Suscol Creek Collaborative Partnership
Restoration Project 2006

Prepared by Charley Dewberry
for Napa Wine Estates LLC
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Introduction

This is the third year of the Suscol project. With each additional year we gain a greater understanding of how the steelhead trout and macro-invertebrate communities respond to changing conditions in the stream due to management activities and different weather conditions during the year. This understanding enables us to better prescribe management actions that are effective at accomplishing the desired goal. The goal of this project is to sustain the native fish population and protect plants and wildlife in the Suscol Creek watershed . The Institute for Conservation Advocacy, Research and Education, (ICARE) will assist Suscol Creek property owners with this goal. The Suscol Creek Stewardship is committed to habitat conservation, restoration, and improvement of water quality and quantity.

Part I of this year's report summarizes the field work and analysis for the year. It was an unusual year. Precipitation was significantly higher than normal. There were two major storms during the year. One of them was in December that resulted in over 15 inches of rain falling in the month, which is approximately 3 times the normal average of 4.7 inches. The second storm was in March and the monthly precipitation averaged 2.5 times the

normal average of 3.4 inches. Maximum air temperatures were near the average annual regime; however, temperatures were about 5 degrees colder than normal in March and about 5 degrees warmer during the early summer.

Steelhead numbers this year were also slightly above the average of the three years of surveys. In the stream reach above Hwy 12/29, we observed 183 young-of-the-year, 110- 1+, and 27-2+. No centrarchids, (a non-native fish most common in ponds that escapes from a reservoir during spills and preys on young steelhead) from the pond were observed in the stream reach during the survey. In addition, we surveyed the stream reach from the highway downstream to the Napa River. Steelhead trout were observed in this reach, but the number of steelhead trout was low.

Beginning in May, we started collecting adult macro-invertebrates to build a species list for Suscol Creek. The number of insects was likely below average given the two major storms that occurred in the basin during the year.

In part II of this report we provide a historical analysis of the Suscol basin over the last couple of centuries. It describes the changes in land management in the basin over time. This information helps characterize the long-term trajectory of ecological health for the Suscol basin.

Physical Setting (2005-2006 Water Year)

Precipitation

During the 2005-6 water year (from October to September), 43.3 inches of precipitation were recorded at the State Hospital in Napa, CA. This is 169% of the average precipitation for the period 1917-2006. *(Chart 1.1, Figure 1.1)*

Chart 1.1

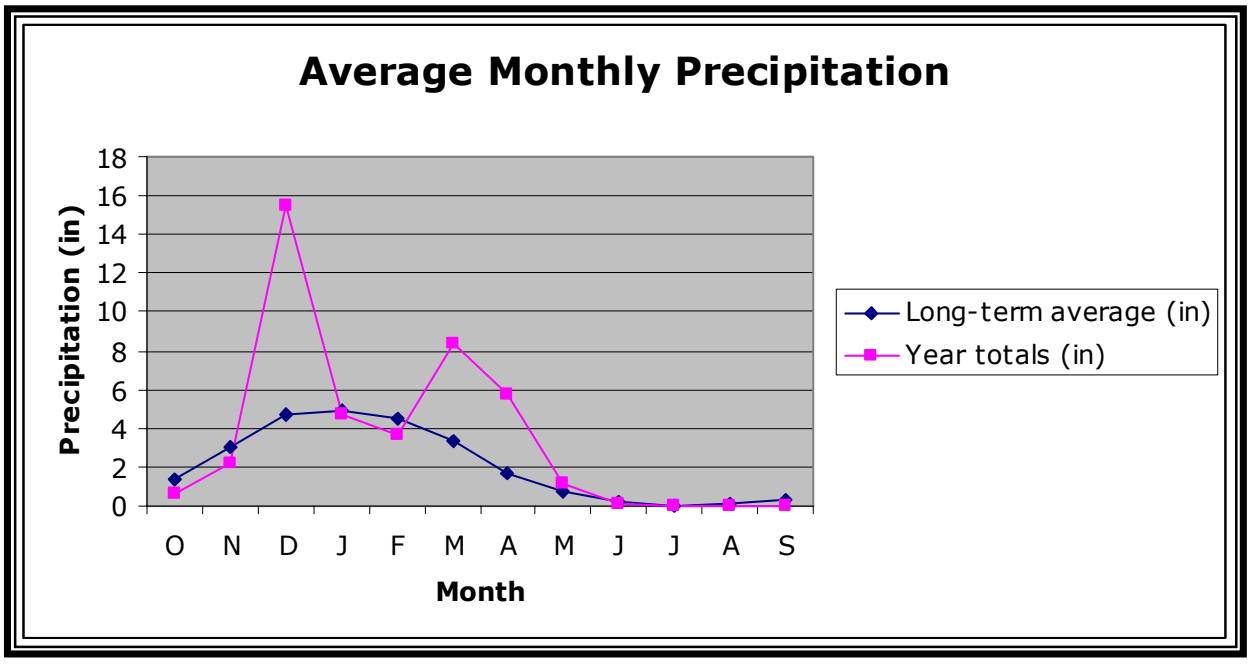


Figure 1.1

Napa monthly precipitation for 2005-06 Water Years (Napa State Hospital, Napa, CA.)

Month	Long-term average (in)	Year totals (in)
O	1.38	0.67
N	3.06	2.25
D	4.71	15.49
J	4.87	4.69
F	4.54	3.71
M	3.39	8.41
A	1.69	5.75
M	0.71	1.19
J	0.23	0.11
J	0.02	0
A	0.08	0
S	0.28	0

Precipitation was also higher than average last year although it was not as high as this year.

For the second year in a row, the December total precipitation was significantly higher than normal. In December 2005, over 15 inches of rain were recorded at the Napa State Hospital, Napa, CA. This is approximately 3 times the normal average of 4.7 inches. This storm caused considerable channel scouring.

The second storm was in March and the monthly precipitation averaged 2.5 times the normal average of 3.4 inches. This series of storms caused some channel changes and kept temperatures lower in March.

