

Steamboat Creek Snorkel Surveys (2020)



Executive Summary

The Frank and Jeanne Moore Steelhead Sanctuary, which was established in March 2019, created a 100,000 acres sanctuary for steelhead and for a temperature refuge for not only Steamboat Creek but the North Umpqua River, itself. During 2020 a snorkel survey was completed by Andrew Dewberry, Emma Latendresse, Rhiana Pritchett, and Nick Chambers (Pacific Rivers). The survey included the mainstem of Steamboat Creek and the tributaries large enough and with access to steelhead trout.

The water year (October 1 to September 30) was a typical water year in that the high flow event occurred in January and each subsequent major storm was of less high flow than the previous one. However, the high flow event was only about 9,000 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. On the whole, this water year was conducive to producing a large age-0 steelhead population.

The snorkel surveys enable us to construct a snapshot of summer rearing of salmonids in Steamboat 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.

The number of salmonids estimated in the survey was: 69,842 age-0 steelhead, 4,910 age-1 steelhead, 2,499 age-2 steelhead and 914 cutthroat trout. Forty-two percent of the age-0 steelhead were in the tributary streams. Little Rock Creek accounted for 50% of the total of age-0 steelhead in the tributary streams and 21% of the basin total. The mainstem Steamboat accounted for 58% of the basin.

Age-1 steelhead were most abundant in the mainstem where 65% of the basin total of 4,910 fish were found. The lower reach from the mouth to Steelhead Creek had 52% of the fish found in the mainstem.

There were 2,499 Age-2 steelhead in the basin and 85% were located in the mainstem. The lower mainstem from the mouth to Steelhead creek accounted for 69% of the fish in the mainstem. In the tributaries, Little Rock Creek accounted for 50% of the fish found in the tributaries.

Cutthroat trout were primarily in the mainstem where 85% of the fish were observed. The numbers of cutthroat were highest in the lower mainstem and declined linearly to the headwaters. Big Bend dominated the tributaries with 38% of the fish observed in the tributaries.

This is the second year of the survey. In 2019, there were 29,264 age-0 steelhead estimated to be in the tributaries of Steamboat Creek. That is more than double the number of age-0 steelhead estimated from the previous year. That pattern held for most of the tributaries with the exception of Cedar Creek which declined from 2,864 age-0 steelhead to 2,410 fish. The number of age-0 steelhead was probably significantly below average in 2019 because of a major storm in April. We have surveyed Canton Creek, a tributary of Steamboat Creek, for 10 years and the number of age-0 steelhead was the lowest recorded in a decade.

A similar pattern was observed in the mainstem, where the number of age-0 steelhead were significantly higher in 2020. For example, in the mainstem reach from Big Bend Creek to Cedar Creek there were estimated to be 179 age-0 steelhead in 2019. In 2020, there were 2,555 age-0 steelhead estimated to be in the reach. Again, the likely explanation was the flood in May 2019.

Analyzing the steelhead survey by density resulted in the following areas of high or very high densities: For age-0 fish the high density areas were on Little Rock Creek and in the mainstem above Cedar Creek. For age-1 fish, in the mainstem between Cedar and Little Rock Creek. For age-2 fish, in the mainstem below Steelhead Creek, especially the lowest one-half of this reach, and in the mainstem immediately above Cedar Creek.

Introduction

The Frank and Jeanne Moore Steelhead Sanctuary, which was established in March 2019, created a 100,000 acres sanctuary for steelhead and for a temperature refuge for not only Steamboat Creek but the North Umpqua River, itself. During 2020 a snorkel survey of the mainstem and tributaries was completed by Andrew Dewberry, Emma Larendresse, Rhiana Pritchett, and Nick Chambers (Pacific Rivers). The survey included the mainstem of Steamboat Creek and all the tributaries large enough and with access to steelhead trout.

The snorkel surveys enable us to construct a snapshot of summer rearing of salmonids in Steamboat 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.

