State of California
The Resources Agency
Department of Fish and Wildlife

Angels Creek Fish Survey
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By

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Introduction

In an effort to get information on the age and growth rate of rainbow trout (*Oncorhynchus mykiss*) (RT) fishery of Angels Creek (Calaveras County), a fish survey was conducted on Nov 14, 2013. This data along with future efforts and data collected from other reservoirs will be used to monitor the status of this fishery which currently appears to have a productive RT fishery.

Location and Description

The headwaters of Angels Creek begin approximately 2 miles northeast of the city of Murphys in the Stanislaus River watershed and flows southwest through Angels Camp and into New Melones Reservoir. This watershed is located on the west slope of the Sierra Nevada mountain range in the central part of California. A large majority of the water in Angels Creek is regulated by Utica Power Authority for irrigation and hydroelectric energy production (Utica Power 2013). A portion of the water in Angles Creek entering New Melones Reservoir is treated wastewater from the City of Angels Wastewater Treatment Plant upstream. Figure one identifies the transect on Angels Creek sampled during this survey in relation to Angels Camp.

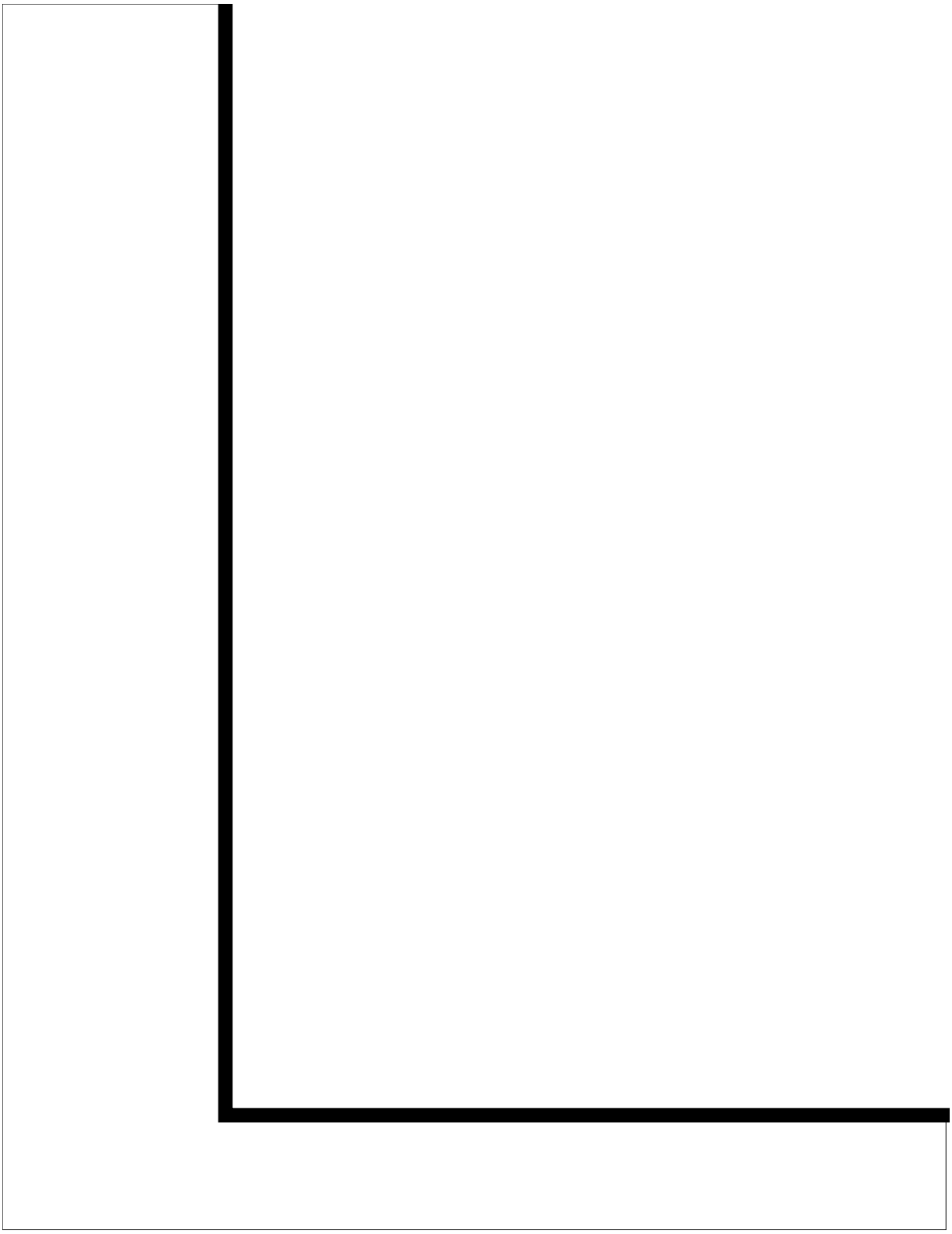


Figure 1. Map of Angels Creek in relation to Angels Camp.

