

# **NAPA CREEK SALMON MONITORING PROJECT**

**ANNUAL REPORT – YEAR 3**  
*(JUNE 2007 – JUNE 2008)*

**JULY 15, 2008**

PREPARED FOR

**THE CITY OF NAPA**  
AGREEMENT #8981

BY



***NAPA COUNTY RESOURCE CONSERVATION DISTRICT***

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## INTRODUCTION

In 2006, the Napa County Resource Conservation District (RCD), funded by the City of Napa, began a five-year study to develop a comprehensive fisheries assessment of Napa Creek (Figure 1). This monitoring project focuses on Chinook salmon (*Oncorhynchus tshawytscha*), steelhead trout (*Oncorhynchus mykiss*) and other native fish species.

This report summarizes results of monitoring efforts between June 2007 and June 2008. Additional background and detailed habitat information for Napa Creek is available in the Year 1 and Year 2 reports from the RCD.

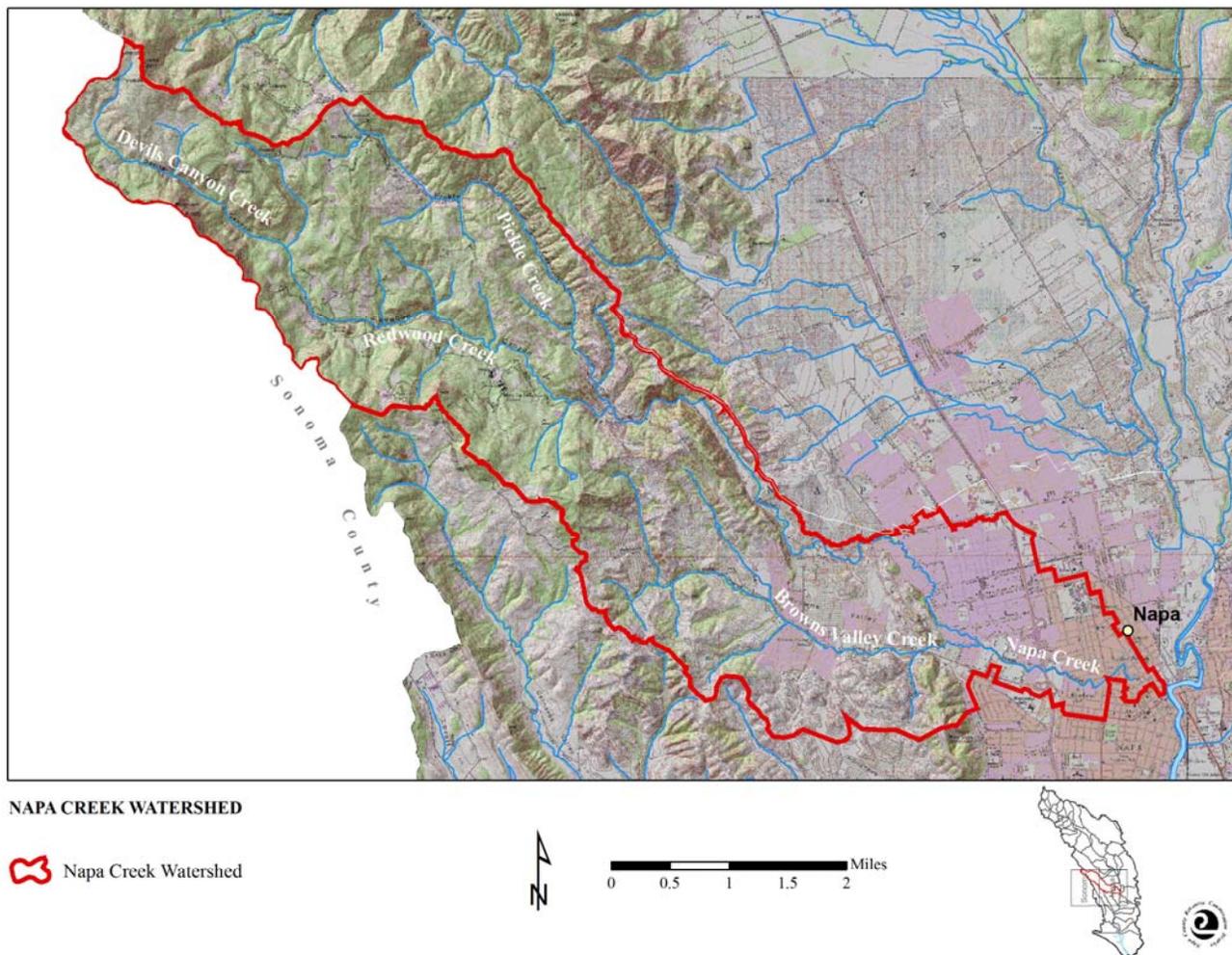


Figure 1. Napa Creek watershed map.