Temperature

The average maximum temperature for the water year was 72.4, slightly higher than the long-term average of 71.1. *(Chart 1.2, Figure 1.2)*

Chart 1.2

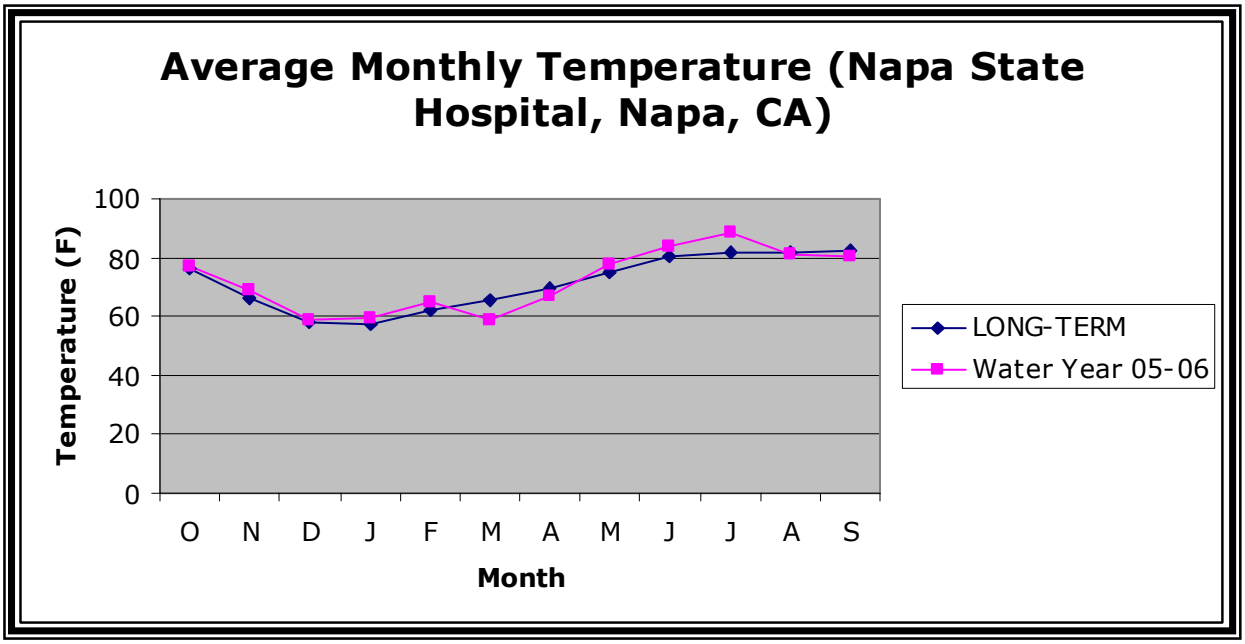


Figure 1.2

Average Monthly Maximum Temperature (Napa State Hospital, Napa, CA)

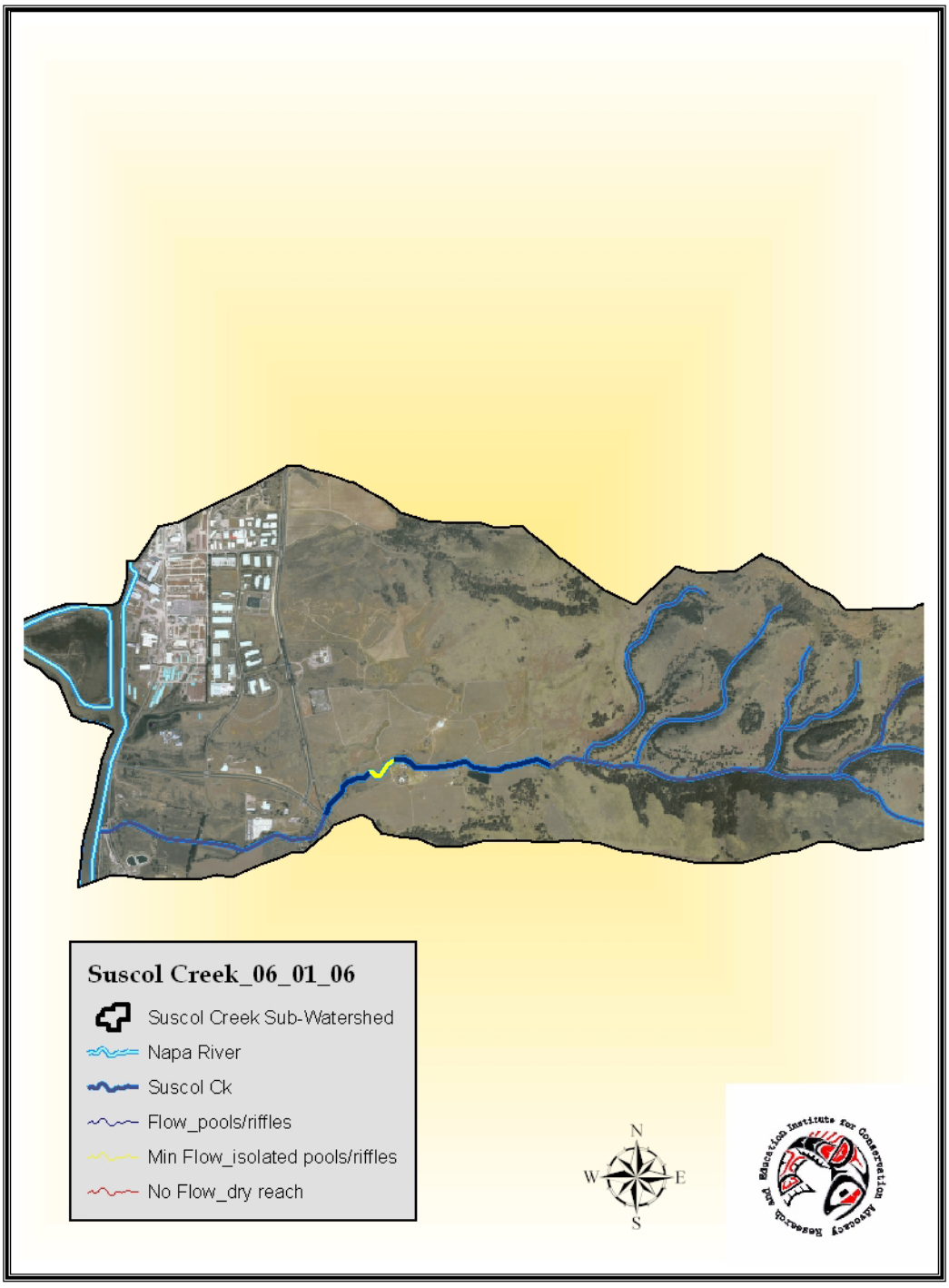
Month	Long-term Avg.	Water Year 05-06
O	76.6	76.8
N	66.3	68.9
D	57.9	58.9
J	57.5	59.5
F	62	64.7
M	65.6	58.8
A	69.9	66.7
M	74.8	77.5
J	80.1	83.7
J	82	88.3
A	81.9	81.1
S	82.2	80.2

