

State of California

Memorandum

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Cc: Region 2 Fish Files

Subject: Native amphibian restoration and monitoring in Bucks Lake Wilderness.

Part 1: Gold Lake fish removal and Rock Lake *Rana sierrae* monitoring.

Part 2: *Rana sierrae* population monitoring at the Mount Pleasant population.

ENVIRONMENTAL SETTING:

Bucks Lake Wilderness is a small wilderness area in western Plumas County consisting of 9695 hectares south of Interstate 70 and north of Bucks Lake Reservoir. The Pacific Crest Trail bisects the wilderness from north to south and elevations in the area range from around 2,400 feet (730 m) above mean sea level near the northern border along the Feather River to 7,067 feet (2,154 m) at the summit of Mount Pleasant. CDFW crews observed two Sierra Nevada Yellow-legged frog (*Rana sierrae*, SNYLF) populations in Bucks Lake Wilderness while conducting baseline surveys in 2003 and 2004. One SNYLF population is located south of Silver Lake at Rock Lake; the second population persists in two unnamed ponds southeast of Mount Pleasant (Figure 1).

THREATS

- Introduced Fish – Gold Lake contains a self-sustaining brook trout population and adult SNYLF have been observed in its tributaries. Trout may be precluding SNYLF from successful tadpole rearing in Gold Lake, which is the only additional deep water habitat near the breeding SNYLF site at Rock Lake. Furthermore, dace (*Rhinichthys spp.*) are present in both Gold Lake the lower sites of the Mount Pleasant SNYLF population. Little information is available regarding the impact of small fish like dace on SNYLF but they may impact smaller life stages of SNYLF like eggs and larvae.
- Disease – All SNYLF populations in Plumas County are chytrid fungus, *Batrachochytrium dendrobatidis*, (Bd) positive. In 2008, 2010 and 2011 Rock Lake and unnamed sites 12049 and 12052 were genetically sampled by epithelial swabs for the presence of Bd. A total of 27 swabs were collected and results for all three years indicate light to very light Bd DNA loads at all sites.
- Marginal Habitats – These frog populations are persisting in Rock Lake, which is small, isolated and has a maximum recorded depth of 3.9 meters, and three small ponds and their tributaries. Any disturbance, natural or otherwise, that threatens overwintering habitats presents a potential extirpation risk. Among the risks to the population are habitat disturbance by humans and possible exposure to severe winter conditions or desiccation that could eliminate the population.