## **METHODS**

RCD staff conducted a salmon spawner survey on December 27, 2007. The two person crew waded Napa Creek from the Napa River to the confluence of Browns Valley and Redwood Creek to count carcasses and live fish, map redd locations and characteristics, and identify critical habitat areas. Surveys were conducted following California Department of Fish & Game protocols as described in the California Salmonid Stream Habitat Restoration Manual (Flosi et al. 1998).

Two steelhead spawner surveys were conducted in Redwood Creek on April 11, 2008 and April 23, 2008. The first survey began at the confluence with Napa Creek and continued upstream to Dry Creek Road. The second survey began at the bridge near Forest Drive and extended 1.95 miles upstream to Alston Park. These surveys followed the same methodology as described for salmon above.

To determine whether water temperatures in Napa Creek are suitable for salmonid spawning and rearing, continuous temperature monitoring was carried out using a digital data logger (*Optic Stowaway Temp*) manufactured by Onset Computer Corporation. The monitoring site selected was in a potential steelhead rearing pool just upstream of Jefferson Street, which remains wet all year. The logger was housed inside a short length of ABS plastic pipe to protect it from damage and direct sunlight. The assembly was anchored to the streambed using a combination of cable and rebar. The logger was set to record water temperature continuously in 30-minute intervals. Physical characteristics of the site were documented at the time of installation including depth, canopy, substrate, estimated flow, and bank vegetation.

The temperature data logger was removed for repair in December, 2007 and reinstalled in early 2008. Two additional temperature data loggers were installed in Napa Creek in reach 1 near Brown Street and in reach 2 upstream of Highway 29.

## **RESULTS**

Spawner survey results are summarized in Table 1. No evidence of Chinook salmon spawning was observed or reported during the 2007/2008 spawning period in Napa Creek. Visual surveys in spring 2008 did not document any juvenile salmon.

During steelhead surveys in Redwood Creek, we documented three redds and recovered a tissue sample from a partial steelhead skeleton (mandible only). The tissue sample was sent to the National Marine Fisheries Service (NMFS) Santa Cruz Laboratory in June 2008 along with other steelhead and salmon samples collected from the Napa River and several tributaries this year.

Abundant young-of-year steelhead were observed throughout the Redwood Creek surveys. These fish were approximately 3-5 cm in length and densities appeared to increase as we progressed upstream. No juvenile Chinook salmon were observed in Redwood Creek during these surveys.

Survey Date	12/27/2007	4/11/2008	4/23/2008
Survey distance (ft)	11,130	9,137	10,293
Water temp (°C)	9.5	12	11.5
Air temp (°C)	12	16	14
Live Chinook salmon observed	0	0	0
Live Steelhead adults	0	0	0
Chinook Carcasses	0	0	0
Mean fork length (cm)	N/A	N/A	*
Range fork length (cm)	N/A	N/A	*
Adipose fin clip	N/A	N/A	*
Skeletons	0	0	1 (partial steelhead)
Redd count	0	2 (steelhead)	1 (steelhead)

Table 1. Summarized salmon spawner survey results. Note -both steelhead surveys were conducted outside of the expected spawning window for Chinook salmon. \*Since only a partial skeleton was recovered, no data on length or presence of a hatchery fin clip could be obtained for this fish.

Water temperature has been recorded continuously from June 21, 2006 through December 4, 2007 in Napa Creek. Results of continuous temperature monitoring are shown in Figure 3.