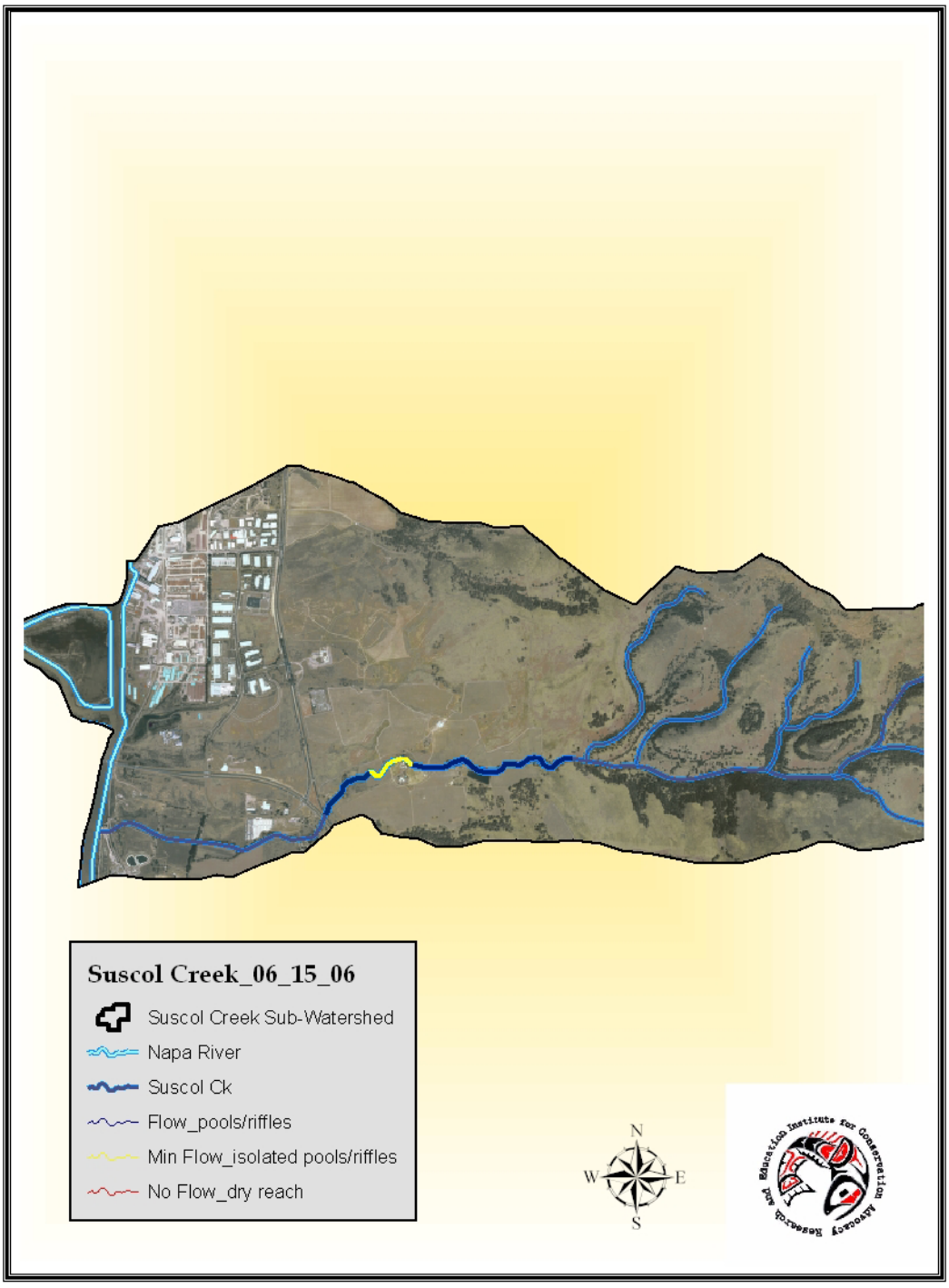
Temperatures were about 5 degrees lower in March due to the storms. Also, early summer temperatures were about 5 degrees warmer than usual.

Stream flow

The water year 2005-6 had significantly more precipitation than normal. The higher than normal precipitation, especially in March and April, resulted in more stream flow through the summer-fall period. As a result, more of the stream maintained permanent flow during the summer and fall period. Maps 1.1-1.9 show the sections of stream that became a series of isolated pools or were dry during the summer months. Again, more stream length maintained permanent flow as a result of the higher than average precipitation.

