Suscol Creek Collaborative Partnership and Restoration Project 2012

Summary

This is ICARE's 10th year of working on Suscol Creek. The population dynamics of steelhead in Suscol Creek returned to a more normal pattern after the unusual pattern observed last year.

The water year 2010 (from October to September) was about 10% below the long-term average of the past 90 years of record from the recording station at the Napa State Hospital. The only months with above average precipitation were March and April. March precipitation was almost three times higher than the long-term average. This is the second year in a row that March precipitation totals significantly exceeded long-term averages.

We conducted our usual June survey of the Suscol Creek watershed. In our long-term study reach, we observed: 93 age 0 steelhead, 90 age 1+ steelhead, and 95 age 2+ steelhead age. The number of age 0 steelhead was below the long-term average for the reach, but significantly higher than the previous year. The number of age 1 steelhead was approximately double the long-term average. In 2011, we observed 95 steelhead 2+ fish. This is the highest number of age-2+ we observed in the long-term study reach.

This is also the fourth year that we completed a survey of upper Suscol, including the 2 forks. We observed: 74 age-0 (YOY) steelhead, 51 age-1 steelhead, and 22 age-2+ steelhead. The number of age-0 steelhead was lower than previous years in this reach. It is possible that the unusually high stream flows in March scoured out many of the buried eggs. The number of age 1 steelhead was below the long-term average. The number of age-2 steelhead was below the long-term average that we have observed in the upper reach.

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 2009. In 2010, these fish are 1 year old. In 2011, these fish are two years old. We are directly calculating their survival with each successive year.

During 2011 we collected four macro-invertebrate samples along Suscol Creek. The first sample was collected in upper Suscol Creek about 300 m below the forks. The taxa richness was 41. The second sample was collected about 100 m above the restoration site in upper Suscol. The taxa richness was also 41. The third sample was collected at the middle bridge

and the taxa richness at this site was 33. The lower site was the bridge next to the state highway. We observed a taxa richness of 34. The samples were collected in March, 2012.

During the late summer of 2012, it appeared that water being pumped to fill the reservoir was resulting in dewatering the stream channel between the reservoir and a point about 100 m below the middle bridge.

During 2012, we worked on three restoration projects (see map suscol restoration). In lower Suscol Creek, a number of native plants were planted during 2011 in openings created by dead alder trees. During this year, we monitored the survival of those plants. Survival was very good (see map labeled vegmap & vegmap2). We also started removing a large Himalayan Blackberry patch associated with a stream crossing that was repaired in 2011. Removal of this large HBB patch will continue throughout 2013 as well as throughout the Suscol Creek watershed.

Introduction

The 2010-11 Water Year

The water year from October 2010 to September 2011 was about 10% below the long-term average (90-year record) from the Napa State Hospital

precipitation gauge. The average precipitation is normally about 24.8 inches per year. During the current water year, just over 22 inches were observed (Figure 1, Table 1). Only monthly totals for March and April exceeded the long-term averages. The March totals were about 3 times the long-term average. This was the second year in a row where the March totals significantly exceeded the long-term average.

Steelhead Population

Long-term Study Reach

We conducted our annual June survey beginning above the state highway. In our normal study reach, (see map labeled suscol study area) we observed: 93 age 0 steelhead, 90 age 1+ steelhead, and 95 age 2+ steelhead age (Table 2). The number of age 0 steelhead was below the long-term average for the reach, but significantly higher than last year. The age 1 steelhead were about equal to the long-term average for the reach. In 2011, we observed 95 steelhead 2+ fish. This is the highest number of age-2+ we observed in the long-term study reach.

It will be interesting to see how many of these fish are observed in the survey during 2013. During the late summer period, the stream reach from

the pond to about 100 m downstream of the middle bridge was dry. This condition has not been observed in previous years. During that time the pumps were running to fill the pond. In a later section of this report we will return to this issue. (see map labeled wet dry map)

The macro-invertebrate samples were collected during March 2012. Normally, the number of macro-invertebrate species richness will increase from the headwaters to the mouth of the stream. We collected two samples from Suscol Creek. The taxa richness in both samples was 41, which is low but within the range we have observed previously in upper Suscol Creek. One sample was collected from the middle bridge. Taxa richness was 33 and one sample was collected immediately above the lower bridge near the highway. The taxa richness at the bottom site was 34. Macro-invertebrate sampling indicates that below the pond taxa richness is reduced significantly. One likely candidate to explain at least part of the reduced habitat condition is the sediment inputs from the major cattle crossing just above the pond. These samples were collected in March so they do not reflect the dry stream conditions below the pond. Macro-invertebrate samples collected in the spring of 2013 will reflect the effects on the macro-invertebrates because of the dry conditions in the stream.

No centrarchids were observed in the study reach of Suscol Creek during the 2012 surveys. The mesh placed over the outlet pipes to the ponds has successfully kept the centrarchids from moving into the stream during high water for the last four years. During the June survey, we observed that one of the sets of screens had been removed from one of the outlets to the pond. The screen was replaced. However, we need to ensure that the screens are not removed during the winter high water period.

