



Annual Report



Canton Creek Snorkel Surveys

Prepared by Pacific Rivers

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EXECUTIVE SUMMARY

During twelve of the last thirteen summers, a snorkel survey of Canton Creek (North Umpqua basin) has been completed. During 2023, the survey was completed by Andrew Dewberry, Bethany Dewberry, Dane Miller, Emma Latendresse, Rhiana Pritchett, Julian Larson, and Charley Dewberry. The Phoenix School participated in the survey and two teams completed the survey of Pass Creek and Upper Canton Creek. The survey included all of the mainstem of Canton Creek, Pass Creek, East and West Pass Creek, and Mellow Moon Creek. This comprises the total area snorkeled during most of the previous surveys. For the surveys during the current year, the Phoenix School estimates and the Pacific Rivers estimates were separated for pools and glides. The Pacific Rivers team dove all the riffle units.

The water year (October 1, 2022 to September 30, 2023) started out normal. There were five storm events over 1,000 cfs from November to late December. Each storm was larger than the previous one. The late December storm, the largest of the year, was just under 8,000 cfs, which is below normal. To this point, the water year would be favorable to successful spawning during the water year. The high flow event was 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 successfully spawn. There were no large peak-flow events from January to March 1, 2023. In March and April, there were two major storms in the 5,000-6,000 cfs range and a number of smaller peaks. As a result of these storm events, the summer base flow was higher than average.

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.

During this sample season, we were able to complete all our survey of Canton Creek. We analyzed the total estimated number of salmonids of each age within the basin and then examined the trends within each reach. The number of age-0 steelhead in the basin has ranged from 7,300 to 40,000 with a long-term average of 26,000 fish. During 2023, the number of age-0 steelhead in Canton Creek was about one-half of the average population recorded in our 12 years of sampling. A total of 13,932 age-0 steelhead were estimated to be in the basin. The mainstem and all the tributaries had lower than average number of age-0 steelhead. It is likely that the peak flow events in March and April were detrimental to survival of steelhead eggs and fry.

During 2023, the estimate population of age-1 steelhead in the Canton Creek was 2,743, which is equal to the long-term average. The mainstem of Canton Creek and all major tributaries had a lower-than-average number of age-1 steelhead, except for Pass Creek.

During 2023, the population estimate of age-2 steelhead was three times higher than the long-term average for the Canton Creek basin. During the thirteen years of sampling, the population estimate of age-2 steelhead has only been greater than 1,000 fish during the last two years. In 2022, the estimate was 2,425 fish and this year it was 2,500 fish.

During 2023, the cutthroat trout population estimate was about five times higher than the long-term average and it was by far the highest estimate we have recorded during the thirteen years of surveys. During 2023, over 1,200 cutthroat trout were estimated to be in the Canton Creek basin. The previous high was in 2020 when 735 cutthroat were estimated to be in the basin. The population estimate for cutthroat trout follows closely the population estimate for age-2 steelhead. Both age-2 steelhead and cutthroat were very high after two years with higher-than-average base flow.

INTRODUCTION

During thirteen summers (2011-2023 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, Phoenix School and Pacific Rivers completed the survey. The divers from Pacific Rivers were Andrew Dewberry, Bethany Dewberry, Dane Miller, Emma Latendresse, Rhina Pritchett, Julian Larson, and Charley Dewberry. The survey included all of the mainstem Canton Creek, Upper Canton Creek, Pass Creek, East and West Pass Creek, and Mellow Moon Creek (Figure 1).

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.