Map1.1-Map 1.9


Suscol Creek_06_01_06
Suscol Creek Sub-Watershed
Napa River
Suscol Ck
Flow_pools/riffles
Min Flow_isolated pools/riffles
No Flow_dry reach
N
W
E
S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Napa River
Suscol Ck
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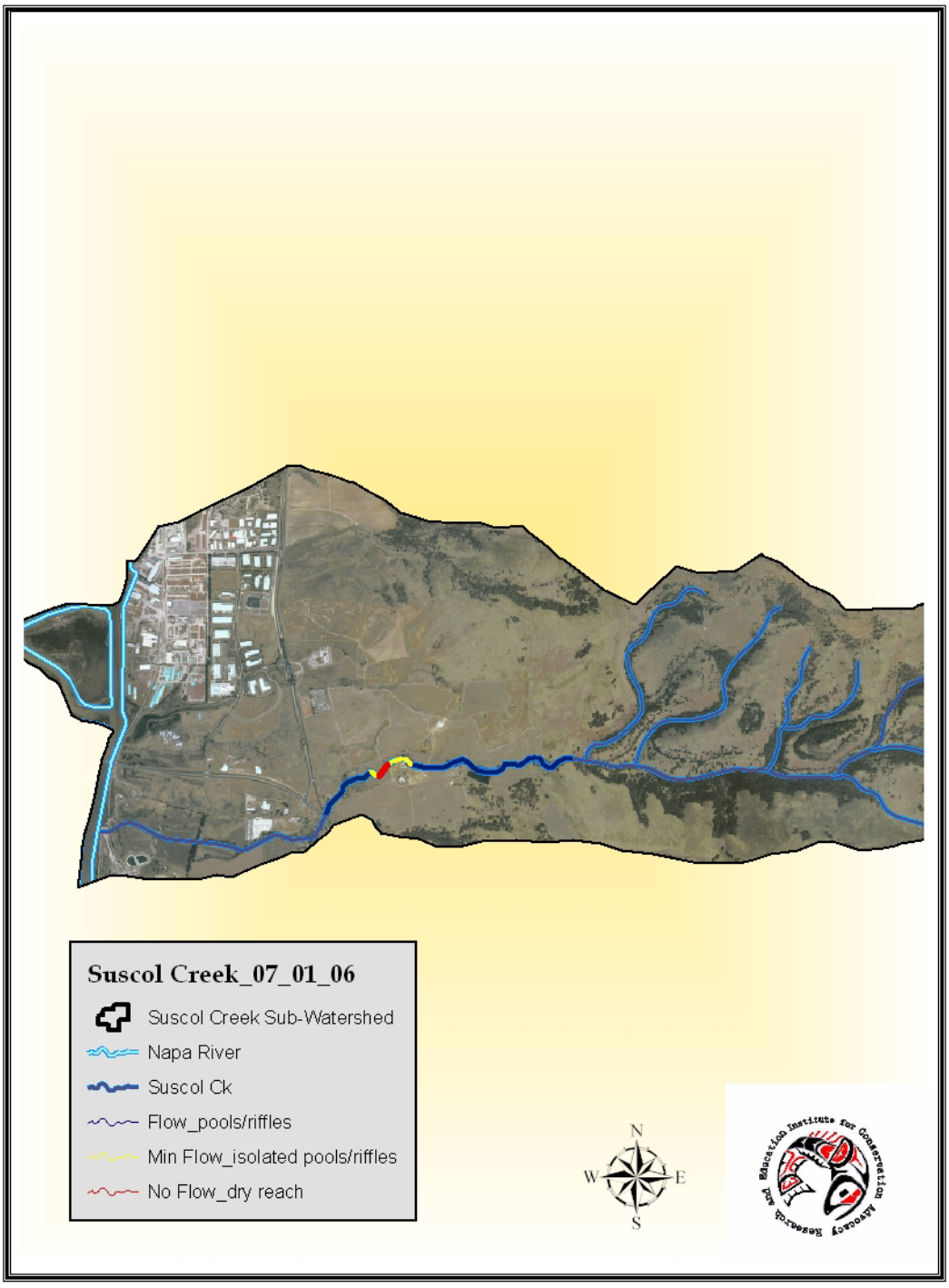
