Summary Report

Little Rock Creek Trout Removal Project

(per Section 6 Grant E-2-F-21)

California Department of Fish & Game
Tim E. Hovey
Associate Fisheries Biologist
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Overview

Mountain yellow-legged frogs (*Rana muscosa* and *R. sierrae*) are found in southern California and high elevation lakes and streams in the Sierra Nevada. Populations of this frog have been drastically declining throughout California since the late 1960s (Bradford et al. 1994; Stebbins and Cohen 1997; Knapp and Matthews 2000, Vredenberg et al. 2007). Historically, close to 100 populations were documented in Southern California. In 2002 the species was federally listed as endangered in southern California, and eight populations were detected in 2005. These are: Bear Gulch, Devil's Canyon, Little Rock Creek, South Fork Big Rock Creek and Vincent Gulch (Angeles National Forest) and East Fork City Creek, Fuller Mill Creek and Dark Canyon (San Bernardino National Forest). Causes of these declines include non-native predators, loss and alteration of habitat, and a highly contagious fungal infection that results in chytridiomycosis, an often fatal condition in amphibians.

The U.S. Forest Service (USFS), U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), and California Department of Parks and Recreation (CDPR) are the agencies responsible for the management of the mountain yellow-legged frog (MYLF) and its habitat in southern California. In response to the decline and the idea that planted trout may be negatively impacting MYLF populations, all involved agencies initiated a program where stocked trout were actively removed from creeks also inhabited by the endangered MYLF. The CDFG also ceased trout stocking in eight locations in southern California where trout may negatively impact MYLF.

Summary

Of the eight remaining MYLF populations in southern California, the Little Rock Creek population was chosen as the pilot drainage for the trout removal program. Due to its exceptionally small remaining population of MYLF located at the headwaters, an existing population of wild trout located downstream of the frogs, and its isolated location, the agency consensus was that trout removal efforts should start in this drainage. Fish removal efforts began in 2002 and have continued through 2007. To date, fish removal efforts in Little Rock Creek have been accomplished through Section 6 funding (2002 and 2003) and agency volunteers (2004-2007).

In 2001, the USFS in cooperation with USFWS and CDFG, constructed a fish barrier on Little Rock Creek, approximately 1.5 km below the MYLF population. This barrier was put in place to preclude upstream migration of wild trout. A natural barrier is located on the creek approximately 1 km above the constructed barrier and below the MLYF population. This natural barrier has effectively blocked upstream migration of wild trout and eliminated direct impacts on MYLF by trout. Trout occupying the creek section between the two barriers are essentially trapped. This section, termed the removal reach, is where CDFG has been performing annual fish removal since 2002. It is believed that MYLF will in time extend their downstream range once the trout have been removed.

