

## Memorandum

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

### INTRODUCTION

Alder 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 Alder 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 Alder Creek, but no known sightings have occurred since 2009 (CNDDDB 2017). The low elevation distribution, isolation, and potential for extirpation make the Alder Creek SNYLF population of interest to CDFW.

### ENVIRONMENTAL SETTING

Alder Creek is a perennial tributary to the South Fork American River in El Dorado County, just north of Mormon Emigrant Trail, between Iron Mountain (to the west) and Alder Ridge (to the east). In the past, SNYLF were observed in a section of Alder Creek near FS Road 11N46 (CNDDDB 2017; Figure 1). The section surveyed for this report is a 1.5-km reach between 5,580 and 5,730 feet elevation (Figure 1). CDFW field crews also surveyed another small tributary segment that flows into Alder Creek from the south (Figure 1). The first known SNYLF observations documented in Alder Creek are from 1993 (CNDDDB 2017). CDFW has not previously monitored this area for native amphibians. Eldorado National Forest (USFS) manages the land, and Sierra Pacific Industries (SPI) owns a section of the land surrounding Alder Creek west of road 11N46. The land surrounding the site has been logged and cattle grazed in the past (CNDDDB 2017).

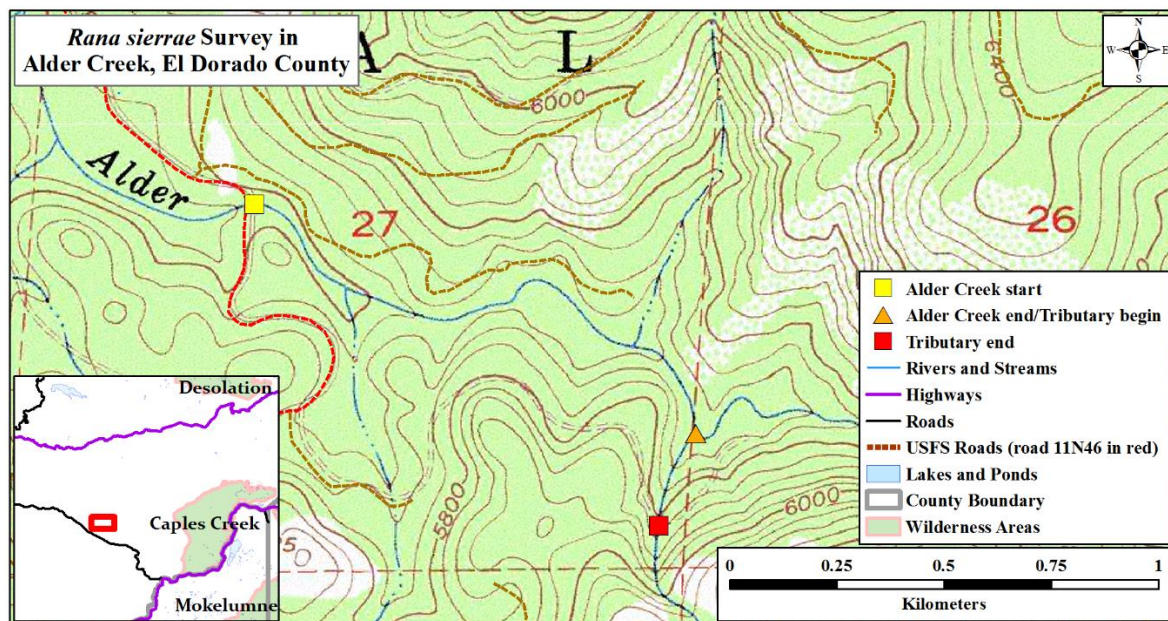


Figure 1: Location of Alder Creek and tributary stream segments surveyed in El Dorado County on 29 June 2017. Sections of Alder Creek west of USFS road 11N46 are owned by Sierra Pacific Industries.

## THREATS

- **Introduced Fish** – Alder Creek contains trout, which were observed visually during the survey on 29 June 2017. All trout appeared to be Rainbow Trout (RT; *Oncorhynchus mykiss*). Trout readily consume larval and young post-metamorphic SNYLF (Needham and Vestal 1938, Bradford 1989, Vredenberg 2004). Therefore, the presence of trout in Alder Creek highly restricts the locations in which SNYLF can successfully breed. With limited predator-free breeding habitat available, SNYLF recruitment is likely very limited in Alder Creek.
- **Isolation** – Limited recruitment, resulting in small population size, increases the risk of SNYLF extirpation in Alder 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 El Dorado County are positive for amphibian chytrid fungus (*Batrachochytrium dendrobatidis*, *Bd*). It is likely that any SNYLF still present in Alder Creek are *Bd* positive.
- **Land Use Change** – This frog population, if still present, occurs in a relatively small perennial stream (Figures 2–4). 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: Alder Creek, looking upstream, close to the bottom of the surveyed reach. (CDFW 2017)

