PACIFIC RIVERS

2021 CANTON CREEK SNORKEL SURVEY

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Prepared by Pacific Rivers, a 501(c)(3) organization

Canton Creek Snorkel Surveys (2011-2021)

EXCECUTIVE SUMMARY

During ten of the last eleven summers, a snorkel survey of Canton Creek (North Umpqua basin) has been completed. During 2021, the survey was completed by Andrew Dewberry, Emma Latendresse, Rhiana Pritchett, and Charley Dewberry. Normally the Phoenix School has participated in the survey but because of COVID-19, they were not able to participate. The survey included all of the mainstem of Canton Creek, Pass Creek, East and West Pass Creek, and Mellow Moon Creek. We were not able to complete the survey of Upper Canton Creek because of a closure due to wild fire.

The water year (October 1, 2020 to September 30, 2021) was a fairly typical water year in that there were two high flow events of about equal size that occurred in December and January in the Steamboat basin, including Canton Creek, and each of the subsequent major storms had a lower flow than the previous one. However, the high flow events were only about 8,000 cfs. This is enough flow to get the steelhead into the tributaries but it is not enough to make it easy for the fish to make it far into the headwaters of the tributary streams. The fish were able to make it into the tributary streams in January and the subsequent storm were not large enough to scour the eggs out of the redds (nests). On the whole, this water year was conducive to successful spawning and fry emergence. This situation usually produces a larger than average age-0 steelhead population. However, the summer low-flows were significantly below average. The median low-flow at the Steamboat Creek USGS gage for the 65 years of record is about 45 cfs. The flows recorded for much of September were about 25 cfs. This lower than average flow reduces stream habitat and increases stream temperature issues for the summer months.

The snorkel surveys enable us to construct a snapshot of summer rearing of salmonids in Canton Creek. This snapshot of the abundance and distribution of steelhead (the dominant salmonid) in the basin and the evaluation of the stream habitat and landscape processes provide basic information to identify restoration opportunities within the basin. With each additional year of survey, the trends in the population of each salmonid and age class of steelhead become clearer. It also allows us to greater understand the factors affecting the abundance and distribution of the salmonids in the basin.

As a result of not being able to complete the snorkel survey in Upper Canton Creek, we changed our method of analysis for survey. In previous years we have first analyzed the total number of salmonids of each age with in the basin and then discussed the trends within each reach. In this year we will analyze the survey primarily from the ten-year averages for each reach. During 2021, the number of age-0 steelhead in the mainstem of Canton Creek, Pass Creek, and Right Fork of Pass Creek were below the 10-year average.

While, the West Fork of Pass Creek and Mellow Moon Creeks had a higher than average number of age 0 steelhead. Given the water year with good spawning conditions but poor summer rearing conditions, we anticipated that the headwater areas would be higher than normal, while the downstream reaches would have lower than average numbers of salmonids because of higher stream temperatures during the low-water summer period. That turned out to be the general trend for the year and fits with the general trend for the decade.

During 2021, the age-1 steelhead had higher than average populations in Pass Creek, and the Left and Right Forks of Pass Creek. Age-1 steelhead had lower than average populations in the mainstem of Canton Creek and in Mellow Moon Creek.

During 2021, the age-2 steelhead had the same population results as the age-1 steelhead. It appears that they were affected similar to the age-1 steelhead during this water year.

During 2021, cutthroat trout abundance and distribution was very similar the both age-1 and age-2 steelhead. The only exception was that there were no cutthroat trout (age-1 or older) observed in the West Fork of Pass Creek.

The similar abundance and distribution of age-1, age-2, and cutthroat trout suggests that they were affected by the same cause. The leading explanation would seem to be that the summer low-flows with higher than average summer water temperatures.

INTRODUCTION

In 2011, a partnership was formed among the Pacific Rivers Council, Phoenix School in Roseburg, Oregon, the Cow Creek Tribe, and the BLM to begin collecting baseline information prior to designing a restoration project within the Canton Creek Drainage basin. The Canton Creek Drainage was of interest because it is partially within the Oregon and California Railroad Lands (O&C) as well as being strategically located within the North Umpqua basin. This project provides an opportunity to collect background information for designing an effective restoration project within the context of the North Umpqua drainage.