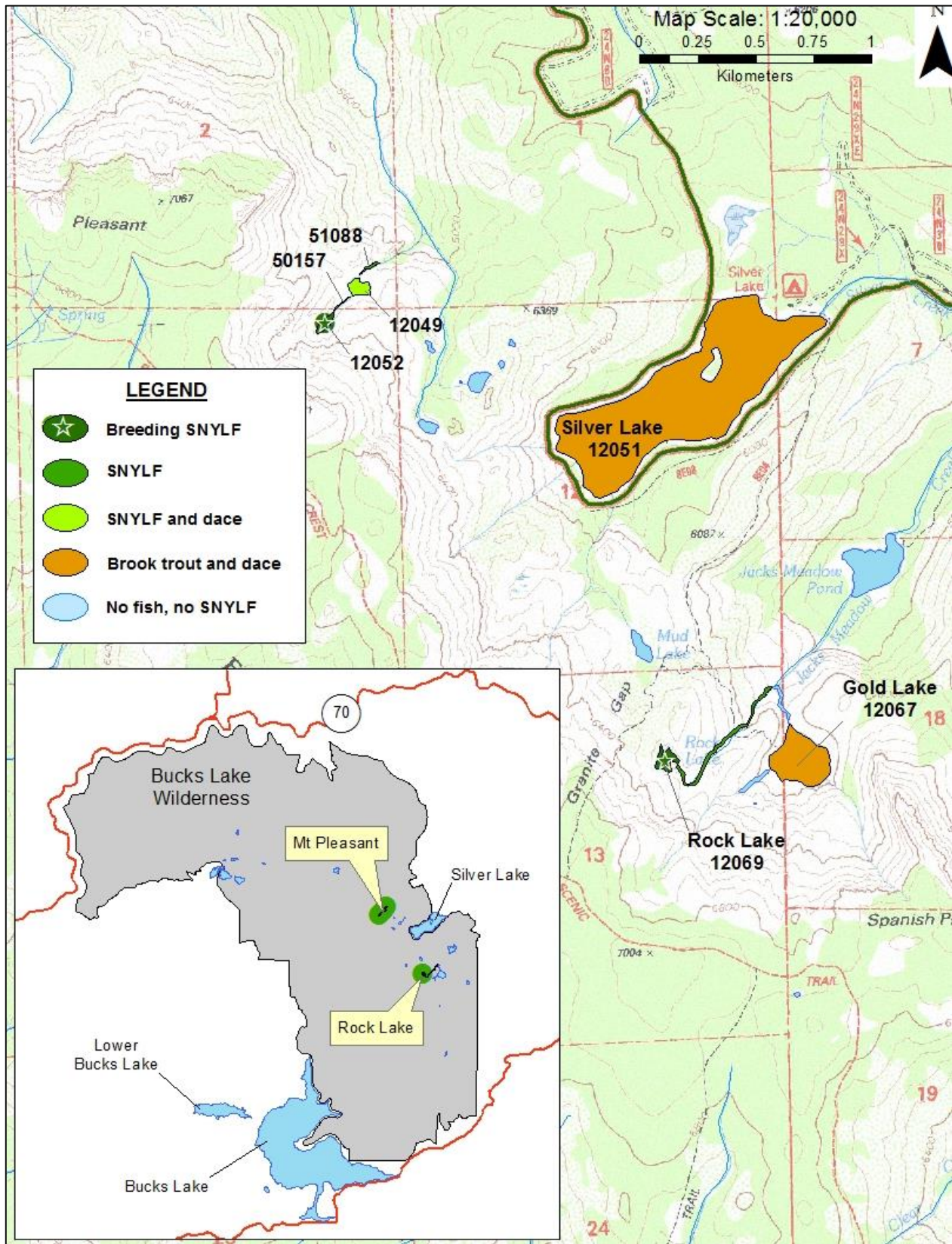


Figure 1: Locations of SNYLF populations in Bucks Lake Wilderness.

Part 1: Gold Lake fish removal and Rock Lake *Rana sierrae* monitoring.

Surveyors observed 8 adults, 7 juveniles, and 21 larvae during a 2004 baseline visual encounter survey at Rock Lake (12069) (Figure 2) – the only sign of breeding within the area. An 8 hour gill net set at Rock Lake yielded no fish; however a 9 hour net set at nearby Gold Lake captured 8 brook trout and indicated a self-sustaining fishery. While nearby Mud Lake may offer foraging and basking habitat to adult SNYLF, it is likely too shallow (1.5m deep) and simple (100% silt in the littoral zone) to provide breeding habitat. Additionally, Mud Lake is not hydrologically connected to Rock and Gold Lakes. Both Gold and Rock lakes are easily accessible via a short hike from Silver Lake trailhead and there is high recreational use at each site. Based on extensive surveys during the summer of 2002-2005, the small SNYLF population at Rock Lake is one of three documented lake-based populations in Plumas County. In accordance with the CDFW mission statement to balance native species diversity and recreational opportunity, Gold Lake (Figure 3) was identified as a potential restoration site for *Rana sierrae*.



Figure 2: Rock Lake looking southeast on 7/5/2012(CDFW).



Figure 3: Gold Lake looking east on 7/2/2012(CDFW).

FISH REMOVAL AT GOLD LAKE

In 2008 CDFW crews identified Gold Lake for fish removal for native species restoration. As of 2013 fish removal has not been implemented due to funding and personnel issues.

VISUAL ENCOUNTER SURVEYS AT ROCK LAKE

The baseline visual encounter survey was performed at Rock Lake (12069) in 2004 and 8 adult *Rana sierrae*, 7 juveniles and 21 larvae were observed. Ten years of monitoring data suggest that this population is stable, but low numbers of adults make deriving trends difficult (Figure 4). CDFW continues to monitor the site every other year.

