Species

In addition to the three salmonid species that were encountered during sampling, at least seven other animal species were incidentally captured during seining or minnow trapping. Brook sticklebacks (*Culaea inconstans*) were the most numerous of these organisms, followed by the speckled dace (*Rhinichthys osculus*) (Figure 4). Two salamander species were encountered during sampling: the coastal giant salamander (*Dicamptodon tenebrosus*) and the long-toed salamander (*Ambystoma macrodactylum*) (Picture 17). Crayfish were the only arthropods counted.

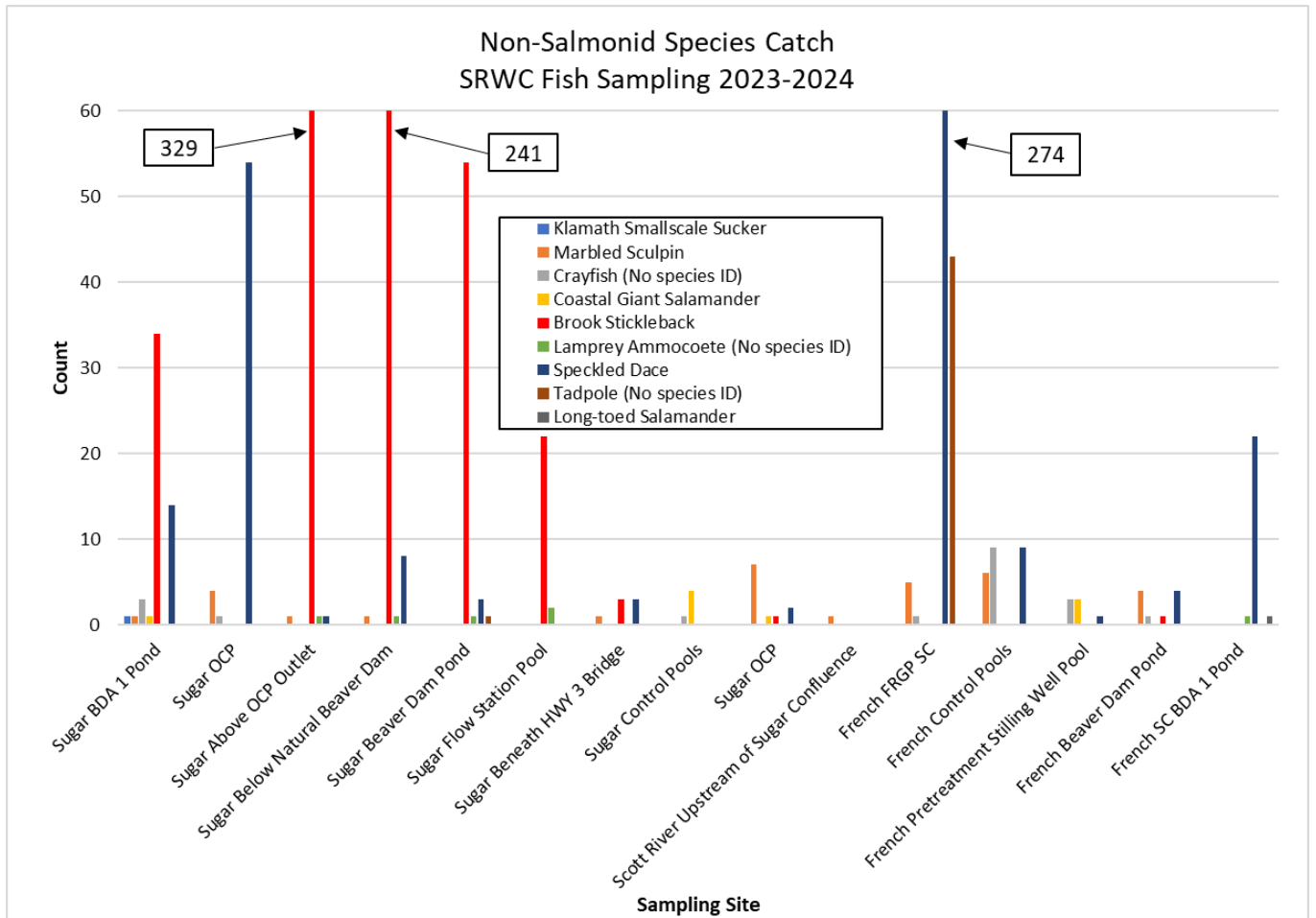


Figure 4. Non-salmonid animals captured during the 2023-2024 fish sampling season.