Methods and Materials

In order to collect information on the growth rates of RT of a given age, the California Department of Fish and Wildlife (Department) needed to collect total lengths and scale samples from the lateral line area of RT. Collection of scale samples would be accomplished by a combination of angling and a Smith-Root LR-20B backpack electrofishing unit over a given amount of time. Any RT collected would be marked with a hole punch in the upper caudal fin in order to recognize newly captured RT from a previous collected RT.

The mean lengthand age ranges for any RT collected were recorded.

Figure 2. Electrofishing and angling transect for Angels Creek fish survey November 14, 2013.

Results

A total of 21 RT were collected using electrofishing and angling as methods of take (Figure 3) with no recaptures.

Figure 3. Rainbow trout collected using electrofishing at Angels Creek.

Average total length of RT collected was 399.6 mm (15.7 in.). Lengths ranged from 320 – 440 mm (12.6 – 17.3 in.) with the greatest number (n = 8) collected in the 400 mm (15.7 in) length class (Figure 4).

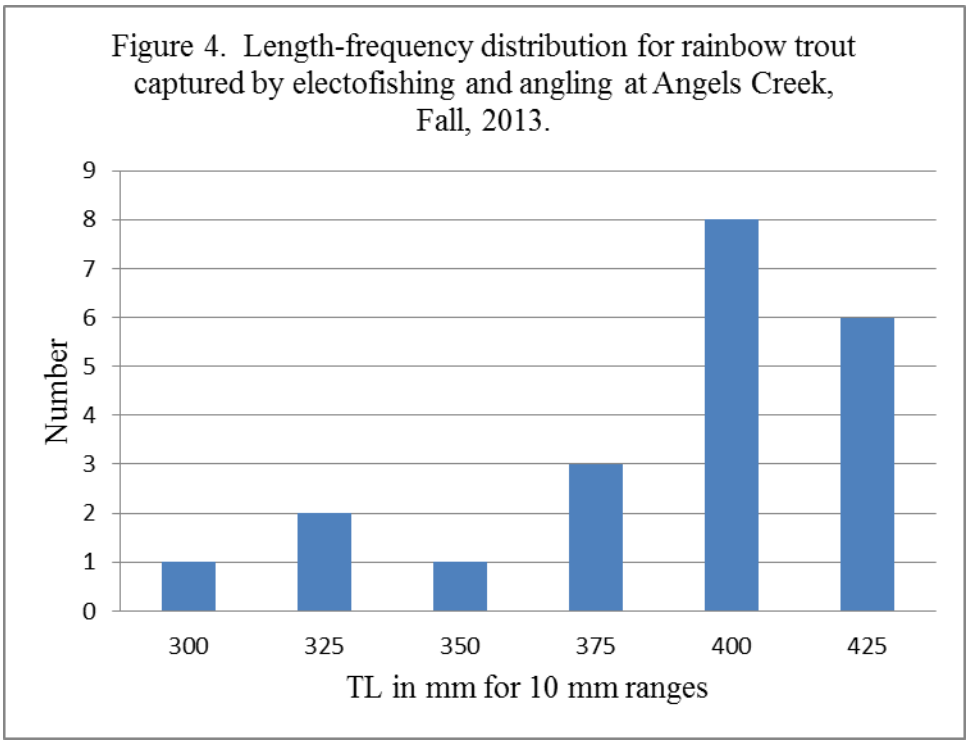


Table 1 summarizes the mean total length and ages read by scales (Figure 5) of RT collected by both sampling methods. Mean total length of these RT was 399.6 mm (15.7 in.). Mean age of these RT was 1.7 years of age. Total lengths ranged from 320 – 440 mm (12.6 – 17.3 in.).

Table 1. Mean total length and age for rainbow trout collected from hook and line angling and gillnet set by CDFW staff at Angels Creek (Calaveras County), November 14, 2013.