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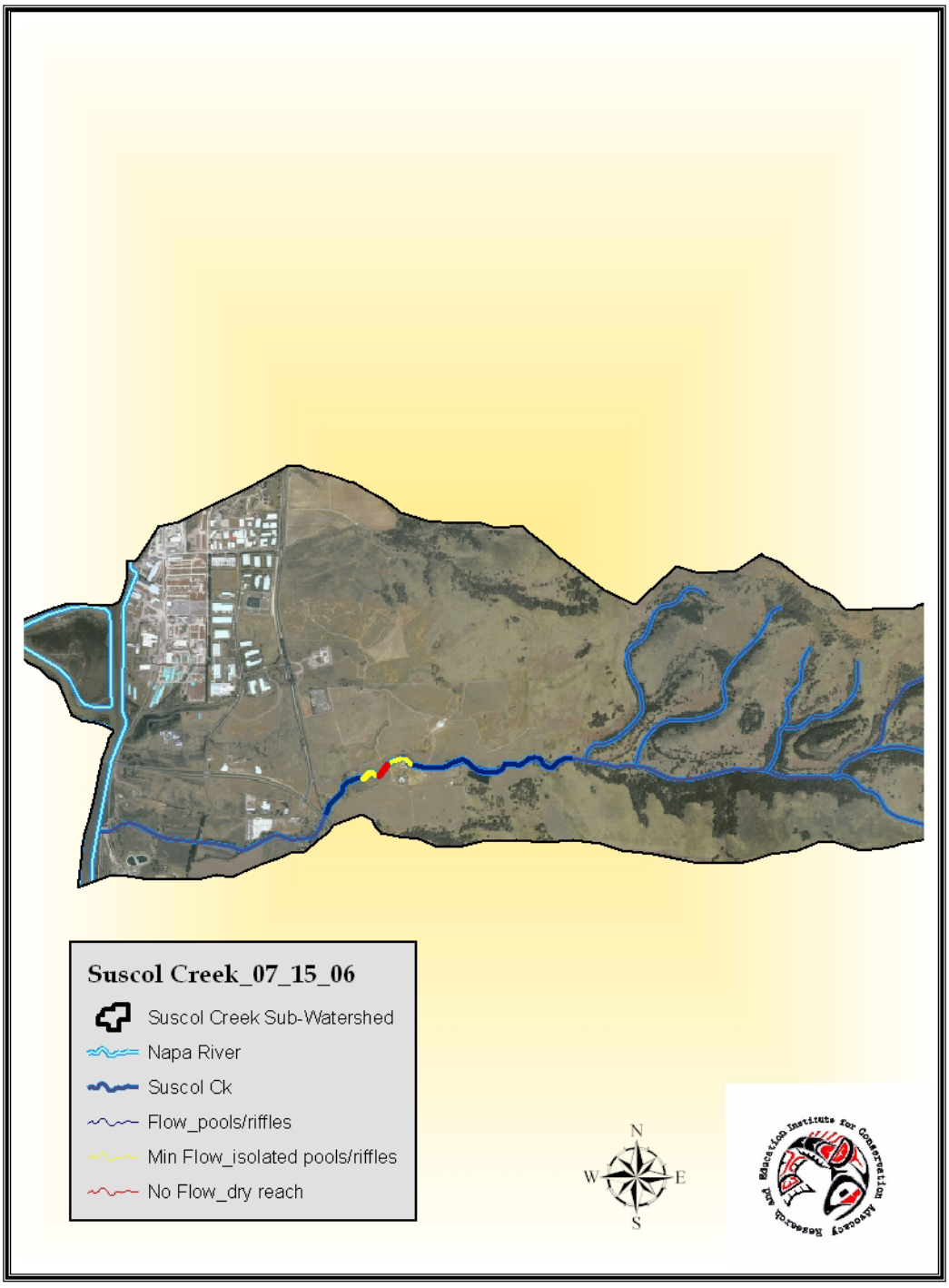
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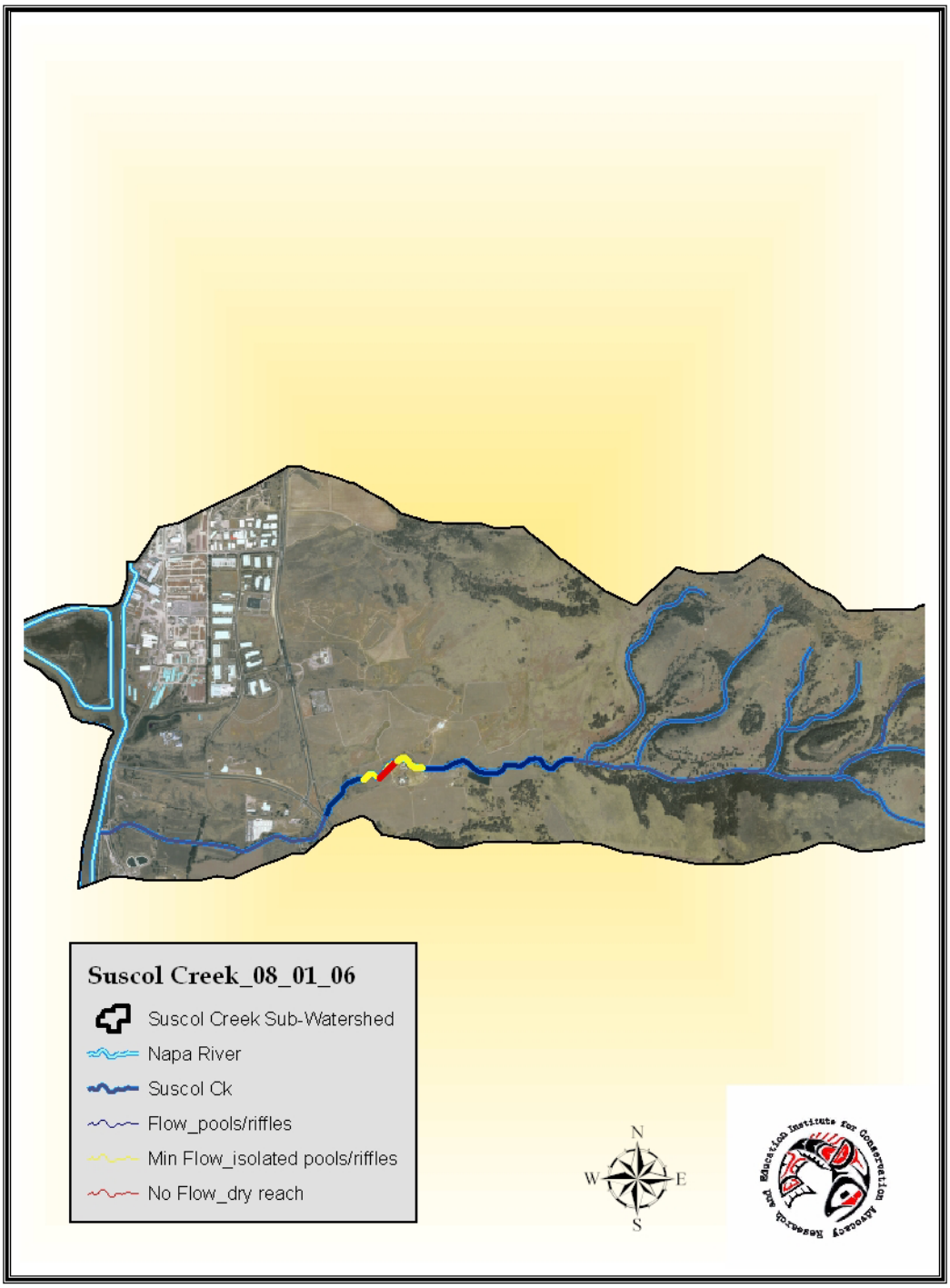
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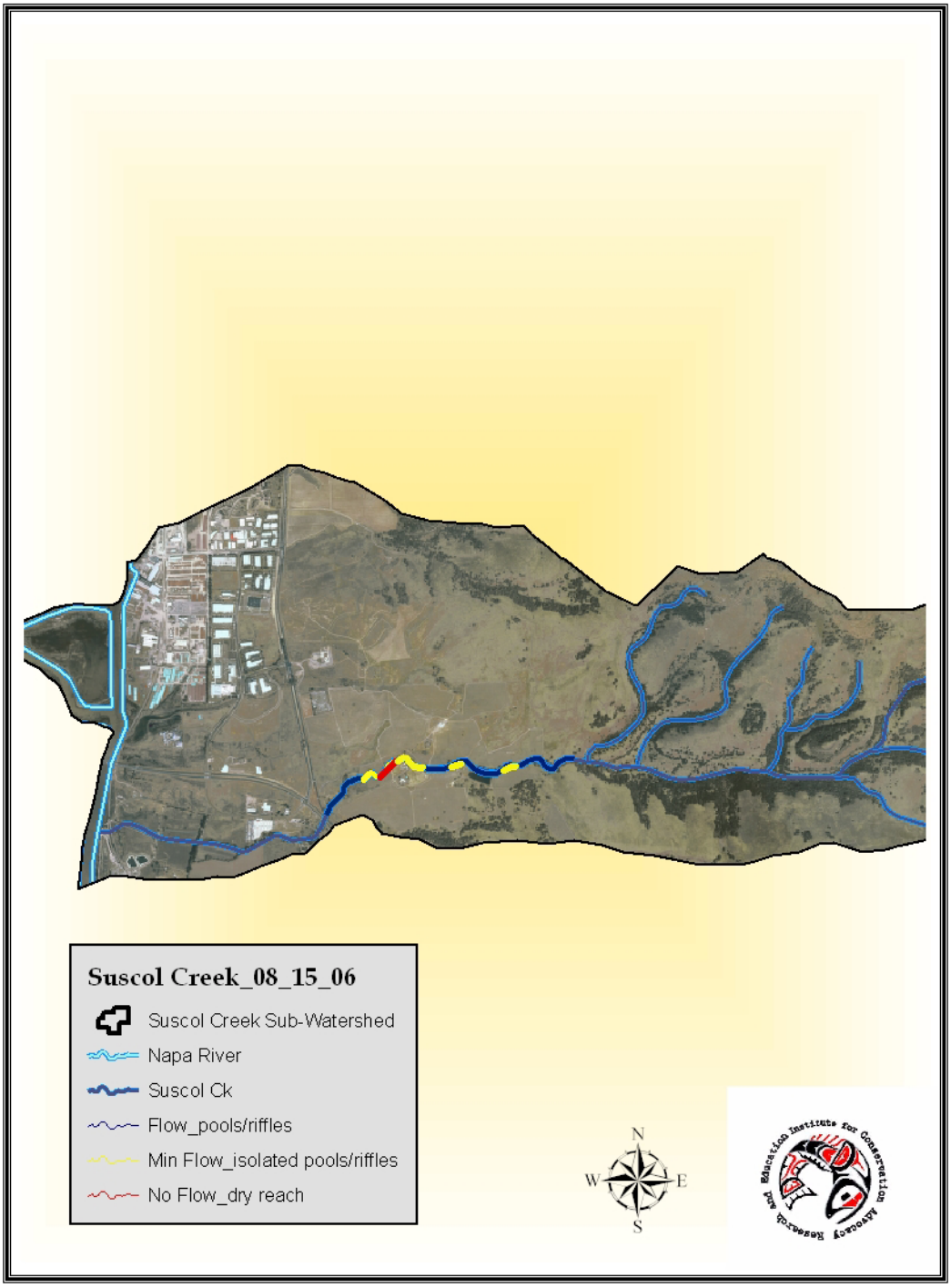