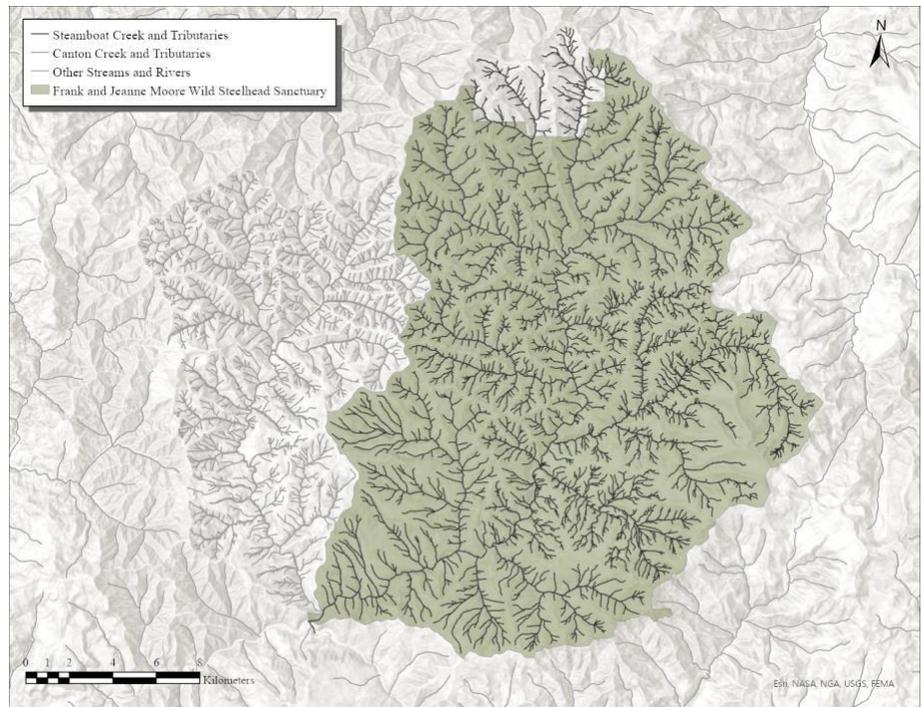


Fig. 1: The Frank and Jeanne Moore Wild Steelhead Sanctuary, situated within the Steamboat Creek watershed, is adjacent to Canton Creek within the N. Umpqua watershed.

Study Area

Steamboat Creek is a major tributary of the North Umpqua River basin (Figure 1). The drainage area is approximately 100,000 acres. Steamboat Creek is a strategically important producer of steelhead trout, coho salmon, chinook salmon and cutthroat trout within the North Umpqua drainage.

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.

The Water Year

The water year (October 1 to September 30) was a typical water year in that the high flow event occurred in January and each subsequent major storm was of less high flow than the previous one. However, the high flow event was only about 9,000 cfs. The next highest was only about 4,500 cfs in April, and the final one in May of about 1,500 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. On the whole, this water year was conducive to producing a large age-0 steelhead population. The fish were able to make it into the tributary streams in January and the subsequent storm was not large enough to scour the eggs out of the redds (nests).