During ten summers (2011-2021 minus 2012): a snorkel survey for juvenile salmonids in Canton Creek (North Umpqua basin) was completed by Phoenix School students and Pacific Rivers. Thomas McGregor, Director of work experience at the Phoenix School, coordinated the student participation. During the current year, all the snorkel divers were from Pacific Rivers: Andrew Dewberry, Emma Latendresse, Rhiana Pritchett, and Charley Dewberry. No students from the Phoenix School were allowed due to COVID-19 and the wild fires in the North Umpqua basin. The survey included all of the mainstem Canton Creek, Pass Creek, East and West Pass Creek, and Mellow Moon Creek (Figure 1). The only reach where the survey was not completed was upper Canton due to the basin being closed due to wildfire.

STUDY AREA

Canton Creek is a major tributary of Steamboat Creek in the North Umpqua River basin. The drainage area is approximately 60 square miles. Canton Creek is a strategically important producer of steelhead trout, coho salmon, chinook salmon and cutthroat trout within the North Umpqua drainage. Most of the western two-thirds of the basin are BLM-private land checkerboard (O&C lands). The remaining one-third of the basin is managed by the USFS.

The basin is entirely within the western Cascades. The geology is dominated by weathered Tertiary volcanic rocks. The dominant forest community is western Hemlock- Douglas fir.

METHODS

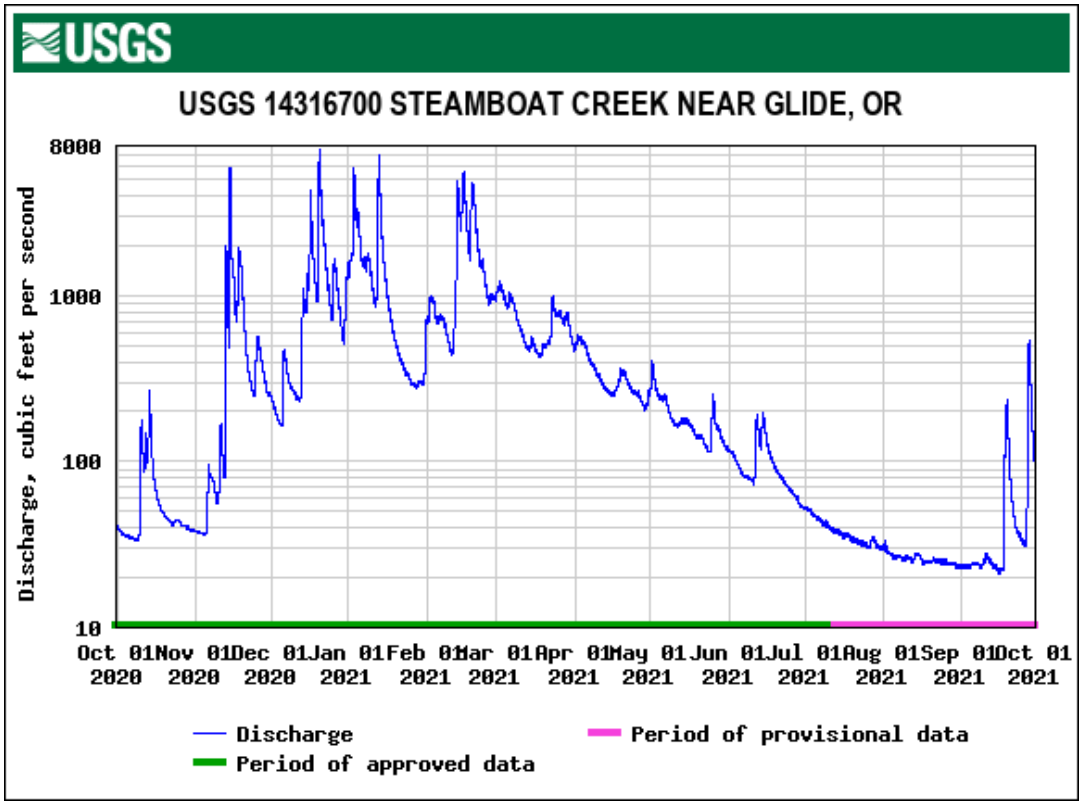
The snorkel surveys were conducted during August and September each year using the Hankin-Reeves method (Hankin and Reeves 1990). A dive crew consisting of two or more people work their way upstream through their designated stream reach. The stream channel was divided into three habitat types: riffles, pools, and glides. For each habitat unit, the length and width was estimated. The frequency of the surveyed units was: 1:10 riffles; 1:8 glides; and 1:5 pools. All salmonids were counted in each surveyed stream habitat. In the habitat units that were snorkeled, the length and width were measured.

