

Memorandum

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Cc: Region 2 Fish Files

Subject: Native amphibian monitoring in Middle Creek, El Dorado County.

INTRODUCTION

Middle Creek contains one of the lowest elevation Sierra Nevada Yellow-legged Frog (SNYLF; *Rana sierrae*) populations in California Department of Fish and Wildlife (CDFW) Region 2. The population is isolated from other known SNYLF populations, the closest of which are in the southern Desolation Wilderness (to the northeast) and northeastern Amador County (to the southeast). The low elevation distribution, isolation, and potential for decline make this population of interest to CDFW.

ENVIRONMENTAL SETTING

Middle Creek is a small, perennial tributary to the Silver Fork American River in El Dorado County near Kyburz, California. SNYLF are located along a 1.2-kilometer reach of stream between 5100 and 5400 feet elevation (Figure 1). In 1994, USGS located this SNYLF population, after which CDFW began monitoring the area in 2002. Eldorado National Forest manages the land. Much of land surrounding the site burned in the 1970's (G. Elliott, pers. comm., 2012). Cattle formerly grazed on the land (G. Elliot, pers. comm., 2012), and remnants of a cattle enclosure (iron T-bars, barbed wire fencing) are still present along portions of the site.

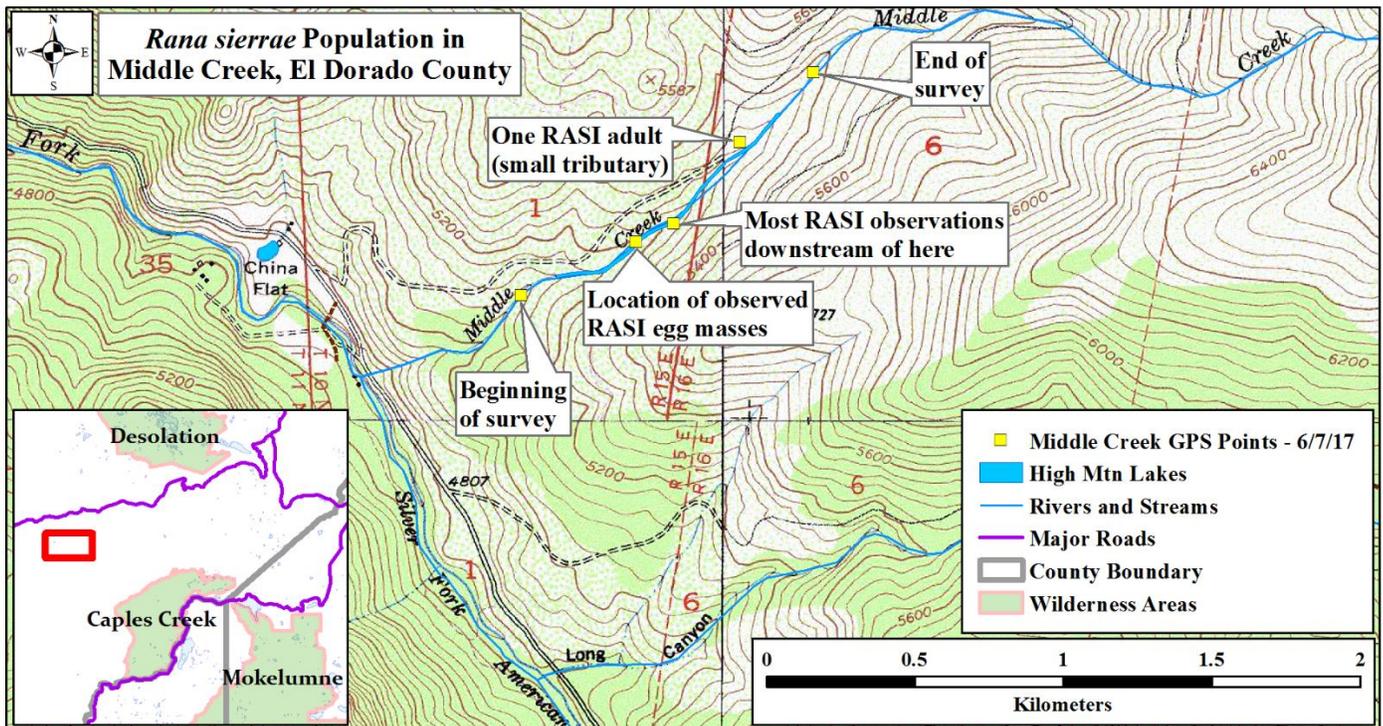


Figure 1: Location of Middle Creek SNYLF population in El Dorado County.