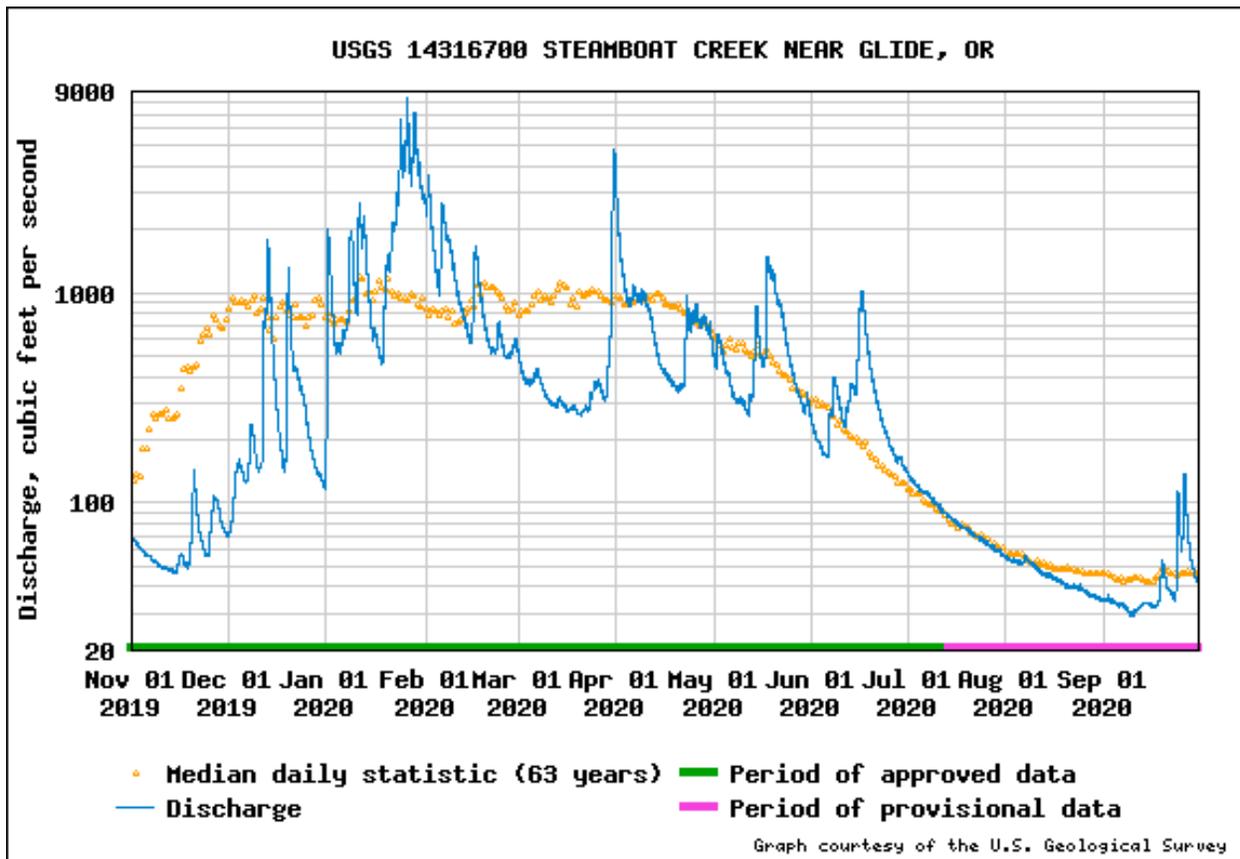


Fig 2: Median water discharge as recorded from Nov. 2019–Sept. 2020.

Methods

The snorkel surveys were conducted during July and August 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 of the habitat units 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. Adult salmonids were observed in the surveys, however, they were not counted.

The abundance of each age class was also converted into density by dividing the abundance of each age class of steelhead by the area of each habitat unit. When the density of a unit exceeded the current density class, the density class would increase at the average distance between the two surveyed habitat units. To smooth the distribution map, the density class would not decrease until two units in a row were observed with the lower density class.

