

## Fish Sampling Summary Report

### South Fork McKenzie River 2019 - 2022

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Part of the OWEB Grant # 220-7000-17342 of Evaluating Ecological and Geomorphic Responses to Stage 0 Restoration

#### 1.0 Juvenile Spring Chinook Salmon and Native Trout Monitoring

Oregon Department of Fish and Wildlife (ODFW) worked in partnership with U.S. Forest Service (USFS) and McKenzie Watershed Council to study juvenile Chinook salmon and native trout during and after in-stream restoration work in the South Fork McKenzie River. ODFW and USFS worked collaboratively in 2019, 2021, and 2022 to capture and tag juvenile Chinook salmon, cutthroat, and rainbow trout in Phase I and II of the project area. Fish were implanted with passive intergraded transponder (PIT) tags prior to release back to the same site where they were captured. In addition, fish were measured for fork length, weight, and scanned for previously implanted PIT tags. In 2019 in Phase I, we tagged 1,460 juvenile Chinook, seven cutthroat trout and 11 rainbow trout from mid-June to mid-August. In 2021 in Phase I & II, we tagged 982 juvenile Chinook, 14 cutthroat trout and 20 rainbow trout from mid-June to mid-August. In 2022 in Phase I & II, we tagged 929 Chinook, 30 cutthroat trout and 18 rainbow trout (Table 1). In addition, fish were tagged in the Strube Flat area upstream of phase II to monitor movement into the restoration areas; in 2021 we tagged 519 juvenile Chinook, 33 cutthroat trout, and six rainbow trout and in 2022, 331 juvenile Chinook, 17 cutthroat trout and 3 rainbow trout. We were unable to sample and tag fish as planned for periods each year because of high flow events from Cougar Dam (Figure 1).

*Table 1. Number of fish tagged in South Fork McKenzie Phase I & II and upstream of Phase II (2021-22) from 2019-2022.*

Species	2019	2021	2022	Total Above Phase II	Grand Total
Chinook salmon	1,460	982	929	850	<b>4,221</b>
Cutthroat Trout	7	14	30	50	<b>101</b>
Rainbow Trout	11	20	18	9	<b>58</b>