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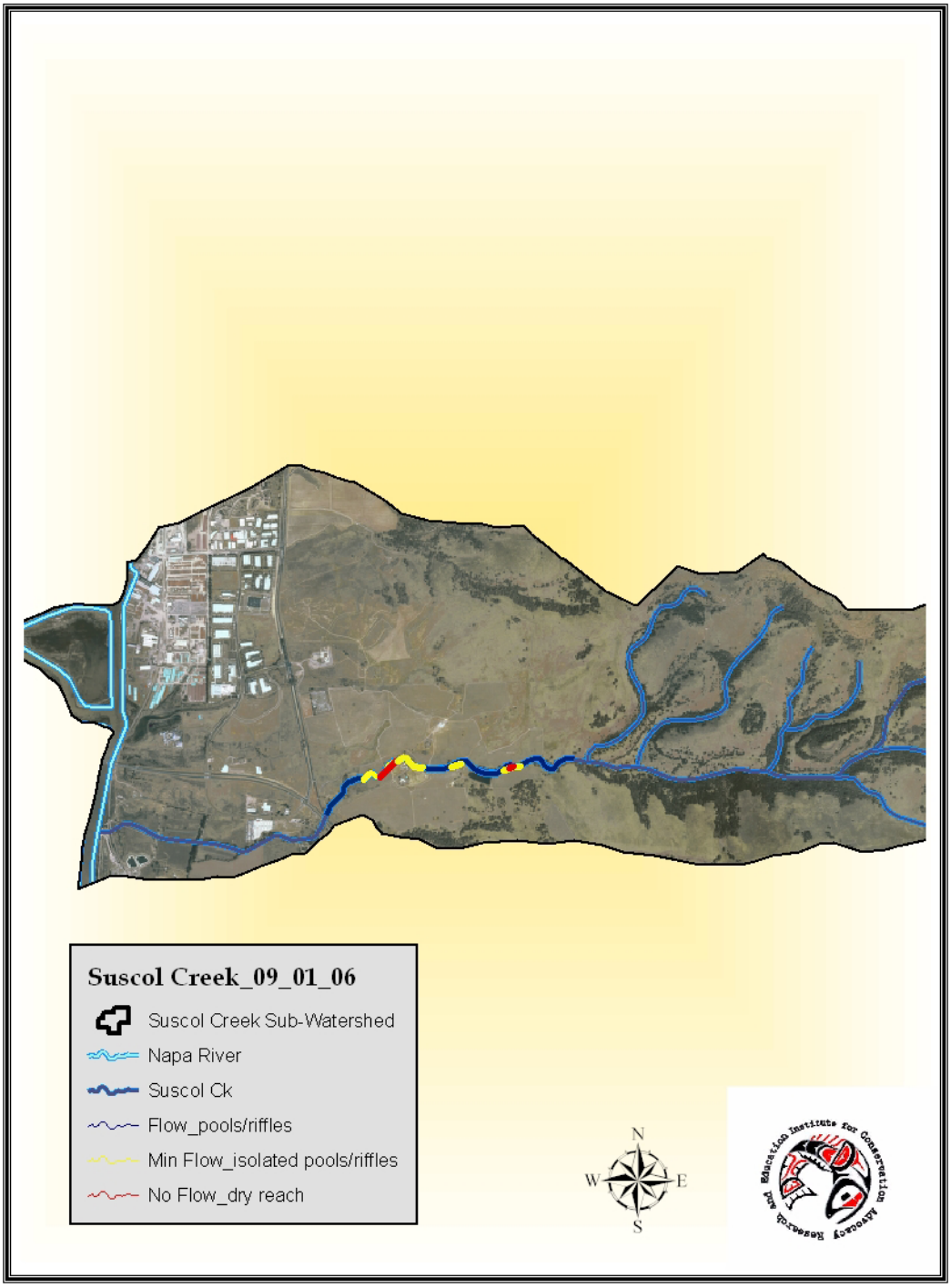
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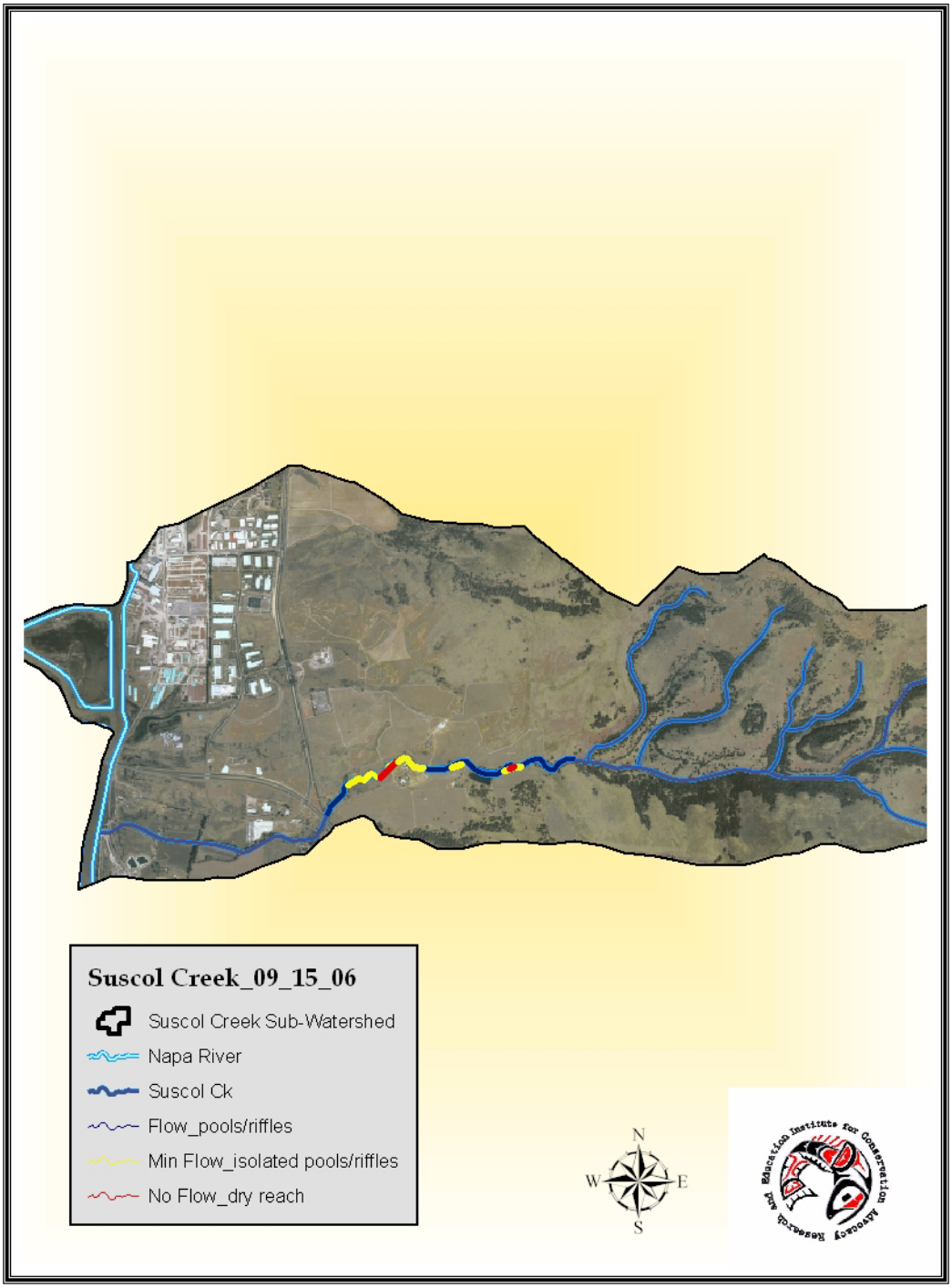
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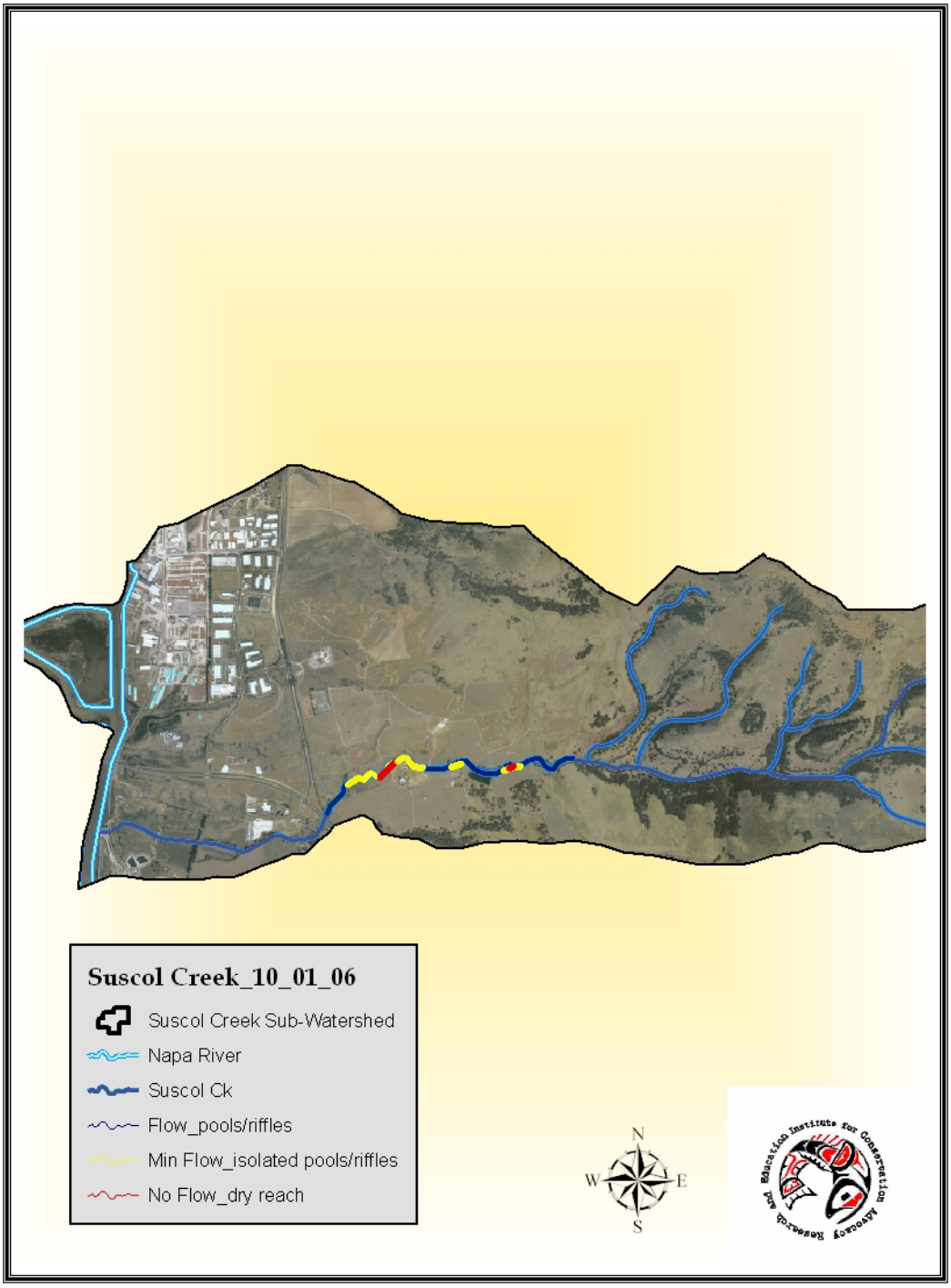
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Salmonid Surveys-