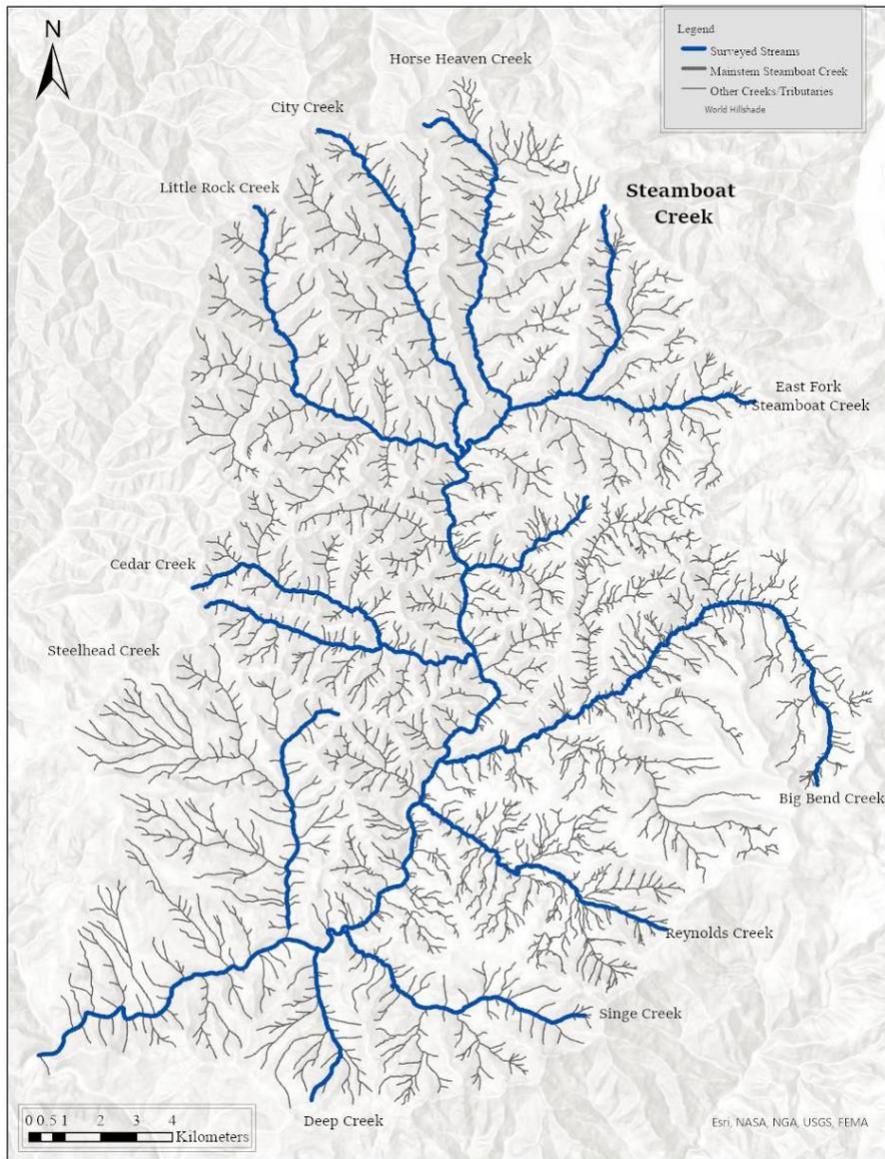


Fig. 3: Surveyed tributaries in the Steamboat Creek watershed. Note that the full reach of each tributary may not have been surveyed, only those reaches that an adult salmonid could have access to.

Results and Discussion

Surveyed Reaches

During July and August of 2020, the snorkel survey of the basin was completed. The following tributaries were surveyed: Big Bend Creek, Buster Creek, Cedar Creek, City Creek, E. Fork of Steamboat Creek, Horse Heaven Creek, Little Rock Creek, Reynolds Creek, Singe Creek, and Steelhead Creek.

All of the mainstem of Steamboat was surveyed from the mouth to the headwaters. This included Black Creek Canyon.

Salmonid Population Estimates

The number of salmonids estimated in the survey (Table 1) was: 69,842 age-0 steelhead, 4,910 age-1 steelhead, 2,499 age-2 steelhead and 914 cutthroat trout. Forty-two percent of the age-0 steelhead were in the tributary streams. Little Rock Creek accounted for 50% of the total of age-0 steelhead in the tributary streams and 21% of the basin total. The mainstem Steamboat accounted for 58% of the basin total age-0 steelhead. Of the age-0 steelhead in the mainstem, the lower section from the mouth to Steelhead Creek had 25% of the total.

Mainstem Reaches	Age 0 Steelhead	Age 1 Steelhead	Age 2 Steelhead	Cutthroat Trout
Mouth-ST	10148	1633	1461	274
ST-Rey	7420	727	320	88
Rey- Big Bend	2088	32	21	59
BB-Cedar	2555	131	11	151
Cedar-Little Rock	8897	284	105	133
Little Rock - Horse Heaven	4921	151	174	39
Horse Heaven	4549	203	16	32
Total of Mainstem Steamboat Creek	40578	3161	2108	776

Tributary Reaches	Age 0 Steelhead	Age 1 Steelhead	Age 2 Steelhead	Cutthroat Trout
Big Bend	2843	308	45	53
Buster	185	19	5	5
Cedar	2410	135	118	10
City	1919	282	35	0
E. Fork	572	6	0	22
H Heaven	5771	243	76	26
Little Rock	14685	312	12	12
Reynolds	198	142	16	0
Singe	156	87	21	5
Steelhead	525	215	63	5
Total of Tributary Reaches	29264	1749	391	138

	Age 0 Steelhead	Age 1 Steelhead	Age 2 Steelhead	Cutthroat Trout
Totals of Mainstem Reaches	40578	3161	2108	776
Totals of Tributary Reaches	29264	1749	391	138
Basin-wide Totals	69,842	4,910	2,499	914

Table 3: Total salmonid counts within delineated by age and reach.