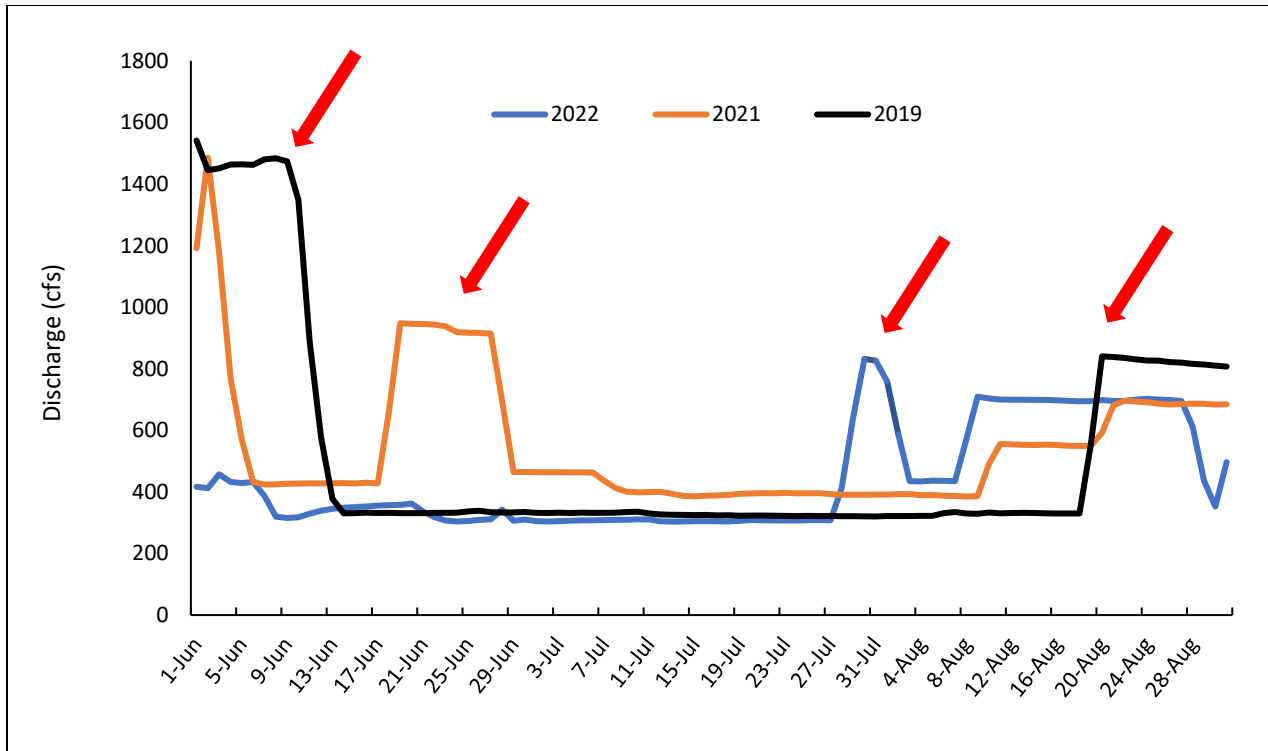


Figure 1. Discharge (cfs) in South Fork McKenzie from June 1– August 31 2019–2022. Arrows highlight major increases in discharge from water released at Cougar Dam.

### 1.1 South Fork McKenzie River PIT-tag Detections

To confirm rearing in Phases I & II, ODFW designed, assembled, and installed PIT-tag detection arrays (2 antennas/array) in three channels at the confluence with the McKenzie River (the downstream end of Phase I) and two arrays in two channels at the upstream end of Phase II in 2021 & 2022. Arrays were operational from mid-June through mid-October, except for 2022 when they were removed in early October due to a deep drawdown of Cougar Reservoir. ODFW also monitored PIT-tag detection arrays at Walterville bypass canal in the lower McKenzie River to track the movement of juvenile Chinook.

In 2019, PIT arrays in Phase I detected 23 juvenile Chinook migrating out of the project area between July and October (Table 2). In 2021, PIT arrays in Phase I & II detected 139 fish (Table 2). In addition, 35 fish tagged above Phase II in 2021 were detected entering the restoration area. Also in 2021, 26 fish were detected leaving the restoration area through the lower antenna arrays from late July through late August. Our PIT arrays detected five adult spring Chinook and four adult Pacific Lamprey entering the South Fork McKenzie in 2019 and two adult spring Chinook in 2021. Detection data from 2022 is pending.

### 1.2 Walterville Canal PIT-tag Detections

Twelve juvenile Chinook tagged in 2019 in the South Fork McKenzie were detected at Walterville canal bypass, with most fish detected in October and November 2019 (range July

2019 - March 2020). In 2021, 10 fish were detected at Walterville canal from November 2021 - March 2022; four were tagged within the restoration area and six were tagged above the restoration area between Strube Flat and top of Phase II. No Chinook tagged in the South Fork McKenzie were detected at Walterville in fall 2022. We could have some fish detected in the next few months, with fish following the spring migration.

### 1.3 Residency Time

Residency time in the restoration areas averaged 37 days (median 35 days; range 11-79 days) in 2019 and 11 days (median 4 days; range 1-65 days) in 2021. Residency in 2021 was likely longer than 11 days because of issues with one of PIT arrays probably limited the data collected. The array across the southern most channel was not detecting fish continuously in late August and September because of issues with the power supply. Also, the dramatic decrease in water temperature in late August, from a release of water from Cougar Dam, probably caused fish to migrate out of the restoration area into the mainstem McKenzie River much sooner than they would have otherwise. In 2019, most of the migrants were detected in the southern channel since it has the most water during the late summer.

In 2021, issues with power supply to several antennae caused us to miss some fish detection data; two antennae at the upstream end of Phase II in August and September and two antennae in the south channel of Phase I from late August till mid-October.

## 2.0 Spring Chinook Salmon Spawning Surveys:

In 2019, 2021 and 2022, USFS and ODFW personnel conducted spawning ground surveys in the South Fork McKenzie River, working together to compare methods and confirm redd counts. Full census redd surveys were not completed in 2020 due to the impacts of the Holiday Farm Fire and associated access and safety risks. In 2019, peak redd count in the South Fork McKenzie River below Cougar Dam was 328 redds, with 241 of those redds counted in Phase I and II. In 2021, 112 redds were counted below Cougar Dam with 84 of those redds in Phase I and II. In 2022, 140 redds were counted below Cougar Dam with 105 redds located within Phase I and II. The total redd counts are summarized in Table 2. These counts are much higher than before restoration took place in the lower South Fork McKenzie River.