For these surveys, age-0 and 1 trout include both steelhead and cutthroat trout. While some individuals are easy to identify into their respective species, others are very difficult. As a result, we elected to combine both species into these age categories. Age-2 steelhead were differentiated from age-2 cutthroat trout. While a few adult salmonids were observed in the surveys, they are not included in this discussion.

RESULTS AND DISCUSSION

THE WATER YEAR

The water year (October 1, 2020 to September 30, 2021) was a fairly typical water year in that there were two high flow events of about equal size that occurred in December and January in the Steamboat basin, including Canton Creek, and each of the subsequent major storms had a lower flow than the previous one (Figure 1). However, the high flow events were only about 8,000 cfs. This is enough flow to get the steelhead into the tributaries but it is not enough to make it easy for the fish to make it far into the headwaters of the tributary streams. The fish were able to make it into the tributary streams in January and the subsequent storm were not large enough to scour the eggs out of the redds (nests). On the whole, this water year was conducive to successful spawning and fry emergence. This situation usually produces a larger than average age-0 steelhead population. However, the summer low-flows were significantly below average. The median low-flow at the Steamboat Creek USGS gage for the 65 years of record is about 45 cfs. The flows recorded for much of September were about 25 cfs. This lower than average flow reduces stream habitat and increases stream temperature issues for the summer months.



SURVEYED REACHES

During the ten years, the following reaches of Canton Creek were snorkeled each year: the mainstem up to the confluence with Pass Creek, Pass Creek (including both forks), Upper Canton Creek, and Mellow Moon Creek. Only a portion of the Upper Canton reach was completed during this year due to the area being closed due to wildfire (Figure 2).

In previous years, the mainstem of Canton Creek was primarily snorkeled by Charley and Andrew Dewberry. During this year the mainstem of Canton Creek was snorkeled by Andrew Dewberry and Emma Latendresse.

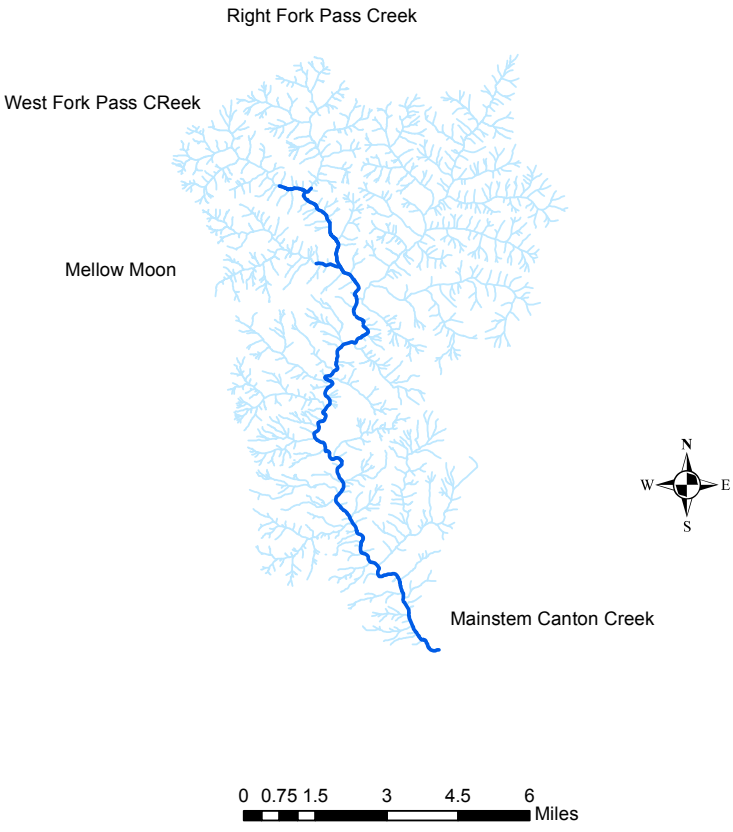


Figure 2. Snorkel Survey Canton Creek 2021

SALMONID POPULATION ESTIMATES

The results of the ten years of snorkel surveys are summarized in Tables 1-4. Steelhead trout, and cutthroat trout were observed and their populations estimated in the basin. In addition, a few adult steelhead and Chinook salmon were observed in the mainstem of Canton Creek, but their numbers were low and were not estimated. In previous years population estimates were made of coho salmon, but in 2018 and 2019 coho were observed in the mainstem but an accurate population estimate could not be created. During the current year about 289 coho salmon were estimated to be in the lower mile of the mainstem Canton Creek.

Table 1. Population estimate of Steelhead Age 0 in Canton Creek (2011,2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021).