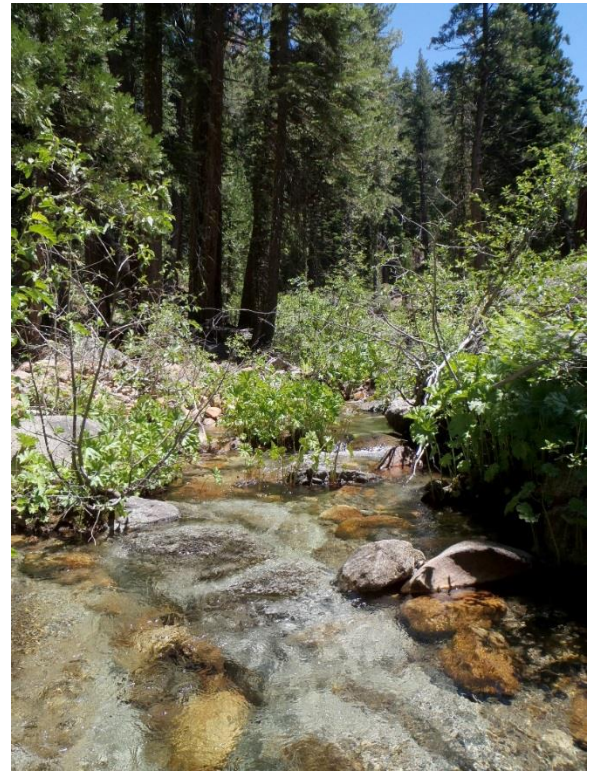


Figure 3: A section of Alder Creek about half way up the surveyed reach. (CDFW 2017)





Figure 4. Alder Creek, looking upstream, close to the top of the surveyed reach. (CDFW 2017)

#### POPULATION STATUS AND DISCUSSION

Results from this survey are inconclusive regarding SNYLF population status in Alder Creek. No SNYLF were detected during approximately two hours of visual encounter surveying (VES) undertaken by four people on 29 June 2017. Previous VES efforts (about which few details are available in CNDDDB [2017]) between the early 1990's and late 2000's reveal a consistent, very small number of adults detected somewhere in the vicinity of USFS road 11N46. 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 no SNYLF were detected.

It is possible that the SNYLF population in Alder Creek is extirpated. Following five years of drought (2012–2016; NOAA 2016, Swain 2017), and then a record-breaking precipitation year (winter 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 2016–2017), or some other factor. If the SNYLF population size in Alder Creek is very small, as suggested by the previous VES data, then the chances are greater that this population may have been extirpating through stochastic events.

Another possibility is that the SNYLF population in Alder Creek is extant, but the area in which frogs have been previously detected was not surveyed. Much of the SNYLF locality polygon in CNDDDB is downstream of USFS road 11N46. However, the stream segment downstream of road 11N46 was not surveyed on 29 June 2017 because a portion of the land is owned by SPI. Efforts should be undertaken to coordinate with the USFS and SPI to conduct VES efforts downstream of the road. Surveying additional areas in a different time period (e.g., later in the summer) may result in SNYLF detections.

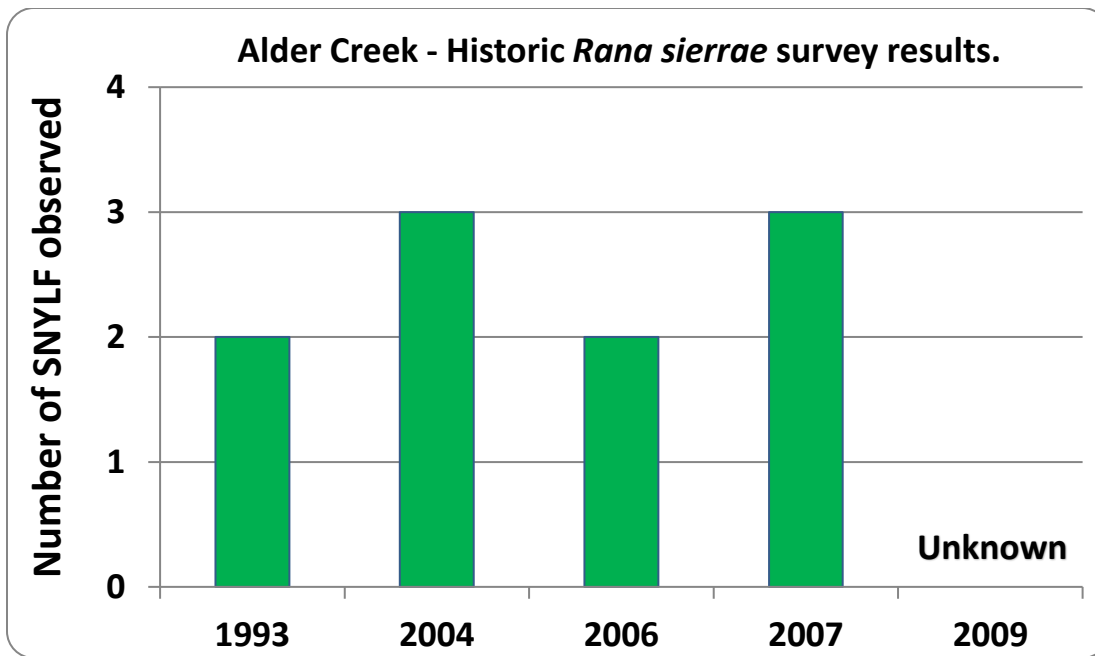


Figure 5. VES data for Alder Creek collected between 1993 and 2009. Data obtained from the California Natural Diversity Database (CNDDDB 2017). Adults were observed in 2009, but the number of frogs seen was not documented. The agencies responsible for data collection were not provided in the database, so the source of survey data is unknown, but likely USFS and/or U.S. Geological Survey.

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