*Table 2. Peak redd counts below Cougar Dam in South Fork McKenzie in 2019 - 2022.*

Sections:	2019	2021	2022
Cougar Dam to Top of Phase II	87	28	35
Phase I and II	241	84	105
Total	328	112	140

### 3.0 Pending 2022 Summaries:

The results from juvenile fish Chinook salmon sampling for the 2022 season are pending during the spring 2023 with fish following the spring migration period. The current results are summarized in Table 3. The total catch by species is shown in Figure 2. The average weight, length, and minimum and maximum length are detailed in Tables 4-6. Stream temperatures from US Geological Service gauge 14159500 on the South Fork McKenzie River during the summer of 2022 are shown in Figure 3 for context.

Table 3. Catch by species in the South Fork McKenzie for four sampling periods in 2022.

Sampling Period	Chinook	Cutthroat	Rainbow
June 22 - 29	309	16	3
July 6 - 13	370	12	3
July 19 - 27	422	17	2
August 3 - 10	139	2	12
	1240	47	20

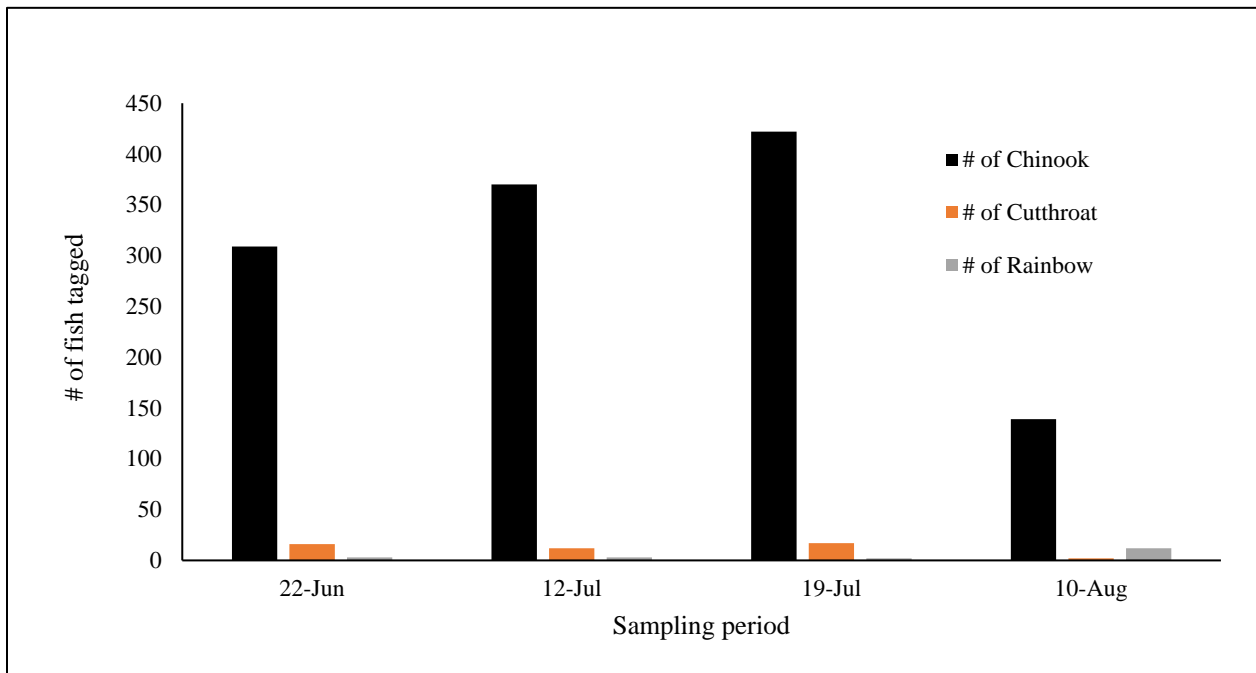


Figure 2. Catch by species in the South Fork McKenzie for four sampling periods in 2022.

Table 4. Average length and weight of fish tagged in the South Fork McKenzie from June 26 – August 3, 2022.

<b>Species/Area</b>	<b>Avg of Length mm</b>	<b>Avg of Weight g</b>	<b># of Fish tagged</b>
<b>Chinook</b>	<b>84.2</b>	<b>7.0</b>	<b>1261</b>
above Rd 19 bridge	89.0	8.7	119
Phase I & II	83.6	6.8	1142
<b>Cutthroat Trout</b>	<b>141.5</b>	<b>29.5</b>	<b>48</b>
above Rd 19 bridge*	141.9	32.6	9
Phase I & II	141.4	28.1	39
<b>Rainbow Trout</b>	<b>92.9</b>	<b>13.7</b>	<b>21</b>
above Rd 19 bridge	86.5	18.9	2
Phase I & II	93.6	12.9	19
<b>Grand Total</b>	<b>86.4</b>	<b>7.9</b>	<b>1330</b>

\* Above Rd 19 only on July 19<sup>th</sup>

Table 5. Average length and weight of fish tagged in the South Fork McKenzie in July 2022.