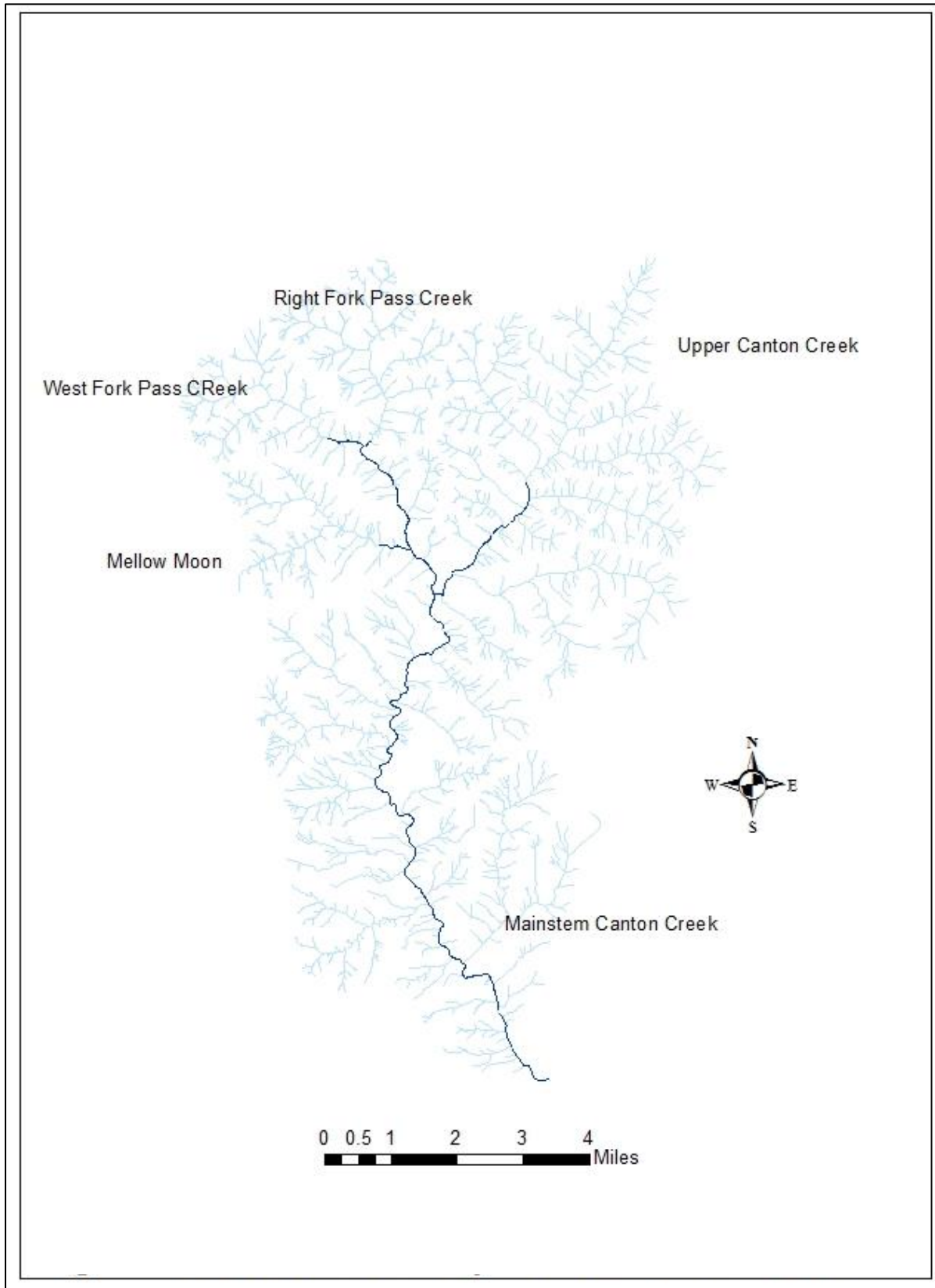


Figure 1: Canton Creek Waterways with the Steamboat Basin of the North Umpqua.

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 were 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.

The population estimates were expanded by multiplying the observed salmonids in a reach by the frequency of the sampling. For instance, one out of five pools were surveyed. Therefore, we multiplied the observed number of salmonids by five to arrive at the estimate.

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.