Young of the year, YOY, are steelhead that hatched in the current calendar year, 1+ are steelhead that hatched the previous year, 2+ are steelhead that hatched two previous years.

During 2006, a single snorkel survey was conducted in June. This survey included the section below the highway 12/29 bridge as well as the usual survey above the bridge. The survey was conducted on June 4th and 5th by Dr. Charley Dewberry and Josh Malan. The total number of fish observed in the reach above the highway bridge during the survey was 183 young-of-the-year (YOY) steelhead trout, 110 Steelhead 1+, and 27 Steelhead 2+ (Table 2 Snorkel Surveys). In addition, no centrarchids were observed in the survey.

The number of Steelhead trout YOY was above the average for the three years we have conducted the survey; however it was significantly less than the 577 YOY that were observed in 2005. The major storm probably had little significant effect on the YOY steelhead. Most of the steelhead trout spawned after the storm. The storm in March was not a major channel scouring event, so it probably had minimal impact on the survival of YOY trout.

The survival of the 1+ age steelhead was reduced from 577 YOY observed during 2005 to 110 age 1+ in 2006. This is a survival rate of 19%. The survival rate the year before was 41%. The reduction in survival of age 1+ steelhead is almost certainly due to the major winter storms in December of 2005. This was a major channel altering flood which scoured significant portions of the channel. However, 19% survival from YOY to age 1+ still resulted in there being over 100 age 1+ trout in the reach. (Less than 25 age 1+ trout were observed in the survey during the first year). In summary, the number of age 1+ trout in the study reach during 2006 was higher than in previous years due to the very high numbers of YOY observed in 2005.

The number of 2+ fish remained essentially the same as the previous year. It is likely that the number of 2+ trout remains around 25 fish during years with higher than average stream flow. Currently we do not know how many 2+ trout migrate to the estuary/ocean as steelhead. The majority of the 2+ fish are less than 10" so it suggests that the majority of 2+ fish are migrating out of the study reach during their 2nd spring. A total of around 25 2+ steelhead trout may be near the current carrying capacity of the study reach of Suscol Creek.