Reach	2011	2013	2014	2015	2016	2017	2018	2019	2020	2021	Avg
Mainstem	32,968	15,430	7,433	23,180	11,537	20,768	13,780	3,902	29,755	12,001	17,075
Upper Car	3,888	5,948	3,247	4,901	1,372	4,929	6,274	822	3,431		3,868
Pass Creel	3,138	9,523	5,089	5,491	4,784	6,279	6,652	1,911	4,689	3,175	5,073
RF Pass Creek		200	131	462	572	386	12	245	373	114	277
LF Pass Creek		165	216	716	498	410	458	116	291	377	361
Mellow M	135	233	165	529	207	582	165	306	346	548	322
Total	40,129	31,499	16,281	35,279	18,970	33,354	27,341	7,302	38,885		

AGE-0 STEELHEAD

Steelhead trout were the most abundant salmonid within the basin. As expected, age-0 fish dominated the survey. During the ten years of survey, between 16,000 - 40,000 age-0 steelhead were usually observed in the major surveyed reaches. During the current year, just over 16,000 age-0 fish were estimated to be in the basin. This is without counting Upper Canton Creek.

As a result of not being able to complete the snorkel survey in Upper Canton Creek, we changed our method of analysis for survey. In previous years, we have first analyzed the total number of salmonids of each age with in the basin and then discussed the trends within each reach. In this year we will analyze the survey primarily from the ten-year averages for each reach. During 2021, the number of age-0 steelhead in the mainstem of Canton Creek, Pass Creek, and Right Fork of Pass Creek were below the 10-year average. While, the West Fork of Pass Creek and Mellow Moon Creeks had a higher than average number of age-0 steelhead. Given the water year with good spawning conditions but poor summer rearing conditions, we anticipated that the headwater areas would be higher than normal, while the downstream reaches would have lower than average numbers of salmonids because of higher stream temperatures during the low-water summer period. That turned out to be the general trend for the year and fits with the general trend for the decade. During this year of low-flow during the summer (and with higher stream temperatures) only 12,001 age-0 steelhead were estimated to be in the mainstem of Canton Creek. The ten-year average is over 17,000 fish.

To summarize, the total number of age-0 steelhead observed in 2021 was below average in the mainstem and Pass Creek, which are the two largest stream reaches in the basin. The West Fork of Pass Creek and Mellow Moon Creek, both headwater streams, were the only reaches with a higher than average number of age-0 fish.

Table2. Population estimate of Steelhead Age 1 in Canton Creek (2011,2013, 2014 and 2015, 2016, 2017, 2018, 2019, 2020, 2021).

Reach	2011	2013	2014	2015	2016	2017	2018	2019	2020	2021	Avg
Mainstem	3,615	892	1,512	1,585	796	745	1,385	1,232	1,549	1,064	1,438
Upper Car	1,059	644	444	685	134	357	945	194	53		502
Pass Creel	211	937	518	287	264	278	284	425	148	638	399
RF Pass Creek		6	0	4	118	0	0	186	81	92	54
LF Pass Creek		35	37	31	48	58	13	34	86	138	53
Mellow M	197	53	12	228	154	22	16	142	17	61	90
Total	5,082	2,567	2,523	2,820	1,514	1,460	2,643	2,213	1,934		

AGE-1 STEELHEAD

The population estimates of age-1 steelhead were between 1,460 and 5,000 fish for the previous ten years of sampling (Table 2). The largest population was observed in 2011, even though the survey underestimated the number of fish in that year because only about three-quarters of Pass Creek and Upper Canton Creeks were completed. The lowest number of age-1 steelhead was observed in 2017.

During 2021, the age-1 steelhead had higher than average populations in Pass Creek, and the Left and Right Forks of Pass Creek. Age-1 steelhead had lower than average populations in the mainstem of Canton Creek and in Mellow Moon Creek. Age-1 steelhead estimates were expected to be above average because last year's age-0 population estimates were the second highest observed during the ten years of survey. Therefore, it was no surprise that Pass Creek and both forks of Pass Creek had higher than average estimates for age-1 fish. The fact that the mainstem of Canton Creek had fewer than average number of age-1 fish, suggests it was not a good year for steelhead surviving from age-0 to age-1. The winter flows were of low magnitude, ruling out the likelihood that winter high flows resulted in higher than expected mortality of the age-0 fish. That leaves the summer low-flows as the most likely cause of the low estimates of age-1 fish in the mainstem of Canton Creek.

Mellow Moon Creek was the exception. It had a lower than average number of age-1 steelhead during 2021. There is no immediate reason to explain the lower than average numbers.