In previous years, the Phoenix students were supervised by having an experienced diver “look over their shoulder” as they conducted their count. In other words, for each habitat unit dove, the experienced diver was verifying the student counts. In this year, we separated the estimates by the experienced divers and the Phoenix School students. The Phoenix School students did their own counts without the experienced diver verifying their count. The separate samplings were done only in pools and glides. All riffles were counted by experienced divers. The counts by experienced divers were used to calculate the survey results. The results of the Phoenix School students are reported separately in the report.

RESULTS AND DISCUSSION

The Water Year

The water year (October 1, 2022 to September 30, 2023) started out normal. There were five storm events over 1,000 cfs (cubic feet per second) from November to late December. Each storm was larger than the previous one. The late December storm, the largest of the year, was just under 8,000 cfs, which is below normal. To this point, the water year would be favorable to successful spawning during the water year. The high flow event was 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

successfully spawn. There were no large peak flow events from January to March 1, 2023. In March and April, there were two major storms in the 5,000-6,000 cfs range and a number of smaller peaks. As a result of these storm events, the summer base flow was higher than average.

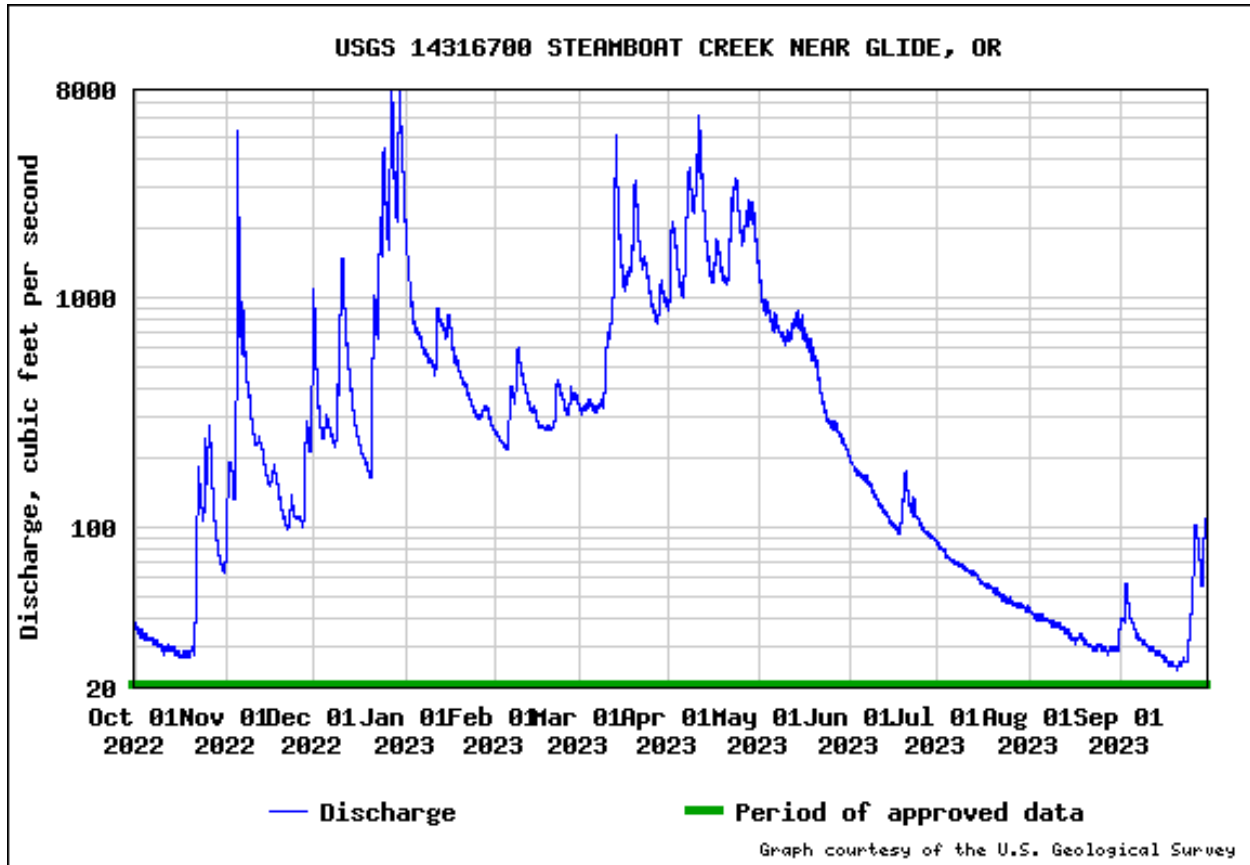


Figure 2: Annual Hydrograph for 2022-2023 Water Year (Oct 1 - Sept 30), Steamboat Creek Gauge 14316700.

Surveyed Reaches

During the twelve 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.

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 Dane Miller. Upper Canton and Pass Creeks were snorkeled by Dane Miller, Bethany Dewberry, Charley Dewberry. Tributaries were surveyed by the above-mentioned divers and Rhiana Pritchett and Julian Larson. The Phoenix School students surveyed Pass Creek and upper Canton Creek in a separate survey of glides and pools. The student counts were verified by Charley Dewberry

Salmonid Population Estimates

The results of the twelve 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. During the current year, coho salmon were present in the lower mile of the mainstem Canton Creek.

Age-0 Steelhead

Steelhead trout were the most abundant salmonid within the basin. As expected, age-0 fish dominated the survey. During the twelve years of survey, between 7,000 - 40,000 age-0 steelhead were usually observed in the major surveyed reaches (Table 1). During the current year, just under 14,000 age-0 fish were estimated to be in the basin. This is just over 50% of the long-term estimated population of age-0 steelhead observed in the basin during the twelve years of sampling.