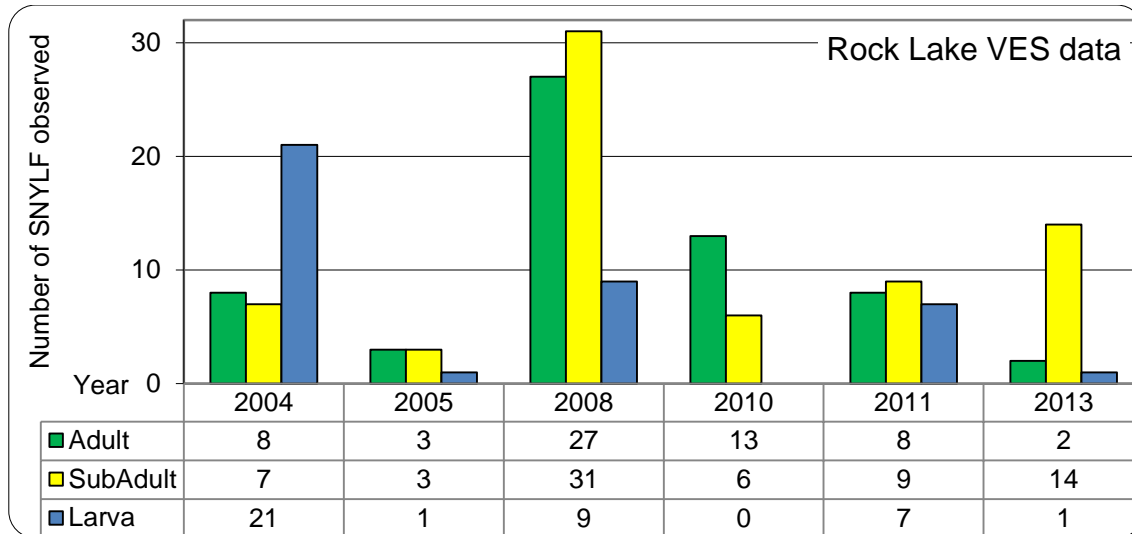


Figure 4: Visual encounter survey data by life stage and year at Rock Lake.

Part 2: *Rana sierrae* population monitoring at the Mount Pleasant population.

The second known SNYLF population in Bucks Lake Wilderness is located at the top of an unnamed drainage southwest of Mount Pleasant. CDFW survey crews observed breeding SNYLF at a single site in 2004. Subsequent monitoring surveys consistently observed SNYLF adults at two sites, 12049 and 12052 (Figure 5), and their tributaries. Dace (*Rhinichthys spp.*) were observed at 12049 – the lower site – and SNYLF tadpoles have not been documented there. Little data on the ability of SNYLF to persist in the presence of a population of small sized fish is available. Mechanical dace removal is currently not possible, therefore CDFW will continue to monitor this population.



Figure 5: Site 12052 (left) and 12049 looking north on 7/3/2012 (CDFW).

VISUAL ENCOUNTER SURVEYS AT MOUNT PLEASANT POPULATION

The baseline visual encounter surveys were performed in the Bucks Lake Wilderness in 2004 and 50 adult and 7 SNYLF larvae were observed in the headwaters of an unnamed stream consisting of three small ponds and their tributaries. Ten years of monitoring data suggest this population is in decline, although small numbers of adults make it difficult to derive trends (Figure 5). CDFW will continue to monitor this population.

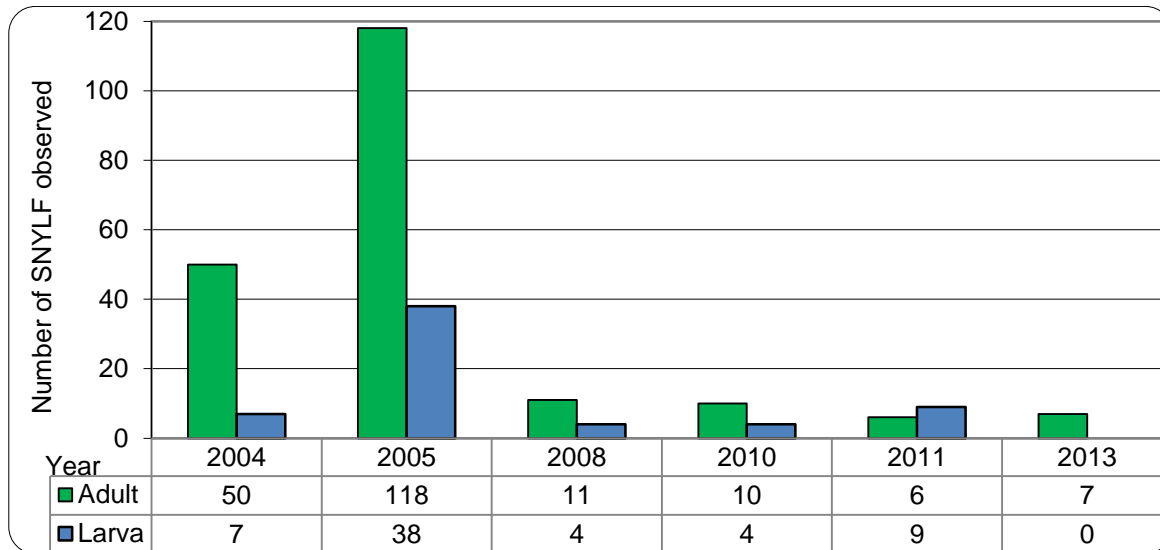


Figure 5: Visual encounter survey data displayed by life stage at Mount Pleasant Lakes from 2004 through 2013.

DISCUSSION

The Gold Lake fish removal project is mechanically feasible and straightforward. Fish removal is at a single lake and its small seasonal tributaries. Creating additional deep water habitat for the Rock Creek population is highly desirable due to the tiny number of lake-based SNYLF populations remaining in Plumas County. Fish removal at Gold Lake is complicated by the extreme popularity and accessibility of the lakes, making public outreach and education an important component of a successful restoration project in this area.