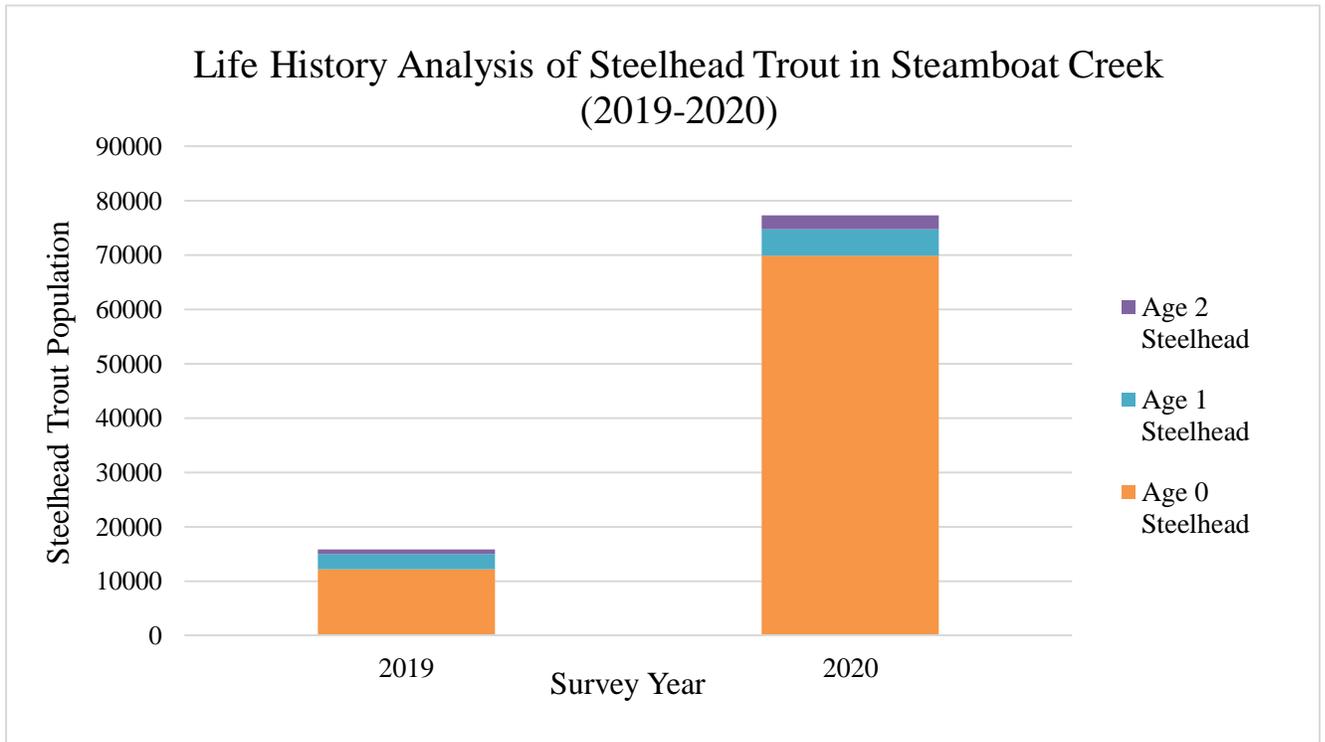


Figure 4: Findings of Life History Analysis Survey. 2019-2020, Pacific Rivers.

Age-0 Steelhead

The majority of the age-0 steelhead were in the mainstem of Steamboat Creek (58%), with the 25% of them from the mouth to Steelhead Creek. In the tributaries, Little Rock Creek accounted for 21% of the basin total of age-0 steelhead and 50% of the age-0 steelhead in the tributaries. The estimated number of age-0 steelhead in the basin was about six times greater than the estimate from 2019. This is not surprising given the major storm that occurred in May of 2019.