THREATS

- **Disease** – All SNYLF populations in Eldorado County are positive for amphibian chytrid fungus (*Batrachochytrium dendrobatidis*, *Bd*). Middle Creek was genetically sampled by epithelial swabs for the presence of *Bd* in 2008 and 2010. Results from both samples detected light to moderate *Bd* DNA loads.
- **Marginal Habitats** – This frog population is persisting in a small perennial stream (Figures 2–5). Any disturbance that threatens overwintering habitats presents a potential extirpation risk. Among the risks to this population are habitat disturbance by humans, wildfire, exposure to severe winter conditions, and drought/desiccation, any of which could eliminate the population. No additional deep-water habitat is known to exist near this population.
- **Introduced Fish** – Middle Creek is fishless and natural fish barriers prevent upstream passage into Middle Creek from Silver Fork American River. However, downstream fish presence prevents SNYLF from expanding into additional, more persistent habitat in the Silver Fork American River. Being isolated in their current location increases the probability of extirpation from stochastic events. In addition, Silver Fork may act as a population sink for dispersing post-metamorphic SNYLF.



Figure 2: Middle Creek, looking downstream at the bottom of the surveyed reach. An adult SNYLF is on the top right of the boulder. (CDFW 2017)

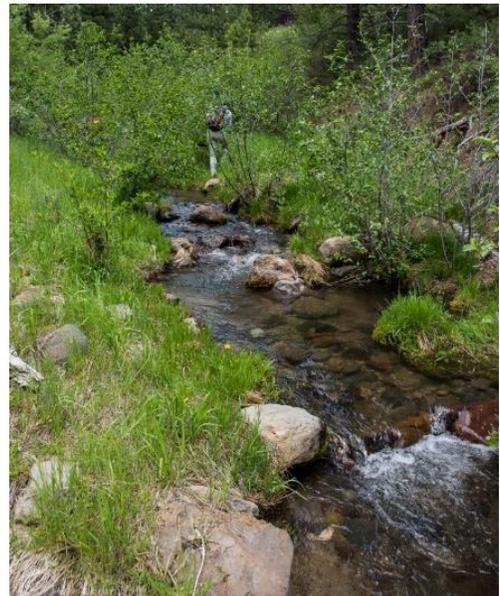


Figure 3: A section of Middle Creek about half way up the surveyed reach. (CDFW 2017)

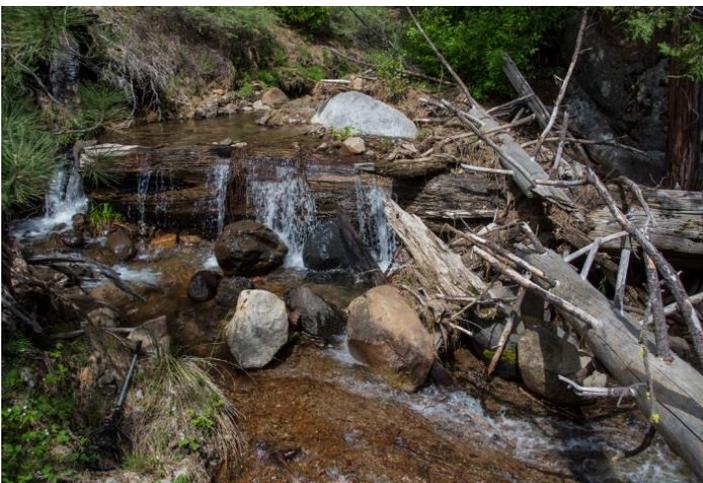


Figure 4: A small barrier located at the top of the Middle Creek site polygon, looking upstream. (CDFW 2017)

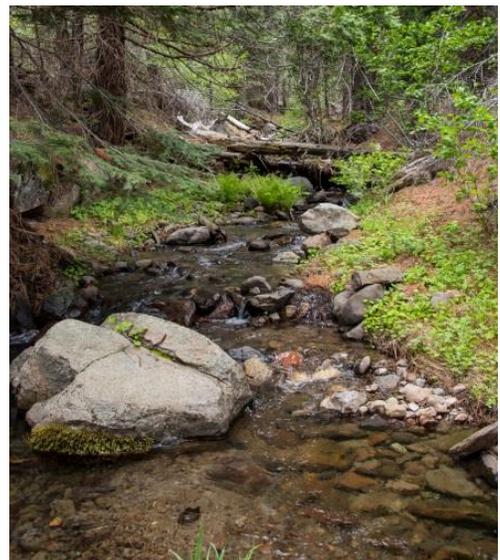


Figure 5: Upper end of the surveyed portion of Middle Creek (upstream of the barrier in Figure 4). (CDFW 2017)

