Suscol Report 2021

Summary

ICARE, the Institute of Conservation, Advocacy, Research, and Education, completed our annual snorkel survey on Suscol Creek during June 5-6, 2021.

The precipitation for the water year was 8.45 inches was well below average, while the long-term average annual precipitation at the Napa State Hospital is approximately 24.6 inches. The observed precipitation is from the rain gauge operated by the partners at Suscol Creek, which is located a few miles from the Napa State Hospital. No months during the water year had greater than average rainfall. In fact, all of the winter months except January 2021 were less than 50% of the long-term average. This suggests it was not a good year for steelhead. January through March is when steelhead spawn. They normally head upstream during storms. With no large storms during their normal spawning time, they cannot run to the headwaters to spawn. As a result, they spawn in less desirable spots downstream. On the plus side, there were no large storms to scour out those eggs.

This is also the second year in a row with significantly less than average precipitation. The result was many areas of lower Suscol Creek were dry or were isolated pools with little or no stream flow passing through them.

Charley and Andrew Dewberry conducted the survey. In our long-term study reach, we observed: 9 age-0 steelhead, no age-1+ steelhead, and 18 age-2+ steelhead age. The numbers of all age classes of steelhead were well below average in this reach.

We completed a survey of upper Suscol, including the 2 forks. We observed: 161 age-0 (YOY) steelhead, 109 age-1 steelhead, and 17 age-2+ steelhead. The number of age-0 steelhead was below the long-term average, while the number of age-1 and age-2 steelhead was above average.

During 2021, the total number of age-0 steelhead in Suscol Creek, as a whole, was less than 50% of the long-term average. The number of age-1 steelhead was about average and the number of age-2 fish was below average.

A life-history analysis follows the year class of fish through their life cycle. For this analysis we use the combined totals of all the observed steelhead in Suscol Creek. For instance, we start with the YOY steelhead in 2008. In 2009, these fish are 1 year old. In 2010, these fish are two

years old. We are directly calculating their survival with each successive year. The average number of YOY steelhead observed during the eight years was about 394 fish. The survival of steelhead from YOY to age-1 was between 45-55 percent in good years. During the current year, survival from YOY to age-1 was 24 percent, which is considerably below average survival. The survival from age-1 to age 2 has averaged about 40 percent and this year's average was over 90 percent.

During the snorkel survey, no centrarchids were observed below the pond. The wire mesh cage that was constructed over the opening in the outflow of the pond had successfully eliminated out-migration of centrarchids from the pond during the winter storms.

During the survey we observed that the Himalayan blackberry at restoration site #2 have been aggressively attacked and the native plants are doing well in the reach. Blackberries have increased during the last year above restoration site #2.

Introduction

The Suscol Project began in 1999 as a partnership between ICARE and partners within the Suscol Creek basin. The goals were:

1) Provide baseline and trend information of the aquatic resources (fish and macro-invertebrates) within the property.
2) Document the effects of land management on the aquatic resources on the property.
3) Use the biological information to develop the restoration opportunities within the property.

In 2008, with the purchase of the rest of the watershed by the partnership, the three goals were expanded to the whole watershed. In addition, we developed an economically effective monitoring plan to not only trace the watershed trends but to identify key reaches that are improving or degrading within the watershed. This information is used to design the future restoration efforts.

Precipitation

During the current water year, we used the observed precipitation at the partner's gauge in Suscol Creek. (See Table 1). The average annual pre-

cipitation for this water year was 8.45", which is significantly less than the long-term average at the Napa State Hospital of about 22.4 inches located a few miles away. The observed precipitation is from the rain gauge operated by the partners at Suscol Creek, which is located a few miles from the Napa State Hospital.

Monthly precipitation totals during the water year were significantly less than average during the winter months. This suggests it was not a good year for steelhead, which normally move to the headwaters during winter storms and spawn in upper Suscol and the forks. There were no major winter storms from January through April. As a result, most steelhead spawned in less desirable spots downstream. On the plus side, there were no large storms to scour out those eggs.

Steelhead Population

Long-term Study Reach (Map 1)

We conducted our annual June survey beginning above the state highway. In our normal study reach, we observed: 9 age-0 steelhead, no age-1+ steelhead, and 18 age-2+ steelhead age (Table 2). The populations of all three ages of steelhead were below average the long-term average. The

range of age-0 estimated each year in the lower reach has been between 0 and 577 fish with a long-term average of 126 fish. The nine fish estimated in this reach for the year is among the lowest observed. For the first time, no age-1 steelhead were observed in the lower reach. Also, age-2 steelhead have ranged from 0 to 95 with a long-term average of 24 fish. This years estimate of 18 fish was below the long-term average.

The lower reaches of Suscol Creek were the lowest that we have observed after the two years of significantly below average precipitation. Many reaches of stream were dry. Many pools were isolated with little or no stream flow passing through them. No suitable habitat for steelhead was observed below the pond.