Age-1 Steelhead

Age-1 steelhead were most abundant in the mainstem where 65% of the basin total of 4,910 fish were found (Table 1). The lower reach from the mouth to Steelhead Creek had 52% of the fish found in the mainstem. In the tributaries, Big Bend and Little Rock Creeks combined for 35% of the age-1 steelhead estimated to be in the tributaries. The total number of age-1 steelhead estimated in the basin in 2020 was 1.75 times greater than the estimate from 2019. Again, this is likely the result of the major storm that occurred in May 2019. It is not known how many of the age-1 fish died during the storm or how many were able to move into the mainstem and survive.

Age-2 Steelhead

There were 2,499 Age-2 steelhead in the basin and 85% were located in the mainstem. The lower mainstem from the mouth to Steelhead creek accounted for 69% of the fish in the mainstem. In the tributaries, Cedar Creek accounted for 30% of the age-2 steelhead found in the tributaries. The total number of age-2 steelhead estimated in the basin in 2020 was 2.7 times greater than the estimate from 2019. Again, this is likely the result of the major storm that occurred in May 2019. It is not known how many of the age-2 fish died during the storm or how many were able to move into the mainstem and survive.

Cutthroat Trout

Cutthroat trout were primarily in the main stem where 85% of the fish were observed. The numbers of cutthroat were highest in the lower mainstem and declined linearly to the headwaters. Big Bend dominated the tributaries with 38% of the fish observed in the tributaries. It is not known how many of the age-1 fish died during the storm or how many were able to move into the mainstem and survive.

Analysis of the Steelhead by Density for 2020

For the year 2020, the following areas had high or very high densities of steelhead for each age class (see Figures 5-7):

For age-0 steelhead, high or very high densities were observed in Little Rock Creek and in the mainstem Steamboat Creek above Cedar Creek.

For age-1 steelhead, high or very high densities were observed in the mainstem of Steamboat Creek between Cedar and Little Rock Creeks.

For age-2 steelhead, very high density areas were in the mainstem below Steelhead Creek, especially the lower one-half of this reach and in the mainstem of Steamboat Creek, immediately above Cedar Creek. Curiously, no high density reaches were observed in the Steamboat basin in 2020, only very high density.