POPULATION STATUS AND DISCUSSION

Fifteen years of monitoring data suggest this population may be declining (Figure 6). However, the low number of adults detected makes it difficult to derive trends. Visual encounter surveys (VES) have consistently revealed a small number of detections. Results from 2017 suggest that this population is small, but persisting. For example, the survey crew observed more adults in 2017 than have been observed in over a decade. However, one potential concern is that crews detected almost no larval SNYLF in 2017. There are many possible explanations for the low larval detections, including: 1) limited reproductive success during the 2012-2016 drought (at several points during the drought, it is likely that very little aquatic habitat remained in Middle Creek), 2) low visibility from relatively high stream flows (winter-spring 2016-2017 was a historically high precipitation year), larvae possibly being swept downstream during high spring flows, and 4) observer bias.

An encouraging observation during the 2017 survey was the detection of five SNYLF egg masses (Figures 7 and 8). Observers found all egg masses in one location: in willow roots at the edge of the stream channel, in an area protected from higher stream flows. Given limited visibility caused by thick in-stream vegetation and riffles, it is likely the survey crew did not detect additional egg masses and SNYLF larvae that were present. This is the first year since 2011 that there has been substantial precipitation, so the egg masses are a promising indication that the population is persisting despite extremely variable conditions over the past five years.

CDFW will continue to monitor this population until a restoration opportunity arises, the population disappears, or the population grows to a size where it is no longer in imminent danger of extirpation.

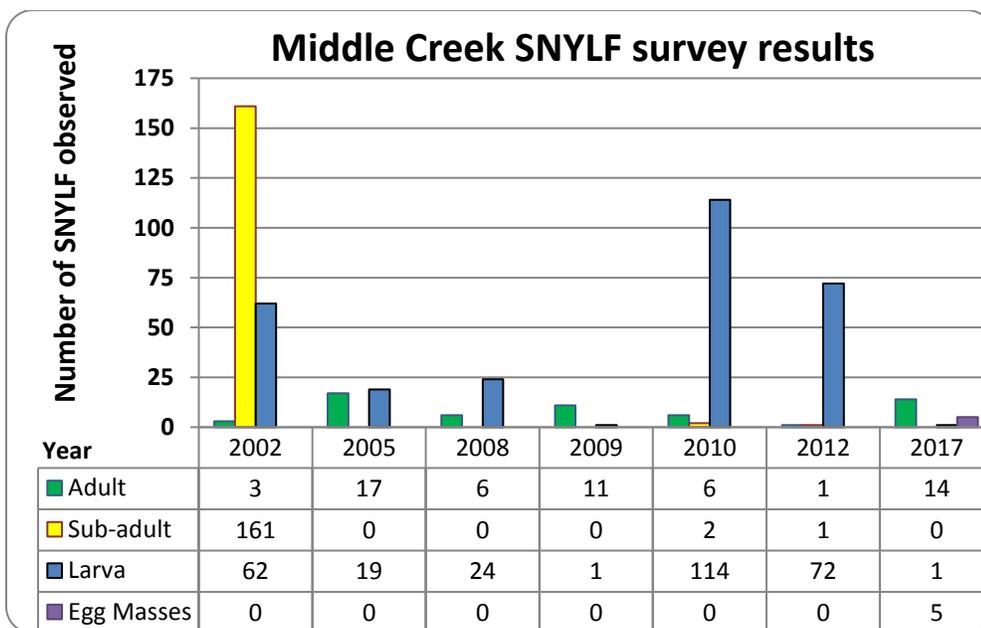


Figure 6. VES Data by life stage at Middle Creek from 2002 to 2017.



Figure 7. Up close view of SNYLF egg mass observed by CDFW personnel on 7 June 2017. (CDFW 2017)



Figure 8. Location of five SNYLF egg masses in Middle Creek observed on 7 June 2017. Approximate location off egg masses is shown in Figure 1. (CDFW 2017)

CITED

Elliott, G. 2012. Personal communication with S. Mussulman (CDFW), December 30, 2012.

APPENDIX

Photos of adult *Rana sierrae* observed in Middle Creek on 7 June 2017. Photos by Isaac Chellman (CDFW).