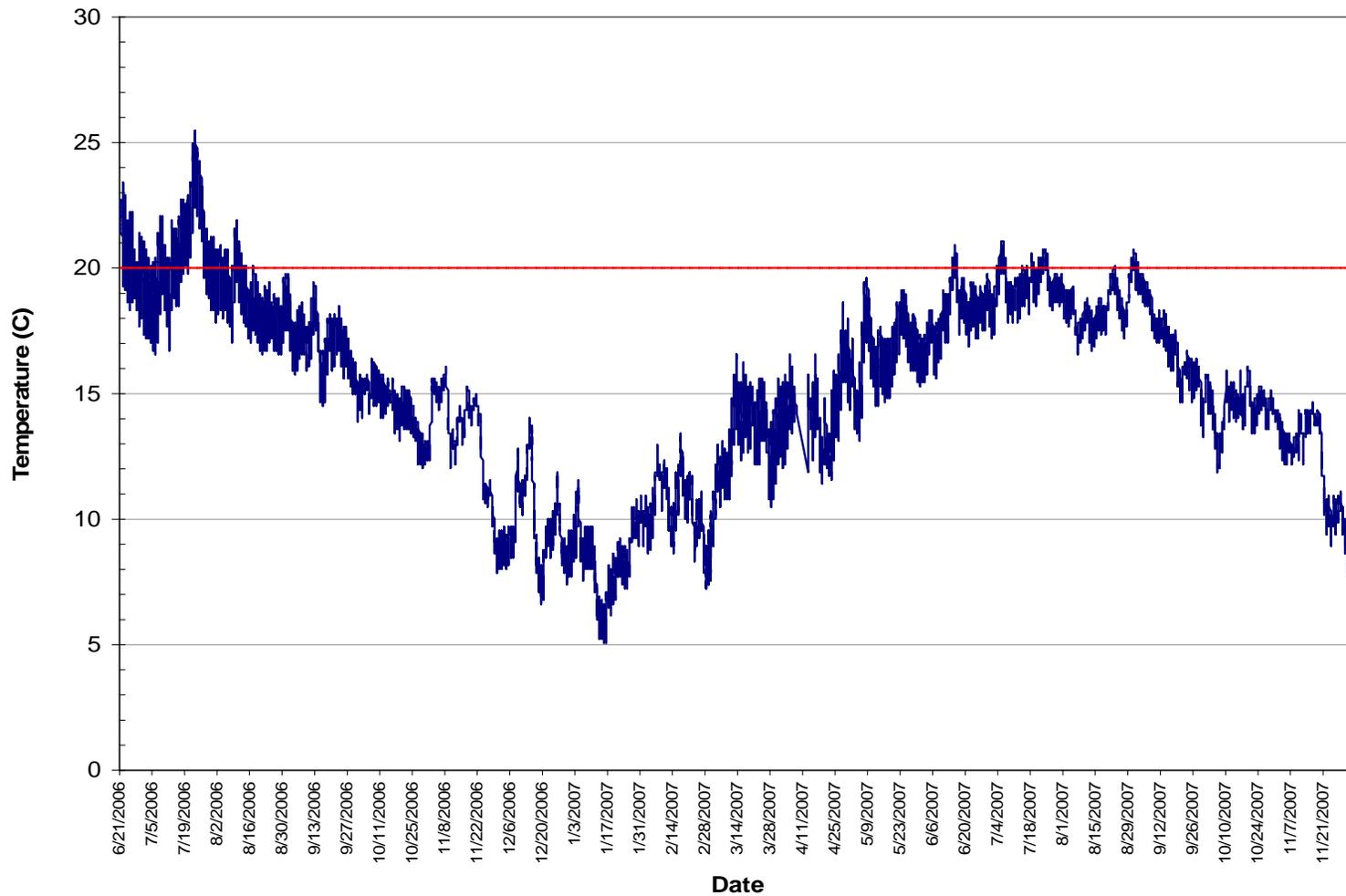


Figure 3. Continuous water temperature monitoring results. The red line represents a temperature threshold (20° C) for juvenile salmonid rearing. Temperatures above this line are generally unsuitable for supporting steelhead and salmon.

## CONCLUSIONS

The number of Chinook salmon in the Napa River watershed, and throughout much of California, during the 2007/2008 spawning year was generally very low. Not surprisingly, the lack of spawning seen in Napa Creek this year reflects this regional and statewide trend. Based on our surveys during the past three spawning years, Chinook salmon appear to use Napa Creek (and perhaps several other large tributaries) primarily during years of high abundance when more fish are in the system and tend to stray into suitable habitat opportunistically. In lower abundance years, like 07/08, little or no spawning occurs in these streams at the outskirts of the species' core range. As documented in previous reports, there are significant sections of Napa Creek and lower Redwood Creek that contain suitable substrate and channel characteristics to support salmon spawning. However, these habitats appear to be largely unused in all but the highest abundance years.

Our surveys suggest that steelhead spawning in Redwood Creek was very successful during the winter 2008 season. The high number of young-of-year observed throughout the reach indicates that egg-to-emergence survival was relatively high. This high survival was likely due to very mild stream conditions during the spring incubation period, in which there were no major storm events to cause redd scour or fry mortality from higher flows. Based on the high numbers of young-of-year, the fact that we only observed three redds in about 3.7 miles appears to be an underestimate, limited primarily by our ability to detect all spawning sites. Steelhead are smaller than salmon and tend to construct redds in swift water where visual observation is often difficult. The true number of steelhead redds in this reach was likely far more than we can confidently count.

Water temperatures in Napa Creek were relatively high in summer 2006 and 2007, and frequently exceeded 20° C. These conditions limit successful juvenile steelhead and salmon rearing from June through October. Chinook salmon are well adapted to such conditions, as the juveniles migrate to the estuary in late spring to avoid elevated summer temperatures.

## FUTURE MONITORING PLANS

- Conduct salmon spawner surveys in fall 2008.
- Conduct steelhead surveys as budget and access permits in winter/spring 2009.
- Conduct ongoing water temperature and water quality monitoring through 2009.

## REFERENCES

Flosi, G., Downie, S., Hopelain, J., Bird, M., Coey, R., and Collins, B. 1998. *California Salmonid Stream Habitat Restoration Manual*, 3rd edition. California Department of Fish and Game, Sacramento, California.