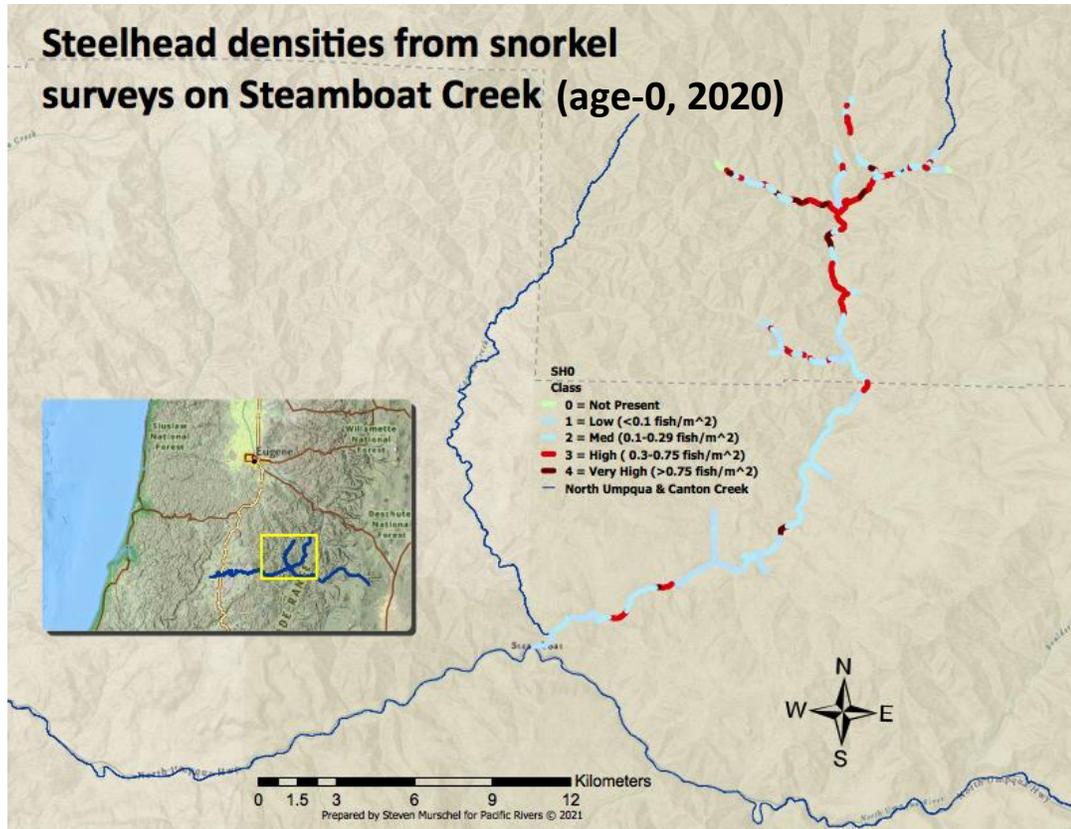


Figure 5: Density of age-0 steelhead in Steamboat Creek. 2020, Pacific Rivers.

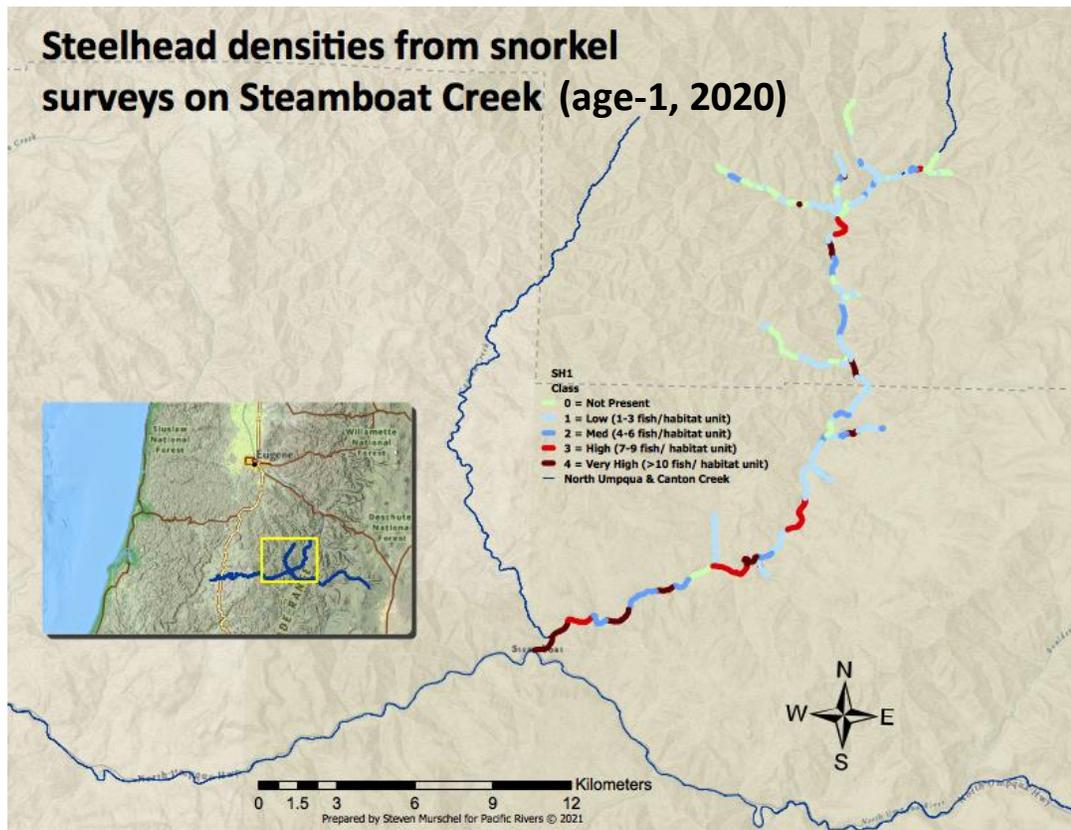


Figure 6: Density of age-1 steelhead in Steamboat Creek. 2020, Pacific Rivers.