Table3. Population estimate of Steelhead Age 2 in Canton Creek (2011,2013, 2014, 2015, 2016, 2017,2018 and 2019, 2020, 2021).

Reach	2011	2013	2014	2015	2016	2017	2018	2019	2020	2021	Avg
Mainstem	673	113	432	301	96	188	728	546	844	336	426
Upper Car	173	36	102	146	28	80	116	23	9		79
Pass Creel	29	124	84	25	26	8	13	148	0	122	58
RF Pass Creek		0	0	4	50	0	0	11	38	24	14
LF Pass Creek		0	0	0	5	5	4	0	11	35	7
Mellow M	69	58	6	10	63	0	0	5	0	17	23
Total	944	331	624	486	268	281	861	733	902		

AGE-2 STEELHEAD

The population estimates for age-2 steelhead were between 268 and 950 fish (Table 3) for the ten years of survey. The largest number of fish was observed in 2011 while the lowest number of fish were observed in 2016 and 2017. During 2021, Pass Creek and the two forks of Pass Creek had a higher than average number of age-2 steelhead, while the mainstem of Canton Creek and Mellow Moon had a lower than average number of age-2 fish. This is the same pattern as was observed for age-1 steelhead. Interestingly, the year before as age-1 steelhead, the mainstem and both forks of Pass Creek had higher than average populations. Pass Creek had less than 50% of the ten year average. In the mainstem of Canton and Pass Creek the number of age-1 steelhead the year before did not determine the strength of the population of age-2 fish in the next year.

Table4. Population estimate of Cutthroat in Canton Creek (2011,2013, 2014, 2015, 2016, 2017,2018, 2019,2020, and 2021).

Reach	2011	2013	2014	2015	2016	2017	2018	2019	2020	2021	Avg
Mainstem	167	42	165	154	32	36	328	246	563	110	184
Upper Car	31	35	6	0	0	11	14	48	62		23
Pass Creel	107	13	15	0	0	16	0	29	102	77	36
RF Pass Creek		0	0	0	20	0	0	28	8	28	9
LF Pass Creek		0	0	0	0	0	0	6	0	0	1
Mellow Moon		0	6	0	0	0	0	64	0	6	8
Total	305	90	192	154	52	63	342	421	735		

CUTTHROAT TROUT

The majority of the cutthroat trout observed in the Canton Creek basin were in the mainstem reach. They were highest in the 2020 survey (735) compared with the previous high of 421 (Table 4). They were lowest in the 2016 survey (52). Their populations were higher than the ten year average in Pass Creek and the Right Fork of Pass Creek and lower than average in the other reaches. The majority of cutthroat trout are always in the mainstem of Canton Creek. That was again true during this survey. However, only 110 cutthroat were estimated to be in the mainstem, while the ten year average is 184 fish.

COHO AND CHINOOK SALMON

In each survey year, some coho salmon juveniles were observed in the lower reaches of Canton Creek. During 2021, we observed an estimate of 289 coho juveniles in the lower mainstem of Canton Creek. Almost all of the coho were observed in side channels connected to pools and away from the major swimming areas. All coho were observed below the falls, just below the first bridge crossing over Canton Creek (about the 1 mile marker).

Chinook salmon juveniles were observed in very low numbers in lower Canton Creek in each of the surveys. Their numbers were so low that reliable population estimates could not be made. No more than 10 juveniles were observed in any one year. All observed chinook were below the first series of falls.

OVERVIEW OF THE SALMONIDS IN THE BASIN

The lower ten miles of the mainstem of Canton Creek are the most important reaches for adult cutthroat trout and juvenile coho and chinook salmon. No juvenile coho or chinook salmon juveniles were observed above the third falls, just below the first bridge. Steelhead trout of all ages are distributed throughout the Canton Creek basin. The majority of steelhead of all ages and cutthroat trout were estimated to be below average in the mainstem of Canton Creek, most likely due to the summer low-flows. The populations in the headwaters appeared to be less affected.

CONCLUSION

The 2020-2021 water year, was a typical year timing wise of major storms, with the peak flow during the year occurring in late January. The peak flow was under 9,000 cfs. These conditions are conducive for successful spawning; however, the low summer flows resulted in reduced habitat and higher summer temperatures. Age-0 steelhead were below average in the mainstem of Canton Creek and Pass Creek. Only in headwaters did they have higher than average populations. Age-1, age-2 steelhead, and cutthroat trout were all lower than average in the mainstem of Canton Creek most likely because of the low summer flows.

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