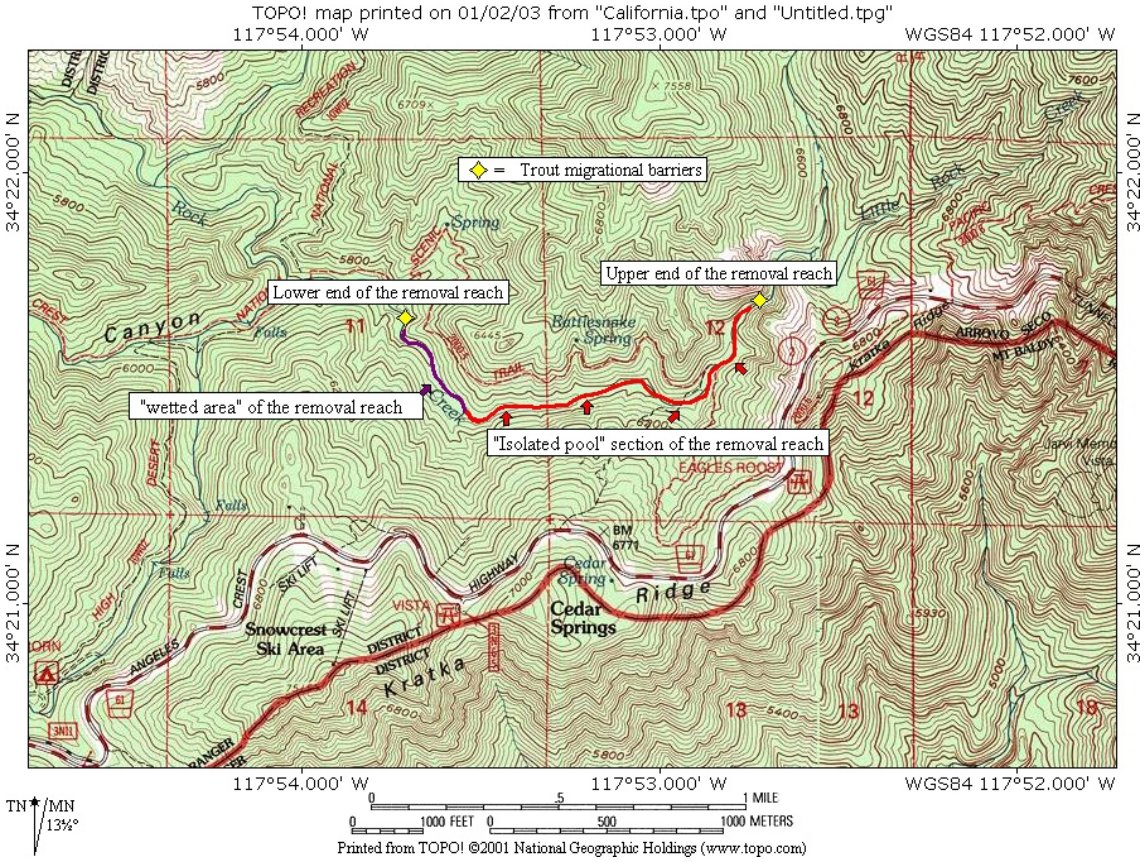
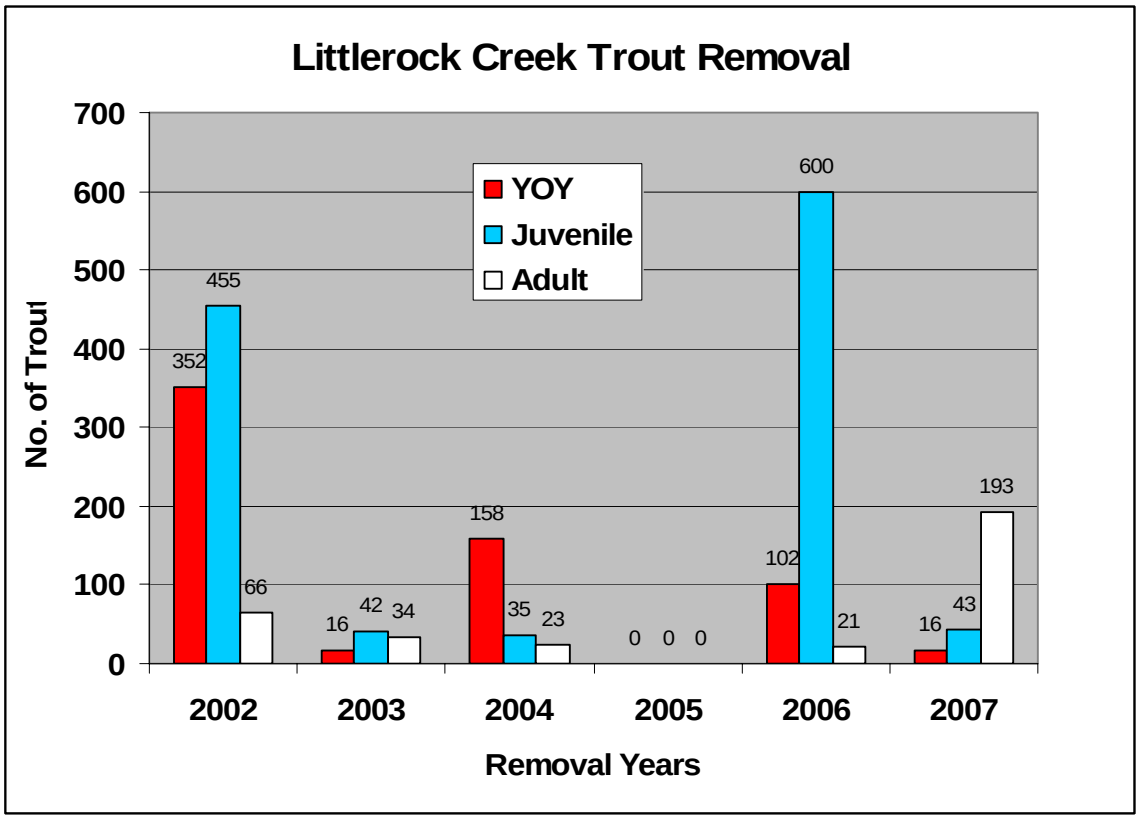