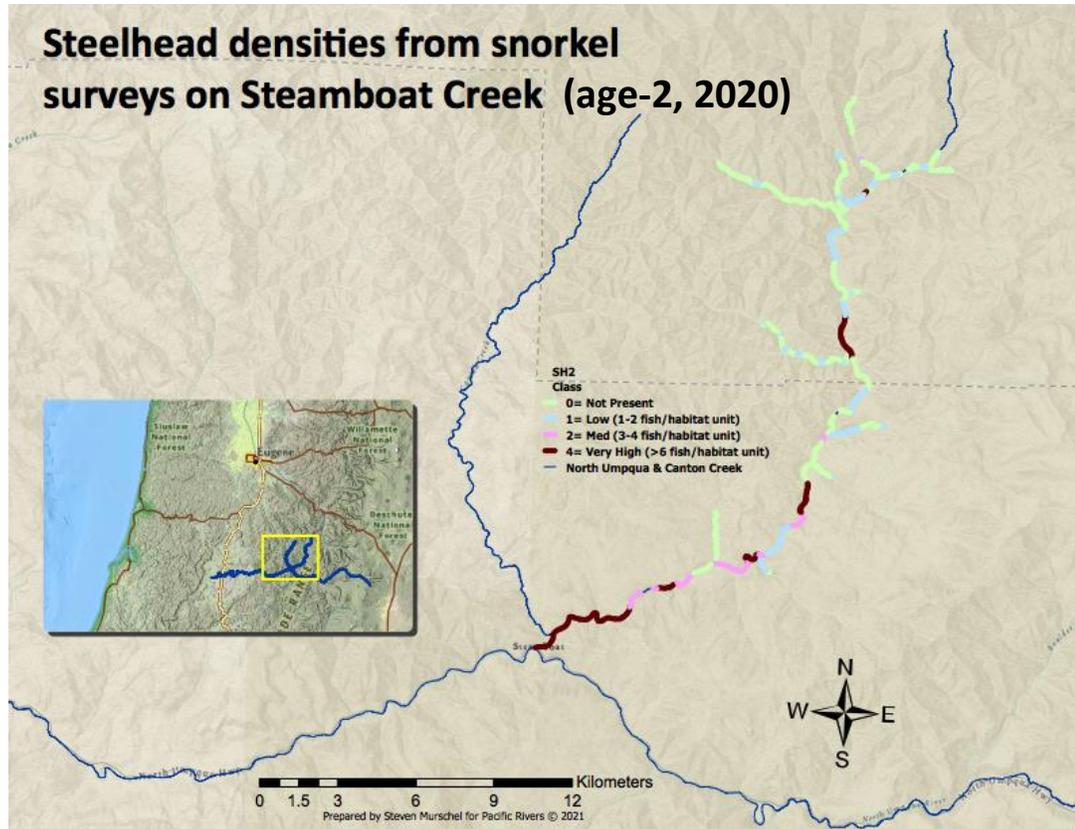


Figure 7: Density of age-2 steelhead in Steamboat Creek. 2020, Pacific Rivers.

Summary

The 2019-2020 water year was conducive for the production of the age-0 steelhead in the Steamboat basin. The peak flow occurred in January and each subsequent storm had a lower peak. Therefore, the eggs that were placed in redds in January experienced little scouring during the subsequent high flow events. However, the annual peak-flow was only about 9,000 cfs. This is enough water to get the adult fish into tributaries but it is not enough to get them into the headwaters of many of the tributaries.

There were several times greater numbers of all ages of steelhead and cutthroat trout in the Steamboat basin in 2020 compared with 2019. The 2020 estimates are probably more typical. In May 2019, there was a major storm that decimated the age-0 steelhead, many of which were still eggs in the gravel. It is unknown what proportion of the age-1 and age-2 steelhead and cutthroat trout were mortalities and what proportion moved down into the mainstem during the storm.