<b>Species/Area</b>	<b>Avg of Length mm</b>	<b>Avg of Weight g</b>	<b># of Fish tagged</b>
<b>Chinook</b>	<b>83.6</b>	<b>6.9</b>	<b>1122</b>
above Rd 19 bridge	89.0	8.6	120
Phase I & II	83.0	6.6	1002
<b>Cutthroat Trout</b>	<b>141.6</b>	<b>29.2</b>	<b>46</b>
above Rd 19 bridge	141.9	32.6	9
Phase I & II	141.5	27.6	37
<b>Rainbow Trout</b>	<b>120.3</b>	<b>26.2</b>	<b>9</b>
above Rd 19 bridge	86.5	18.9	2
Phase I & II	130.0	29.9	7
<b>Grand Total</b>	<b>86.2</b>	<b>7.8</b>	<b>1177</b>

Table 6. Minimum and maximum lengths of juvenile Chinook and trout tagged in the South Fork McKenzie in July 2022.

<b>Species</b>	<b>Max of Length mm</b>	<b>Min of Length mm</b>
Chinook	203.0	55.0
Cutthroat Trout	230.0	81.0
Rainbow Trout	144.0	57.0
<b>Grand Total</b>	<b>230.0</b>	<b>55.0</b>



### USGS 14159500 SOUTH FORK MCKENZIE RIVER NEAR RAINBOW, OR

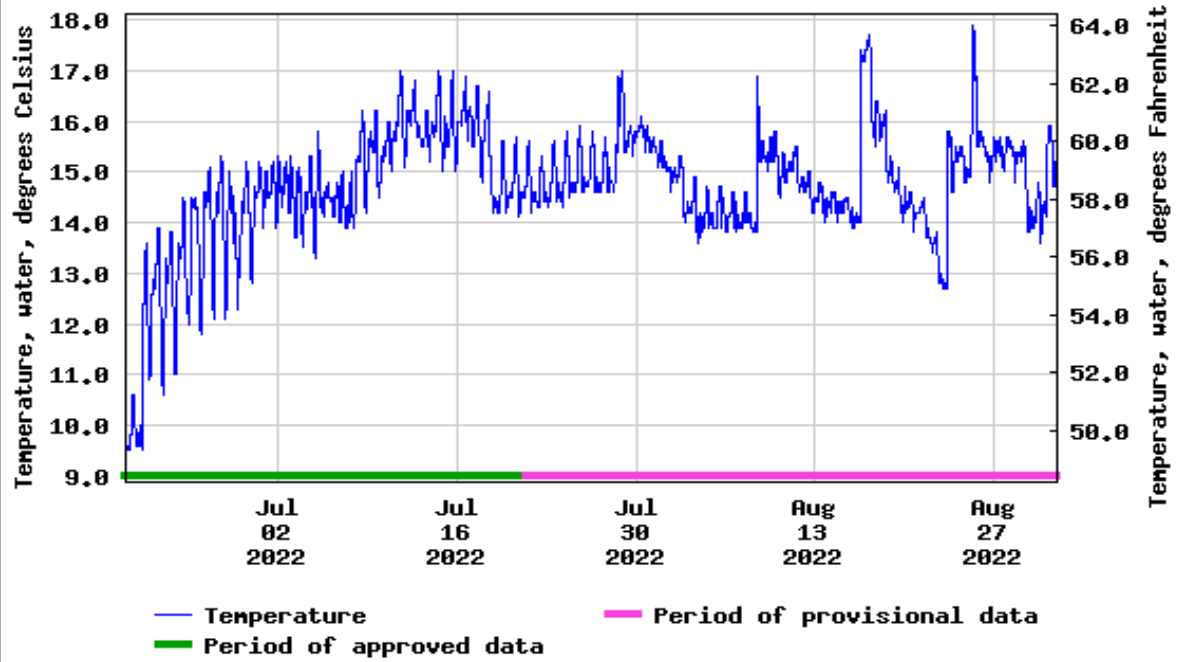


Figure 3. Water temperatures in South Fork McKenzie temperature profile June 20-August 30, 2022