Picture 17. Long-toed salamander captured in the French Creek SC BDA 1 Pond habitat in February 2024.

Comparison to Previous Sampling Season

The juvenile coho salmon with which this report is concerned are the progeny of the spawning adults that returned during the 2022-23 winter. During that season, the California Department of Fish and Wildlife (CDFW) estimated that 238 adult coho returned to the Scott River. Due to a spike in discharge in late December 2022, CDFW was forced to remove their counting station while the migration was still occurring, so it is likely that additional coho salmon returned to the Scott watershed without being counted (CDFW 2023). The 2022-2023 return represents 34% of the average return between 2007 and 2022. In January 2023, SRWC staff conducted weekly spawning ground surveys in French Creek and Sugar Creek. Two coho salmon carcasses and three redds were observed in French Creek, while one carcass and two redds were observed in Sugar Creek. It is possible that high flows and turbidity during these efforts may have obscured additional observations, but it appears that the density of spawning in these tributaries was low.

The juvenile coho encountered during the 2022-2023 sampling season were primarily the offspring of the spawners returning during the 2021-2022 winter. CDFW counted 852 adult coho salmon migrating past the weir site during that season.

SRWC did not attempt to make juvenile coho salmon abundance estimates during the 2023-2024 sampling season. However, the same sampling methods were employed by SRWC staff in August 2022 and August 2023. With this in mind, the raw catch data from these sampling events can serve as a metric of habitat-specific abundance across the two seasons. Coho salmon catch in August 2022 was greater than 200% of August 2023 catch in all but one comparable habitat (Table 10).

Location	August 2023 Coho Salmon Catch	August 2022 Coho Salmon Catch
French - Beaver Dam Pond	107	473
French - Control Pools	181	591
French - FRGP Side Channel	0	178
Sugar - Above OCP Outlet	8	120
Sugar - BDA 1 Pond	160	387
Sugar - Beaver Dam Pond	55	66

Table 10. Comparison of coho salmon catch per sampled habitat in August 2023 and August 2022.

Coho salmon relative growth in fall 2023 was higher than in fall 2022 in all comparable habitats except the Sugar Creek Control Pools. In the French Creek SC BDA 1 Pond, relative growth was higher in winter 2023-2024 than in winter 2022-2023. However, in the Sugar Creek BDA 1 Pond, relative growth was higher in winter 2022-2023 than in the subsequent year (Table 11). Lower winter relative growth values in the Sugar BDA 1 Pond may be correlated to the aforementioned emigration from this habitat in 2023-2024.

Avg mm/mm/day (n>3)				
Location	Fall 2023	Fall 2022	Winter 2023-24	Winter 2022-23
French - Beaver Dam Pond	0.0022	0.0013		
French - Control Pools	0.0018	0.0008		
French - SC BDA 1 Pond			0.0022	0.0014
Sugar - BDA 1 Pond	0.0026	0.0010	0.0011	0.0014
Sugar - Beaver Dam Complex	0.0015	0.0009		
Sugar - Control Pools	0.0013	0.0016		

Table 11. Comparison of coho salmon relative growth in the fall and winter periods of the last two sampling seasons.

The SRWC water temperature logger at RKM 3.2 in French Creek was also collecting data during the 2022-2023 fish sampling season. Between August 1st and November 1st, daily average water temperatures (°C) in French Creek in 2022 exceeded 2023 values on 87% of days. Across the same dates, fall 2023 Scott River daily average discharge at the USGS station (11519500) was at least 200% of fall 2022 daily average discharge on 82% of days (Figure 5). These factors, coupled with higher coho salmon densities, likely explain the differences in relative growth rates seen during these two periods.