Species	Number	Mean total length (mm)	Mean Age (yrs)
Rainbow trout	21	399.6	1.7

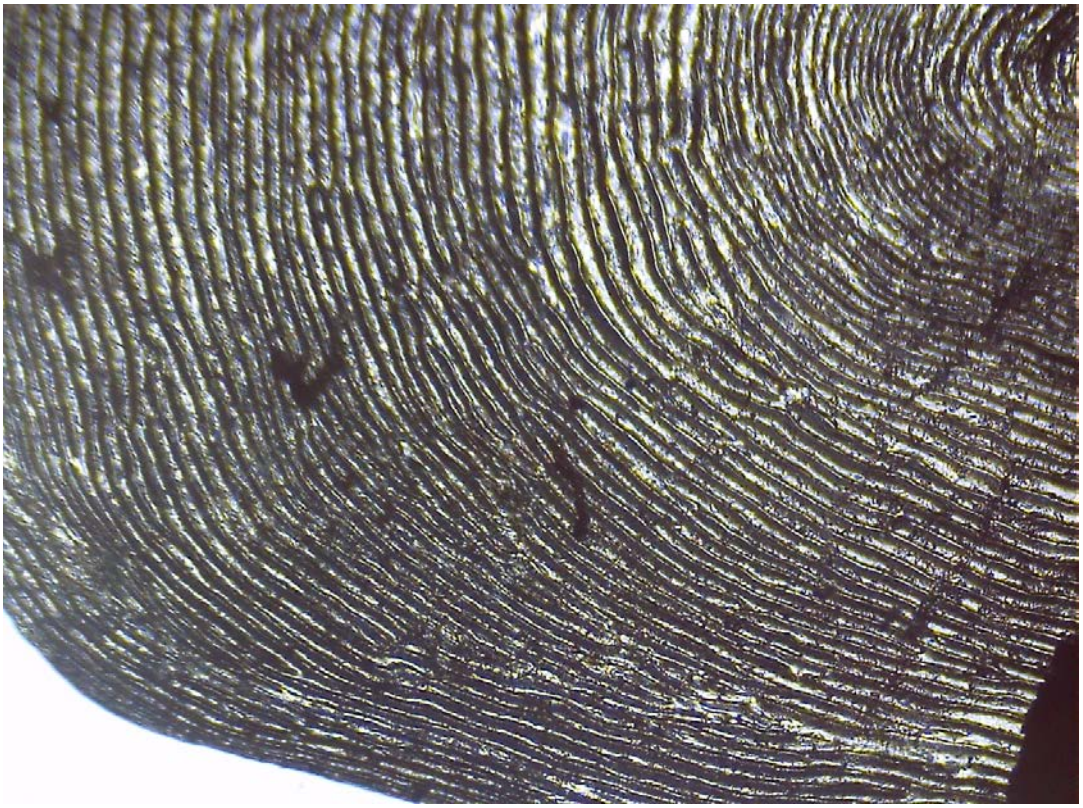
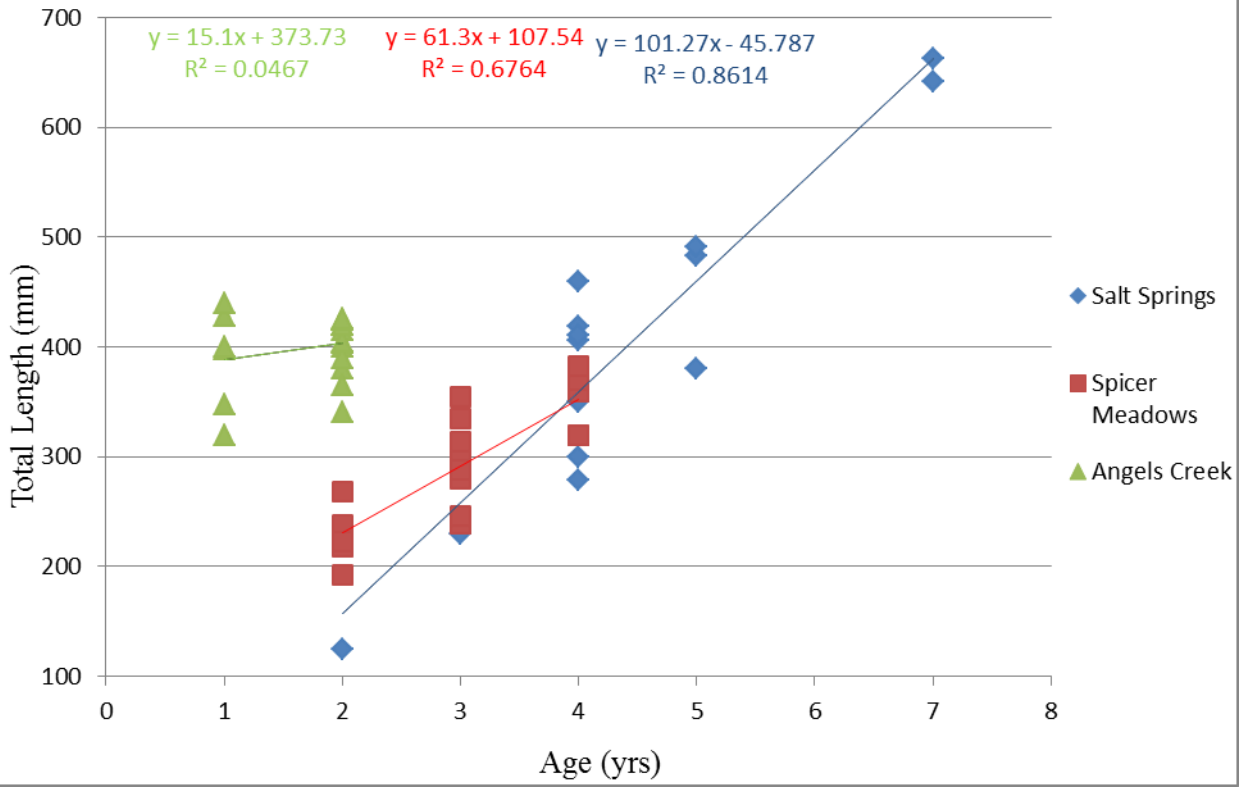