We also did not observe any centrarchids in the survey during 2006. In the previous two years of survey we had observed approximately 100

each year. It is likely that a number of centrarchids were flushed out of the pond during the major 2005 December storms; however, they were also flushed out of Suscol Creek entirely. Because centrarchids are lake and pond fish they have little ability to deal with swift currents. As a result, a major effect of the December storm was removing the centrarchids from the study reach.

Also in 2006 we surveyed the section of Suscol Creek below the highway 12/29 bridge. The lower 1/2 of the reach is a straight channelized section flowing through the Napa Sanitation spray fields. There are significant stands of blackberries in the riparian zone. The upper 1/2 of the reach is a more meandering channel with a few more pools and a more forested riparian zone. However, there are significant stands of blackberries in the riparian zone in the upper half of this reach as well. A few trout were observed below the highway bridge, indicating that trout can survive in the reach, but their numbers were low.

The section of Suscol Creek below the highway has been significantly altered during the last 200 years (See Suscol Creek Historical Ecology Report Part II). Historically, it was a braided, meandering series of channels flowing through a marsh/wetland. Today much of it is a single incised, straight channel.

Macro-invertebrates

In 2006 we also began constructing a list of aquatic species found in the study area of Suscol Creek. Few collections of macro-invertebrates have been made in the Napa Basin. A species list is useful for documenting long-term changes in the species found not only in Suscol Creek but in the Napa basin as a whole. Suscol Creek represents an excellent site to compile a species list for the east side of the Napa basin because of the largely intact riparian zone and long-term commitment to maintaining the integrity of the stream system.

Beginning in May 2006, we placed three emergence traps in riffles in the study reach of Suscol Creek to capture adult insects emerging from the stream. Adult insects are necessary to identify the individual species. The traps were collected once a week during the year. *(Figure 1.3)*

Figure 1.3

EMERGENCE TRAP COLLECTIONS

DATE	TRAP	MACRO-INVERTS		
5/3/2006	1	N		
5/3/2006	2	Y		N= NO MACROINVERTS IN TRAP
5/3/2006	3	Y		
5/17/2006	1	N		
5/17/2006	2	N		
5/17/2006	3	N		
6/13/2006	1	Y		Y= MACROINVERTEBRATES IN TRAP
6/13/2006	2	Y		
6/13/2006	3	N		

6/20/2006	1	N		
6/20/2006	2	Y	midges	
6/20/2006	3	N		
6/28/2006	1	N		
6/28/2006	2	Y		
6/28/2006	3	Y		
7/7/2006	1	Y		
7/7/2006	2	Y		
7/7/2006	3	N		
7/14/2006	1	N		
7/14/2006	2	N		
7/14/2006	3	N		
7/24/2006	1	N		
7/24/2006	2	N		
7/24/2006	3	N		
8/11/2006	1	Y		
8/11/2006	2	Y		
8/11/2006	3	N		
8/24/2006	1	N		
8/24/2006	2	N		
8/24/2006	3	N	Trap damaged	
9/1/2006	1	N		
9/1/2006	2	Y		
9/1/2006	3	N		
9/14/2006	1	N		
9/14/2006	2	N		
9/14/2006	3	N		
9/22/2006	1	Y		
9/22/2006	2	Y		
9/22/2006	3	N		
10/31/2006	1	N		
10/31/2006	2	Y		
10/31/2006	3	N		
11/16/2006	1	Y		
11/16/2006	2	Y		
11/16/2006	3	N		
12/5/2006	1	Y		
12/5/2006	2	Y		
12/5/2006	3	N		

Figure 1.3 lists the dates the traps were checked and whether a trap contained insects.

The samples were stored in vials of alcohol. The insects were identified to Genus (family for a few midges) by Charley Dewberry. Sample individuals were sent to various specialists for the species identification. (C. Dewberry arranged for the specialists to make the species identification at no additional cost to the project). We will receive most of the identifications between 6 months and a year.

Table 1.1 (Suscol 2000-2004) contains a list of genera obtained from the BMI project on Napa over the period from 2000-2004 and there is a tabulation of insects groups that have been captured in the adult traps. Most of the major groups have been collected, although not all species have been collected. Many of them emerged earlier in the year prior to placing the traps in the stream. We will complete the adult trapping during 2007.

Restoration Opportunity

During the last two years with higher than average stream flow we observed that there is a long shallow pool in a permanently flowing section of the creek that is in the sun for most of the day. There are no trees along

the south portion of the riparian zone of the pool. We propose planting willows along the bank of the pool and several native riparian trees alongside the pool to provide shade over the pool.

This action would not only benefit the pool but the downstream reaches as well. Even if the pool becomes isolated in drier years, warm water would flow subsurface into downstream isolated pools or flowing reaches of the stream. A series of maps are provided to identify the area where this pool is located.

Recommendations

- Continue to manage the water levels in the pond such that the pond has minimum water stored as the fall/ winter storm season is entered. If pumping is necessary to fill the pond do it in the early spring.
- Provide a wire mesh cage over the outflow of the pond to minimize the movement of centrarchids out of the pond.
- Continue to remove blackberries from Sucol Creek riparian zone and continue to reestablish native riparian vegetation. This will involve other property owners throughout the watershed.
- Plant riparian species along the identified pool.

Focus of Work for 2007

*We propose continuing the annual June snorkel count. The June count is our benchmark for salmon production for the study reach.

*We are also proposing to continue the flow measurements and to measure the dynamics of the permanently flowing stream channels. These measurements will help understand the relationship of precipitation, recharge, and water withdrawal from the aquifers to stream flow.

*We are also proposing to continue the macro-invertebrate emergent trapping for the coming year. We will place 3 small traps in the stream that allow us to capture all the insects that are hatching under the trap. These captured insects will allow us to get a complete species list, time of emergence, and number of each species produced during the year. This information is of use for a number of reasons. First, collecting these adult insects is necessary to identify what species are present in Suscol Creek. There are only a few streams in California where this information had been collected. It is in these surveys that accurate species lists and new species are usually identified. Suscol Creek is a good location for this sampling because it has a mature, healthy, riparian zone. Second, emergence trapping can be

conducted at a later date to determine changes within the macro-invertebrate communities. Third, emergence trapping can be used to calculate an estimate of the macro-invertebrate annual production. This information, when combined with an estimate of steelhead production, will help us determine how limiting food resources many be for the steelhead.

* Further develop the Suscol Creek Stewardship to remove Himalayan blackberry.

* Assist other Suscol Creek property owners with best management practices to help with conservation and restoration efforts on Suscol Creek.