Upper Suscol

This was the fourth year that we surveyed upper Suscol Creek. There were steelhead all the way to the forks and up both forks. In upper Suscol Creek, there were 74- age 0 steelhead, 55- age 1, and 22-age 2 steelhead (Table 2). The number of YOY steelhead was the lowest observed during the last four years. It is likely that the high water in March may have scoured out a substantial portion of the eggs. The numbers of age-1 and age-2 steelhead were also below average. The numbers of all three ages of steelhead were about average for the last 4 years in the forks of Suscol Creek.

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 number of age 0 steelhead observed in all of Suscol Creek has varied between 159 and 1,300 fish (Table 3, Fig 2). It is typical for the number of steelhead age 0's to fluctuate widely from year to year. 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. Floods play a major role in scouring out the eggs buried in the gravel.

Survival of the age 0 to age 1steelhead from 2008 to 2009 and 2009 to 2010 was about 11% and 17%, respectively; however, from 2010 to 2011, survival was approximately 100%. This survival rate is not plausible. As we discussed last year it is likely that there were steelhead migrating into Suscol Creek from other areas of the Napa basin during the late high flows. The survival of age 0 to age 1 steelhead in 2012 was 0.46%. This is a higher rate of survival than the first 2 years.

Survival of age 1 steelhead to age 2+ steelhead was 0.58 from 2009 to 2010. During the next year, there were 3 times as many age 2's as there were age 1 fish the year before. As discussed last year, the most plausible explanation is that steelhead migrated into Suscol from other areas of the Napa basin during the late spring high water. Survival of age 1 to age 2 steelhead from 2011 to 2012 was 0.28.

The surveys of steelhead trout on Suscol Creek indicate that the population is sustainable in all but years with severe drought. There is currently a good population of age 1 and 2 fish within the population. In the last two years, the number of YOY steelhead has been considerably below average, but their higher than average survival rates to age 1 have compensated for the low numbers of YOY.

Restoration Activities

During 2012, we began removing a large patch of Himalayan Blackberry from upper Suscol Creek. Native vegetation will be planted in early spring. We also monitored and mapped the riparian plantings in middle Suscol between the pond and the middle bridge. About 2/3rd of all native

plants restored to the Suscol Creek watershed have survived (GIS maps available upon request).

Restoration Opportunities

Long-term cattle grazing in the upper section of the Suscol Creek basin has led to significant degradation of the stream habitat, riparian zone, and uplands. Cattle have broken down the banks and removed the majority of native vegetation communities in the riparian zone and twenty feet + of the uplands in the vicinity of the major stream cattle crossing. This has led to large amounts of sediment entering the stream at these crossings. The sediment has been compacted in the stream channel, creating a raised hard point at the stream crossing. The result is that the gravel in transport is captured above the crossing and this situation has cut off much of the gravel supply to the downstream reaches. It has also increased the amount of fine sediment exported downstream. This site (GIS restoration map included here) is a major source of sediment, likely in part responsible for reducing the total macro-invertebrate taxa.

A bridge is proposed at the primary cattle crossing site where vehicles have also been crossing the stream compounding this cattle crossing site. In

conjunction with the bridge, native vegetation, trees, shrubs, sedges, and grasses will be reintroduced to stop the sediment inputs and reestablish riparian vegetation at the site.

Above the cattle crossing, long-term cattle grazing in the stream and riparian zone has removed the native shrub, sedge, and grass communities and eliminated the recruitment of trees and shrubs. Also, the cattle have broken down much of the stream banks. In this area (Figure 3-Upper Restoration site #2 map attached), the cattle will soon be excluded from the stream and riparian zone. Extensive planting of native trees, shrubs, sedges, and grasses needs to be implemented in the riparian zone.

Upper restoration Site #3 is a large bedrock pool with an open canopy. This site results in significant stream warming. Extensive cattle grazing has eliminated the recruitment of willows or native trees at the site. We are proposing to plant willows and native trees in the riparian zones.

The mainstem of Suscol Creek was dry from the pond down 100 m below the middle bridge. This is not a normal condition. In previous years, this reach has had permanent flows even during the series of dry years about 5 years ago. It was observed that pumps were operating adjacent to the stream, filling the pond. We suggest that the pumps only be used if enough

water is not available for irrigation. The pond will naturally refill during the winter months. Minimizing the pumping will save money as well as minimize the potential water withdrawal from the stream. This situation will also result in a minimal amount of overflow from the pond into the stream during the winter months.

Summary

This year, 2012, was slightly drier than the long-term average. Only March and April had higher than average precipitation. The March totals were about 3 times higher than average.

The 2012 annual snorkel count was completed in June. The results followed a more normal pattern than those observed in 2011. Last year we had to delay the snorkel count two weeks because of high water.

Our life-history analysis indicated that the number of age-1 and age-2 steelhead are higher during the last two years. This is largely due to the above average summer stream flows observed in 2011.

The restoration opportunities in upper Suscol Creek include: 1) Fixing the major cattle crossing that is generating considerable amounts of sediment; 2) Designing and implementing a permanent fix to the upper

stream crossing that is the second major source of sediment in Suscol Creek; 3) Riparian restoration in upper Suscol Creek after the cattle are removed from the riparian zone; 4) Minimizing the amount of groundwater pumped into the pond during the summer-fall period.