Both the mainstem of Canton Creek and all the tributaries had lower than average counts. These results are not surprising. It is likely that the high-flow events from March 1 through April decimated the age-0 steelhead as they emerged from the gravel during the spring. The age-0 steelhead that survived the March through April period likely had higher than average survival as summer stream-flows were higher than average and this provided an abundance of summer habitat and buffered stream temperatures.

To summarize, the total number of age-0 steelhead observed in 2023 was significantly below average in all reaches of Canton Creek and tributaries. It is highly likely the spring high-flow events were responsible for the low survival of the age-0 steelhead.

Age-1 Steelhead

The population estimates of age-1 steelhead were between 1,460 and 5,000 fish for the previous twelve years of sampling (Table 2). During the current year, 2,743 age-1 steelhead were estimated to be in the Canton Creek basin. This is near the average estimate of age-1 steelhead in the basin during the entire twelve years of survey. The mainstem of Canton Creek and all the tributary reaches of stream had higher than average estimates.

This is not surprising given the water year. The peak flow for the water year was only about 8,000 cfs. This is below average. So, there were no large storms that led to high mortality for this age-class of steelhead. In addition, the series of spring storms were not so large as to lead to high mortality of these fish. Lastly, the summer low-flows were higher than normal which creates an abundance of summer habitat and buffers stream temperature. It is also possible that the high summer flows kept more age-1 steelhead in Canton Creek rather than migrating downstream into the North Umpqua River.

Data Tables Providing Population Estimates of Species by Age Class in Canton Creek, Years 2011, 2013-2023.

Table 1. Population estimates of Steelhead Age 0 in Canton Creek (2011 - 2023).

Reach	2011	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Avg
Mainstem	32,968	15,430	7,433	23,180	11,537	20,768	13,780	3,902	29,755	12,001	6,928	8,455	15,511
Upper Canton	3,888	5,948	3,247	4,901	1,372	4,929	6,274	822	3,431		1,236	544	3,327
Pass Creek	3,138	9,523	5,089	5,491	4,784	6,279	6,652	1,911	4,689	3,175	1,461	4,165	4,696
RF Pass Creek	-	200	131	462	572	386	12	245	373	114	75	340	265
LF Pass Creek	-	165	216	716	498	410	458	116	291	377	228	298	343
Mellow Moon	135	233	165	529	207	582	165	306	346	548	58	139	284
<i>Total</i>	<i>40,129</i>	<i>31,499</i>	<i>16,281</i>	<i>35,279</i>	<i>18,970</i>	<i>33,354</i>	<i>27,341</i>	<i>7,302</i>	<i>38,885</i>		<i>9,986</i>	<i>13,932</i>	<i>24,426</i>

Table 2. Population estimates of Steelhead Age 1 in Canton Creek (2011 - 2023).

