

# Memorandum

Date: 4/18/2018

To: Sarah Mussulman  
Senior Environmental Scientist  
Sierra Fisheries Supervisor  
North Central Region

From: Isaac Chellman  
Environmental Scientist  
High Mountain Lakes  
North Central Region

Ec: CDFW Document Library

Cc: Region 2 Fish Files

**Subject: Native amphibian monitoring in Bark Shanty Creek, El Dorado County.**

## INTRODUCTION

Bark Shanty Creek may contain 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 known extant SNYLF population closest to Bark Shanty Creek is located in Middle Creek (Chellman 2017), which is north of Silver Fork Road, about 4 kilometers (km) southeast of Kyburz, CA. SNYLF sightings have been documented in Bark Shanty Creek, but no known sightings have occurred since 1993 (CNDDDB 2017). The low elevation distribution, isolation, and potential for extirpation make the Bark Shanty Creek SNYLF population of interest to CDFW.

## ENVIRONMENTAL SETTING

Bark Shanty Creek is a perennial tributary to the Silver Fork American River in El Dorado County, located between Long Canyon Creek (to the north) and Caples Creek (to the south). In the past, SNYLF were observed near the headwaters of Bark Shanty Creek (CNDDDB 2017; Figure 1). The section surveyed for this report is a 2-km reach between 6,500 and 7,050 feet elevation (Figure 1). CDFW has not previously monitored this area for native amphibians. Eldorado National Forest (USFS) manages Bark Shanty Creek and the surrounding land. Sierra Pacific Industries clearcut several parcels of land near the beginning of the survey reach in the early 2000's (BIOS 2018).

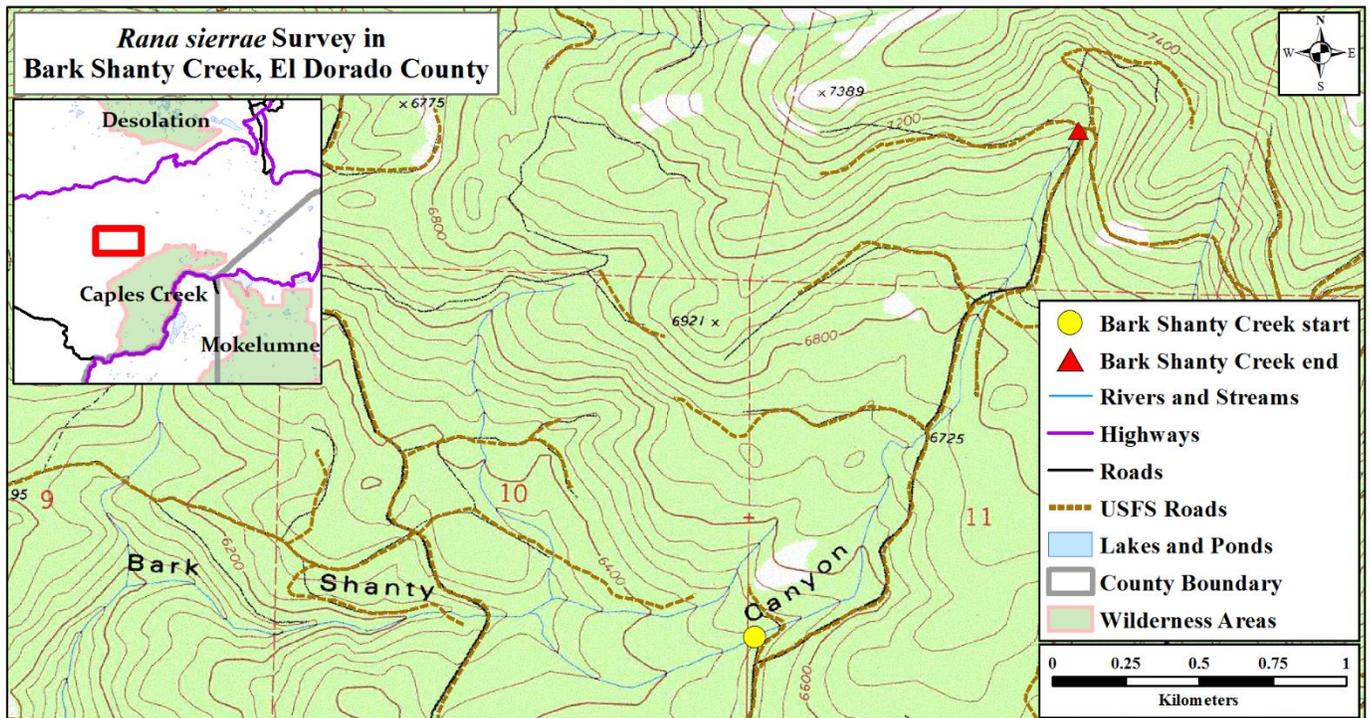


Figure 1: Location of Bark Shanty Creek stream segment surveyed in El Dorado County on 22 June 2017.