Figure 1. Overview of removal reach and trout migration barriers.

Trout removal on the creek is conducted using two 12-v Smith-Root back pack electro-shockers, two netters per shocker, two data collectors and two equipment carriers. The removal effort is conducted during late summer to early fall when creek flows are at their lowest. During this period portions of the creek are reduced to isolated pools, concentrating trout, facilitating collection. However, large amounts of accumulated detritus and willow leaves also drop into the creek during this time, making observing and collecting smaller fish difficult. It is the belief of the field crew that many smaller fish go undetected under this debris during the electro-shocking and that conducting trout removal during the low water period, prior to the leaves dropping would yield better results.

Trout removal began in 2002 and has continued annually until 2007. No fish collection was made in 2005 due to an exceptionally high water year precluding safe creek access. Collected fish were categorized into three size classes; YOY (young of the year), juveniles (first year fish) and adults. All fish were counted and buried at the end of each day. At least two, if not three electro-shocking passes were conducted in the removal reach during each two-day survey. A complete table of size classes and trout numbers is included in Figure 2.



	2002	2003	2004	2005	2006	2007
YOY	352	16	158	N/A	102	16
Juvenile	455	42	35	N/A	600	43
Adult	66	34	23	N/A	21	193
Total	873	92	216	N/A	723	252
Sample Month	October	October	October	N/A	October	August

Figure 2. Bar Graph and table showing sample years, trout sizes and the number of trout collected. (No sampling was conducted during 2005.)

Conclusions/Recommendations

In 2007 the removal efforts were shifted from a fall survey (October), when water levels in the creek were routinely low, to a late summer survey (August), due to an exceptionally dry year. Since the removal effort began on Little Rock Creek in 2002, survey crews have had to deal with leaves floating on the surface of standing water during the fall survey period. This obscures the view of the collectors and it is thought that many YOY and sub-adult fish go undetected during removal surveys. Since no survey data were collected in 2005, we will not know until 2008 if shifting the removal efforts to late summer resulted in a higher number of small to medium sized trout collected. However, the 2007 data strongly suggests that many sub-adult fish were missed during the 2006 collection period, resulting in a high number of adults collected the following year.

USGS has conducted annual surveys of the removal reach. Downstream MYLF re-colonization over the six-year trout removal period has been slow. A single, recently-metamorphosed MYLF detected by USGS surveyors in 2006 was the first sign of frog recruitment in the removal reach (Hitchcock et al. 2006). In 2007, however, USGS surveyors found more frogs (~7) in the removal reach (Schuster et al. 2007). Given the difficulty experienced removing trout entirely, one explanation for the slow frog recruitment, is that until the 2006 removal effort, trout had not been entirely eliminated from the upper half of the reach. The small, natural barrier about half way into the removal reach, in combination with low rainfall in 2006, precluded any upstream movement of fish beyond that point. During the very end of the 2006 MYLF season and throughout the 2007 MYLF season, the frogs began to occupy this upper half of the removal reach. In 2007, fish were removed from the lower half of the removal reach. If, in fact, all fish have been eliminated, continued frog recruitment into the entire removal reach should follow, including egg masses.

It appears that if trout removal continues, as necessary, during low water periods and prior to fall, fish can be eliminated from the removal reach using the current survey methods (electro-shocking). Continued monitoring of frog recruitment and fish presence/absence is necessary to determine the long-term efficacy and benefit of trout removals to MYLF in Little Rock Creek.

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