Reach	2011	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Avg
Mainstem	3,615	892	1,512	1,585	796	745	1,385	1,232	1,549	1,064	2,705	1,327	1,534
Upper Canton	1,059	644	444	685	134	357	945	194	53		516	344	489
Pass Creek	211	937	518	287	264	278	284	425	148	638	718	860	464
RF Pass Creek	-	6	0	4	118	0	0	186	81	92	101	0	53
LF Pass Creek	-	35	37	31	48	58	13	34	86	138	65	101	59
Mellow Moon	197	53	12	228	154	22	16	142	17	61	134	111	96
<i>Total</i>	<i>5,082</i>	<i>2,567</i>	<i>2,523</i>	<i>2,820</i>	<i>1,514</i>	<i>1,460</i>	<i>2,643</i>	<i>2,213</i>	<i>1,934</i>	<i>1,993</i>	<i>4,239</i>	<i>2,743</i>	<i>2,694</i>

Table 3. Population estimates of Steelhead Age 2 in Canton Creek (2011 - 2023).

Reach	2011	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Avg
Mainstem	673	113	432	301	96	188	728	546	844	336	1,750	1,554	630
Upper Canton	173	36	102	146	28	80	116	23	9		320	450	135
Pass Creek	29	124	84	25	26	8	13	148	0	122	249	477	109
RF Pass Creek	-	0	0	4	50	0	0	11	38	24	44	5	16
LF Pass Creek	-	0	0	0	5	5	4	0	11	35	13	6	7
Mellow Moon	69	58	6	10	63	0	0	5	0	17	49	10	24
<i>Totals</i>	<i>944</i>	<i>331</i>	<i>624</i>	<i>486</i>	<i>268</i>	<i>281</i>	<i>861</i>	<i>733</i>	<i>902</i>		<i>2,425</i>	<i>2,502</i>	<i>921</i>

Table 4. Population estimates of Cutthroat in Canton Creek (2011 - 2023).														
Reach	2011	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Avg	
Mainstem	167	42	165	154	32	36	328	246	563	110	142	994	248	
Upper Canton	31	35	6	0	0	11	14	48	62		221	167	54	
Pass Creek	107	13	15	0	0	16	0	29	102	77	10	128	41	
RF Pass Creek	-	0	0	0	20	0	0	28	8	28	0	0	8	
LF Pass Creek	-	0	0	0	0	0	0	6	0	0	10	0	1	
Mellow Moon	-	0	6	0	0	0	0	64	0	6	0	0	7	
<i>Total</i>		305	90	192	154	52	63	342	421	735		383	1,289	360

Age-2 Steelhead

The population estimates for age-2 steelhead in previous years were between 268 and 2,425 fish (Table 3) for the twelve years of survey. During the current year, the estimated number of age-2 steelhead in the basins was over 2,502 fish. This is three times as high as the long-term average of the surveys. Prior to 2022, there had not been a survey over 1,000 age-2 steelhead. Both 2022 and 2023 had estimates greater than 2,400 fish. All stream reaches, mainstem and major tributaries, had higher than average counts. This is not surprising given the water year. It is possible that due to the high summer flows more age-2 steelhead remained in Canton Creek than usual. Also, the estimated population of age-1 steelhead in 2022 was 4,239 fish, the second highest in the twelve years of survey (2011 was the highest). The estimated population of age-1 steelhead population estimate in 2022 was significantly higher than the long-term average of 2,700 fish. So, it was expected that the Age-2 steelhead in 2023 would be higher than expected. The age-2 steelhead in 2023 started out as age-0 fish in 2021. We do not have a complete estimate of the age-0 fish in Canton Creek basin in 2021 because we could not survey Upper Canton Creek in 2021, because of a wildfire. However, Upper Canton Creek averages only 13% of the long-term basin estimates. Subtracting Upper Canton from the long-term basin estimate, in 2021 the basin estimate was 16,215 while the long-term basin average minus Upper Canton Creek was 22,576 fish. The population estimate of age-0 steelhead in Canton Creek in 2021 was 70% of the long-term average. Therefore, the age-2 steelhead in 2023 originated from a smaller than average age-0 class. We have seen this before in the survey. The number of age-0 fish often does not correlate to the strength of the age-2 population that results two years later.