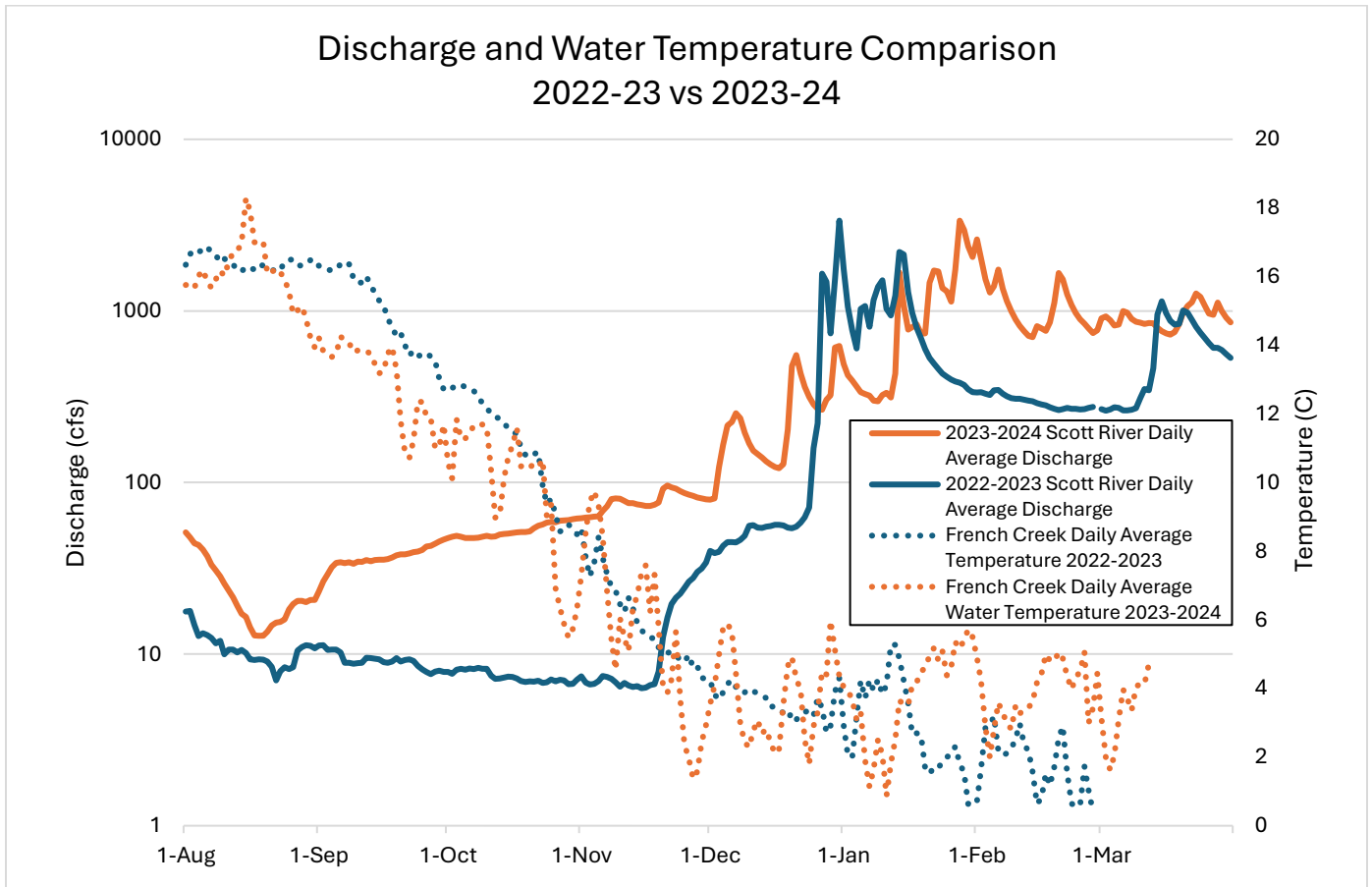


Figure 5. Comparison of Scott River daily average discharge (measured at USGS gage 11519500) and French Creek daily average water temperature across the last two fish sampling seasons.

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