

# **Rainbow Trout and Steelhead Studies in the Matilija Creek/ Ventura River Basin**

## **Summary of Activities**

Christian E. Zimmerman<sup>1</sup> and Reginald R. Reisenbichler

Western Fisheries Research Center  
U.S. Geological Survey  
6505 NE 65<sup>th</sup> St.  
Seattle, WA 98115

Steelhead and rainbow trout (*Oncorhynchus mykiss*) in the Matilija Creek/Ventura River watershed were examined between June 2000 and February 2002 by researchers from the USGS Western Fisheries Research Center. These studies were intended to examine steelhead populations at the southern extent of their range and provide information to the Matilija Dam Removal planning effort. This report is a summary of activities. A final report is in progress.

Historically, steelhead were thought to exist throughout the Ventura River watershed (including Matilija Creek). The number of steelhead returning to the Ventura River is unknown, although some estimates of run size in the 1930's and 1940's exist. Hubbs (1946) suggested that the Ventura River supported "large and consistent runs" of steelhead. In 1946, California Department of Fish and Game personnel estimated that a minimum of 4000 to 5000 steelhead spawned in the Ventura River system in normal water years (Titus et al. in prep). Currently classified as endangered, steelhead are still observed in the Ventura River (below Robles Diversion Dam) but little is known about their distribution or biology. In this study, we focused on three main objectives: 1) Identification of spawning locations by steelhead and rainbow trout; 2) Describing the distribution and characteristics (including genetic population structure) of rainbow trout throughout Matilija Creek; and 3) Determining the utility of otolith microchemistry for determining the maternal origin and migratory polymorphism in steelhead and rainbow trout throughout the basin. Other objectives that were explored but not implemented will be presented in the pending final report.

---

<sup>1</sup> Present Address: USGS Alaska Science Center, 1011 E. Tudor Rd., Anchorage, AK 99503  
czimmerman@usgs.gov

## **Spawning Surveys**

Between January and June 2001, spawning surveys were conducted throughout the basin. A single steelhead was observed holding in a pool in San Antonio Creek (at Soule Golf Course). Because of private property issues, we were unable to walk San Antonio Creek to locate redds. Rainbow trout were observed spawning in upper Matilija Creek on 29 March 2001. Within the Ventura River, between the Shell Road Bridge and the Robles Diversion Dam, one steelhead redd was encountered on 30 March 2001. The redd was located approximately 100m upstream of the Foster Park Bridge. The redd was 2 m long, in gravel of 25 – 60 mm diameter, and in water of 40 cm depth.

## **Juvenile Sampling**

Rainbow trout sampling was conducted throughout the upper basin by means of electrofishing. The basin was divided into several reaches including:

1. Mainstem Matilija (reservoir to Murietta Canyon)
2. Mainstem Matilija (Murietta Canyon to impassible falls)
3. Mainstem Matilija (above falls)
4. Upper N. F. Matilija Below Falls
5. Upper N. F. Matilija Above Falls
6. Murietta Canyon Below Falls
7. Murietta Canyon Above Falls
8. North Fork Matilija Below Wheeler Gorge
9. North Fork Matilija Above Wheeler Gorge
10. Coyote Creek
11. Santa Ana Creek

The upper distribution of rainbow trout was encountered above the second falls on the Mainstem Matilija Creek. Scale samples were collected from all fish and age and growth analyses will be reported in the final report.

## **Otolith Microchemistry**

Otolith samples were collected from 6 mortalities collected during the above electrofishing surveys. Otolith microchemistry can be used to describe the chronology of

migration between freshwater and saltwater and identify maternal origin (steelhead or resident rainbow trout). See Zimmerman and Reeves (2000) and Zimmerman and Reeves (2002) for a description of methods. These methods are based on examination of elements (strontium and calcium) in the otolith. Generally, strontium is low in freshwaters and high in the ocean. Analysis is ongoing and will be reported in the final report.

### **Genetic Population Structure**

This work is not yet completed and is being done in collaboration with the Alaska Science Center (Jennifer Nielsen). Using nonlethal, molecular genetics techniques (mtDNA and micro-satellites), samples of fifty fish are being assayed from each of nine potential subpopulations, and compared with baseline data from southern steelhead and from hatchery populations of rainbow trout. We will test the hypothesis that distance upstream from road access and presence of high-gradient reaches downstream (i.e., increased “remoteness” or isolation from stocking locations) are negatively related to genetic contribution from hatchery trout.

During electrofishing surveys (described below) and during downstream migrant trapping (described below), fin clips will be collected from fish for analysis of mtDNA according to the methods of Nielsen et al. (1997). Results will be compared to the distribution of haplotypes in natural and hatchery populations throughout the distribution of steelhead and resident rainbow trout (Nielsen et al. 1994) to determine occurrence of non-native genotypes throughout the basin. Samples will be blocked according to location in basin and the presence of waterfalls.

Previous genetic sampling efforts in the Ventura River system have focused on analysis of haplotypes variation in the mtDNA control-region of juvenile fish from various locations in the basin. Nielsen et al. (19997) examined 32 juvenile fish from Matilija Creek and 3 samples from taxidermy-preserved adult steelhead captured in the Ventura River in the early 1940’s. Capelli (1997) reported mtDNA haplotypes of 9 juvenile *O. mykiss* collected downstream of the Robles Diversion Dam. California Department of Fish and Game collected 38 fish from the Upper North Fork Matilija Creek in 1999 (Maurice Cardenas, CDFG, personal communication). Five mtDNA

haplotypes have been identified in these studies. The dominant haplotype (MYS3) is one that is widespread in wild and hatchery populations throughout the California Coast. A haplotype (MYS5) that is more common in southern populations is also present.