Cutthroat Trout

During the eleven previous years of survey, the estimated number of cutthroat trout in the Canton Creek basin has ranged from 52- 735 fish. During the current year, the estimated number of cutthroat in the basin was 1,289 fish, which is significantly higher than any other previous survey. The highest number of cutthroat trout were observed in the mainstem. The population estimates of cutthroat trout correlate well with the number of age-2 steelhead, suggesting that it is similar environmental factors that are affecting both populations.

Phoenix School Surveys

This year we separated the surveys for the Pacific Rivers Crew and the Phoenix School crew. The Phoenix School crews got a morning of training before starting their surveys on Upper Canton and Pass Creeks. Both the Pacific Rivers and Phoenix School crews traveled together, and one habitat survey was produced for each of Pass Creek and Upper Canton Creek. Each team dove different pools and glides. The Pacific Rivers team advised the Phoenix School students but this year the student counts represent their work without the Pacific Rivers Crew verifying the count. The Pacific Rivers team dove all the surveyed riffles as these units are much more difficult to accurately count.

The Upper Canton crew finished their stream reach, so the comparisons are for the entire stream reach. The Pass Creek crew did not finish their stream reach so the comparison between the two dive crews is only for the reach that was observed by both groups.

Table 5 summarizes the population estimates for the two dive teams on both Upper Canton Creek and on Pass Creek. The trends were the same for both crews: 1) The Phoenix School crews greatly over-estimated the number of age-0 steelhead in the units; 2) The Phoenix School crews underestimated the number of cutthroat in each unit; 3) The Phoenix School Crew had a difficult time sorting out the age groups.

The first trend results from losing track of what age-0 fish have been counted and not counted as you first focus on the older fish. The second trend is not seeing cutthroat trout and age-2 steelhead. If the diver does not slowly and carefully enter the pool or glide and immediately focuses on the head of the unit, these large fish will leave the unit and not be seen. The third trend is related to difficulties sorting out the steelhead age groups by their respective size. The Upper Canton Crew, in particular, had trouble with the age-1 and age-2 groups. The Pass Creek crew did not have difficulty with age-2 steelhead. In fact, the estimates from the Pacific River Crew and the Phoenix School crew were very similar. The Pass Creek crew had a little more difficulty sorting out the differences between age-0 and age-1 steelhead.

These results illustrate that there is a learning curve to accurately estimating the number of fish. Accurate counts depend on the skill of the divers. In previous years, skilled divers were “looking over the shoulders” of the Phoenix School Students to ensure more accurate counts. During this year we let the students conduct their own counts. If surveys continue, it is recommended that the counts be separated between the experienced crews and the Phoenix School crews; however, the experienced divers should continue to help the student divers improve their technique.

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.

CONCLUSION

The 2022-2023 water year was a typical year timing-wise of major winter storms, with the peak flow during the year occurring in late December. The peak flow was under 8,000 cfs. These conditions are conducive for successful spawning; however, late spring storms led to higher flows during March and April. The estimated population of age-0 steelhead in the basin was well below average, probably due to the series of late spring storms impacting the population of young fry emerging from the gravels. However, age-1 and age-2 steelhead and cutthroat trout benefited from the higher-than-average summer flows during the summer. The result was that age-2 steelhead and cutthroat trout had the highest population estimates to date.