Figure 5. Scale sample taken from RT collected from Angels Creek, Nov. 14, 2013.

Figure six presents an age/length comparison with regression line for RT from Angels Creek, New Spicer Meadow Reservoir (Alpine County) and Salt Springs Reservoir (Amador County).

Figure 6. Rainbow trout age/length comparison between Salt Springs Reservoir, Spicer Meadows Reservoir, and Angels Creek.



Conclusions

With only 21 samples collected and an R^2 value of 0.05, determining an age from a given total length is not reliable for Angels Creek. At the time of the survey, Angels Creek was flowing at approximately 28 cubic feet per second (cfs) (Utica Power 2013) which made it difficult to net all the trout that were shocked. Having more RT to age could have increased our R^2 value for Angels Creek. Conducting another pass through the same area and additional surveys through angling and gillnetting would have likely yielded more RT. In comparison, although there was a limited number of RT collected for New Spicer Meadow (Spicer) (n=19) and Salt Springs Reservoir (Salt Springs) (n=14), Spicer had a R^2 value of 0.67 and Salt Springs had a R^2 value of 0.86. With the high R^2 value at Salt Springs, estimating the age of a RT is reliable if given a specific total length. RT at Angels Creek appear to reach greater total lengths than Spicer or Salt Springs in their first two years of age (Figure 6). Having more RT from Angels Creek in older age classes and greater lengths would have made comparing growth rates to the other waterbodies more reliable.

From January – March, the Department plants half pound (10 – 12 in.) and three-quarter pound (13 – 16 in.) RT into New Melones Reservoir in which Angels Creek is a tributary to (CDFW Pers. Comm.). According to Department staff, these RT are approximately 15- 19 months of age. The large amount of eggs (food) available in Angels Creek in November due to kokanee salmon (*Oncorhynchus nerka*) spawning, the timing of these RT to be in Angels Creek, and extremely high growth rate, it is possible that a proportion of the fish collected were hatchery-raised. The Department might measure RT at Moccasin Hatchery in 2014 to compare the age and length of their fish to the fish collected in this survey from Angels Creek. The information gained will be summarized in a report.

The growth rates of Angels Creek after two years of age cannot be determined or compared to Spicer and Salt Springs due to the absence of RT aged three years and older.

Since 2011, the Department has stocked New Melones Reservoir with thousands of half-pound to three-quarter pound RT every year. From the number of RT collected during this survey in a New Melones Reservoir tributary and speaking with anglers that have fished New Melones for many years and keep coming back, the stocking program appears to be working well.

References

Moyle, P. 2002. Inland Fishes of California. University of California Press, Berkeley and Los Angeles, California. Pg. 278.

Utica Power and Authority. 2013. Angels Creek at Wastewater Treatment Plant. Daily Discharge in Cubic Feet Per Second. Unpublished.