## THREATS

- **Isolation** – Limited recruitment, resulting in small population size, increases the risk of SNYLF extirpation in Bark Shanty Creek. Isolation from other SNYLF populations further increases extirpation risk. Smaller populations are at much greater risk to threats from predation, stochastic events (e.g., drought and floods), genetic drift, inbreeding depression, and increased chance of lower effective population size (Mills 2007, Frankham et al. 2009).
- **Disease** – All known SNYLF populations in Eldorado County are positive for amphibian chytrid fungus (*Batrachochytrium dendrobatidis*, *Bd*). It is likely that any SNYLF still present in Bark Shanty Creek are *Bd* positive.
- **Land Use Change** – This frog population, if still present, occurs in a relatively small perennial stream (Figures 2 and 3). Any disturbance that threatens breeding and/or overwintering habitats presents a potential extirpation risk. Among the habitat-associated risks to this population are 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.



Figure 2: Bark Shanty Creek, looking upstream, close to the bottom of the surveyed reach. (CDFW 2017)



Figure 3: Bark Shanty Creek, looking upstream, at the end of the surveyed segment. (CDFW 2017)

## POPULATION STATUS AND DISCUSSION

Results from this survey are inconclusive regarding SNYLF population status in Bark Shanty Creek. No SNYLF were detected during approximately five hours of visual encounter surveying (VES) undertaken by two people on 22 June 2017. Previous VES efforts (about which few details are available in CNDDDB [2017]) reveal a small number of adults ( $n = 2$ ) and tadpoles ( $n = 18$ ) detected in July 1993. With such a small population, there is a low probability of detecting the likely few individuals that may still be present. Environmental conditions, observer bias, and random chance may explain why CDFW crews did not detect any SNYLF. However, given the historically small number of SNYLF observed, and nearly 25 years having passed since the most recent positive detections, it is likely that the Bark Shanty Creek SNYLF population is extirpated.

Following five years of drought (2012–2016; NOAA 2016, Swain 2017), and then a record-breaking precipitation year (2016–2017; NOAA 2017), the SNYLF population may have succumbed to predation (e.g., being concentrated into smaller remaining aquatic areas during the drought may have increased exposure to predators), lack of recruitment (e.g., due to the drying of limited breeding habitat), flood-induced mortality during heavy spring runoff in early 2017, or some other factor. If the SNYLF population size in Bark Shanty Creek was very small, as suggested by the previous VES data, then chances are greater that this population may have been extirpating through stochastic events.

Another possibility is that a small SNYLF population is extant in Bark Shanty Creek, but located in section of creek that CDFW and USFS crews have not surveyed. Efforts should be undertaken to coordinate with the USFS to conduct VES efforts in areas of Bark Shanty Creek further downstream. Surveying additional areas in a different time period may result in SNYLF detections.

## LITERATURE CITED

Biogeographic Information and Observation System (BIOS). 2018. Version 5.62.14. Data accessed in March 2018.

<https://map.dfg.ca.gov/bios/>

California Natural Diversity Database (CNDDDB). 2017. GIS geodatabase dated 3 Nov 2017. Stored in the California Department of Fish and Wildlife GIS Library.

Chellman, I. 2017. Native amphibian monitoring in Middle Creek, El Dorado County. California Department of Fish and Wildlife (CDFW). Available from: <http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=146699>

Frankham, R., J. D. Ballou, and D. A. Briscoe. 2009. Introduction to conservation genetics. Cambridge University Press, New York, NY, USA.

Mills, L. S. 2007 Conservation of wildlife populations: demography, genetics, and management. Blackwell Publishing, Malden, MA, USA.

NOAA 2016. Accessed on 22 Nov 2017. <https://www.ncdc.noaa.gov/sotc/drought/201613>.

NOAA 2017. Accessed on 22 Nov 2017. <https://www.climate.gov/news-features/featured-images/very-wet-2017-water-year-ends-california>

Swain, D. 2017. Weather West blog. Accessed on 22 Nov 2017. <http://weatherwest.com/archives/tag/california-drought>