No centrarchids were observed in several pools below the pond overflow pipe. The mesh placed over the outlet pipes to the ponds worked as designed and implemented.

Upper Suscol (Map 1)

In upper Suscol Creek, there were 161 age-0 steelhead, 109 age-1 steelhead, and 14 age-2 steelhead (Table 2). The number of age-0 steelhead has ranged between 74 and 910 fish with an average of 312 fish. The number

of age-0 steelhead in the upper reach of Suscol Creek was below average in 2021. The number of age-1 steelhead has ranged from 13 to 265 fish with an average of 93 fish. During 2021, there were 109 age-1 steelhead estimated in the upper reaches of Suscol Creek. This is slightly above average. The number of age-2 steelhead in the upper reach has ranged from 0 to 101 fish with an average of 27 fish. The number of age-2 steelhead estimated in the upper reach was about 50% of the long-term average.

Life-history Analysis

Life-history analysis provides a powerful tool for evaluating the annual populations of steelhead in Suscol Creek. A key part of the analysis is determining the survival of each year class from one year to the next. The population of age-0 steelhead observed in all of Suscol Creek has varied between 106 and 1,303 fish with an average of 394 fish (Table 3). The population estimate of age-0 (YOY) steelhead in Suscol Creek during 2021 was 170 fish. This is less than 50% of the long-term average. There are many factors that affect how many young of the year survive until their first summer. Some of these factors include the number of spawning fish, the number of eggs laid, and the survival of the eggs to hatching. The timing of storms

is important because steelhead spawn at the end of major high flows. Floods play a major role in scouring out the eggs buried in the gravel.

The current water year (2020-2021) was not conducive to successful steelhead spawning. The January through April precipitation was well below average, restricting adult steelhead coming into and spawning in the headwaters. Also, low-flows during the summer were very low. This being the second year in a row with precipitation significantly below average.

Survival of the age-0 to age-1steelhead averages between 45-55 percent in good years and as low as 10 percent in poor years. The survival rate for age-0 to age-1 steelhead during the current year was 24 percent, which is low, but not surprising in such a low-water year.

Survival of age-1 steelhead to age 2+ steelhead was approximately 60 percent in good years for these large fish, while it was as low as 17 percent in poor years. During the current year, the survival rate of age-1 to age-2 fish was over 90 percent, which is very high, these fish experienced no large floods and there were enough pools to support them through the low-flow period.

The surveys of steelhead trout on Suscol Creek indicate that the population is currently sustainable having just experienced two successive years

of severe drought. The distribution and life-history analysis suggests that the reach from just below the middle bridge to above the pond is sustaining fewer than expected fish. During low-flow years, we assumed the decline in fish was due to reduced groundwater inputs and ground-water pumping adjacent to the pond. It is likely that groundwater pumping to fill the pond is at least contributing to the lower than expected stream flows in that reach.

Restoration Opportunity

We recommend that the cattle continue to be fenced out of the riparian zones and steep slopes in the upper basin, especially the left fork. This would allow cattle grazing in other areas to reduce the fire risk, while protecting the upper basin from excessive soil erosion. Much of the riparian zone and steep slopes on the left fork have minimal understory vegetation as the tree canopy is largely closed by mature trees.

The survey and analysis suggests that the removal of the cattle from upper Suscol Creek has benefited the stream within the basin. Much less fine sediment was observed in the stream channel as a whole; however, there was additional fine sediment observed in upper Suscol due to feral pig activity.

Continue the Himalayan Black Berry (HBB) removal. Considerable effort greatly reduced the amount of Blackberry in the middle reaches of the stream, especially restoration site (#2) where the HBB has been removed and the area planted with willows. HBB is also increasing above restoration site #2.

We also should continue planting willow in riparian areas where the cattle have been removed. The riparian vegetation is beginning to rebound nicely with the cattle removal.

Summary

Precipitation

This water year, 2020-2021, was the second successive year of severe drought. In an average year about 24 inches of precipitation falls in the basin. During last two years only a total of 19 inches of precipitation has been recorded.

Snorkel Count

The 2021 annual snorkel count was completed in June. The total number of age-0 steelhead in Suscol Creek was 50% below the long-term average for the basin, while the number of age-1 was about average and age-

2 steelhead were also below average. While these numbers of fish are below the average, it suggests that the population of Suscol Creek steelhead is viable even during two years of significant drought.

Restoration Efforts

The riparian vegetation is responding nicely to having the cattle removed from the stream corridor. Additional willow planting would speed the recovery of the riparian zone.

Also, Himalayan Blackberries (HBB) continue to be an issue along the creek. They have increased some upstream of restoration site #2. During this year, the HBB were attacked at restoration site #2 and the native vegetation was responding well.