



Coastal Tailed Frog Surveys in Headwaters of the Rogue River, Crater Lake National Park, 2015–2018

The coastal tailed frog (*Ascaphus truei*) is an amphibian endemic to the Pacific Northwest and known to inhabit streams in the western portion of Crater Lake National Park (NP) (Farner and Kezer 1953). The frog is a federal Species of Concern and an Oregon Species of Greatest Conservation Need. [Coastal tailed frogs](#) are adapted to fast moving streams with shade and cold water (5–18.5 °C [41–65.3 °F]), and they tend to prefer old growth forest (Welsh 1990). The frogs only inhabit perennial streams, and they remain tadpoles for the first two to four years of life (Bury and Adams 1999). Throughout its range, the species can be adversely affected by changes in habitat, such as increases in sedimentation and temperature, and non-native species such as brook trout (*Salvelinus fontinalis*).

Studies published in 1953 and 2005 provided much of the available data on coastal tailed frogs in Crater Lake NP. Park biologists also observed coastal tailed frogs more recently, and the species has been observed occasionally by the NPS Inventory and Monitoring Program during surveys of wadable streams in the park.

In 2015, biologists set out to study the species' distribution and habitat relationships in a representative set of stream sites within headwaters of the Rogue River basin in Crater Lake NP. They conducted visual encounter surveys in the summer of 2015 and the fall of 2016, and environmental DNA (eDNA) surveys in 2015 and 2018.

How Did Researchers Study the Frogs?

Researchers chose 30 survey sites to represent the range of tributary streams in the study area and to facilitate comparison with previous and contemporary research projects. The stream and riparian ecosystems in the study area have been preserved within the park since 1902 and are largely pristine. Out of the 30 sites selected, researchers sampled 21 sites in the summer of 2015 and nine sites in the fall of 2016.

At each survey site, they conducted visual encounter searches of the stream substrate for 30 person-minutes. They found both tadpoles and adult frogs, which were held in plastic buckets with stream water until the end of the survey.



Researchers (the study authors) surveying for coastal tailed frogs in Trapper Creek. Photo credit: NPS / Duane Whitcomb

Researchers counted, weighed, and measured the frogs, then returned them to the stream near their capture location. Additionally, the researchers measured a suite of physical habitat attributes at each survey site. These included stream gradient, substrate size, density of riparian cover, water depth, channel width, and riparian vegetation type. They also recorded water temperature at 15 sites.

For the eDNA analysis, researchers filtered 5 liters (1.3 gallons) of stream water at 51 locations. The filters were later analyzed at the U.S. Forest Service National Genomics Center for Wildlife and Fish Conservation.

What Did the Surveys Reveal?

All visual detections were in the Castle Creek and Bybee Creek drainages (Figure 1). Researchers visually observed coastal tailed frogs at nine of the 30 sites surveyed. They found both adults (a total of three) and tadpoles (a total of 12). The greatest number of frogs (six juveniles and one adult) was found at one site on Trapper Creek, a tributary of Castle Creek. Coastal tailed frogs were found at sites from 4,725 ft in elevation, at the park boundary on Castle Creek, to 6,398 ft, at the highest site surveyed on Trapper Creek. Coastal tailed frogs were not observed in any of the forks of National Creek, Crater Creek, Copeland Creek, or one surveyed tributary of Red Blanket Creek.

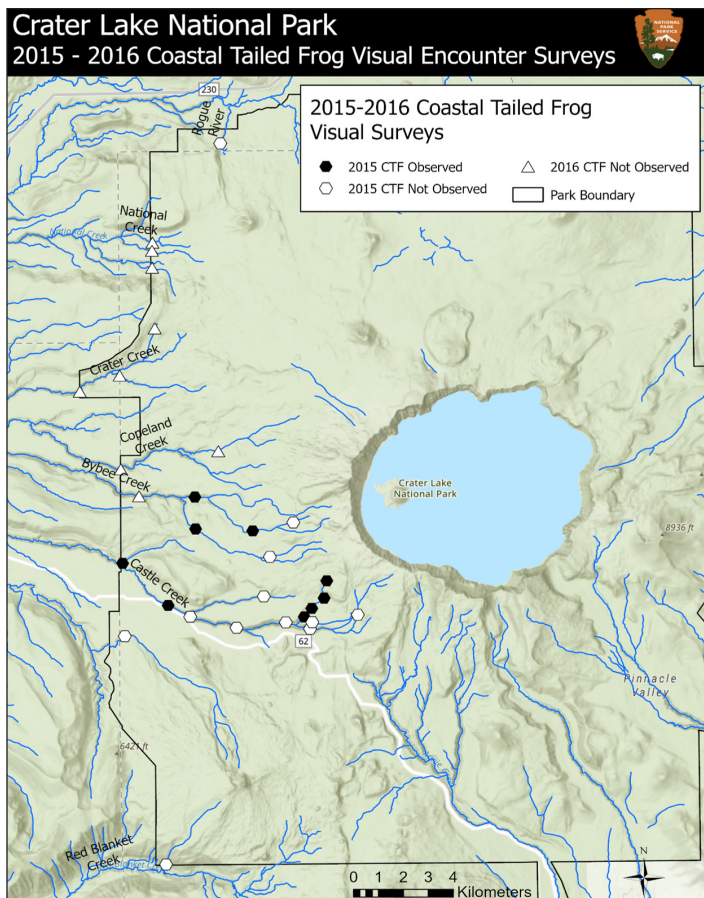


Figure 1. Map of 2015 and 2016 visual encounter survey sites in Crater Lake National Park. Black circles indicate sites where coastal tailed frogs were observed. White circles and triangles indicate sites where coastal tailed frogs were not observed. Figure credit: Hering and Whitcomb (2020)

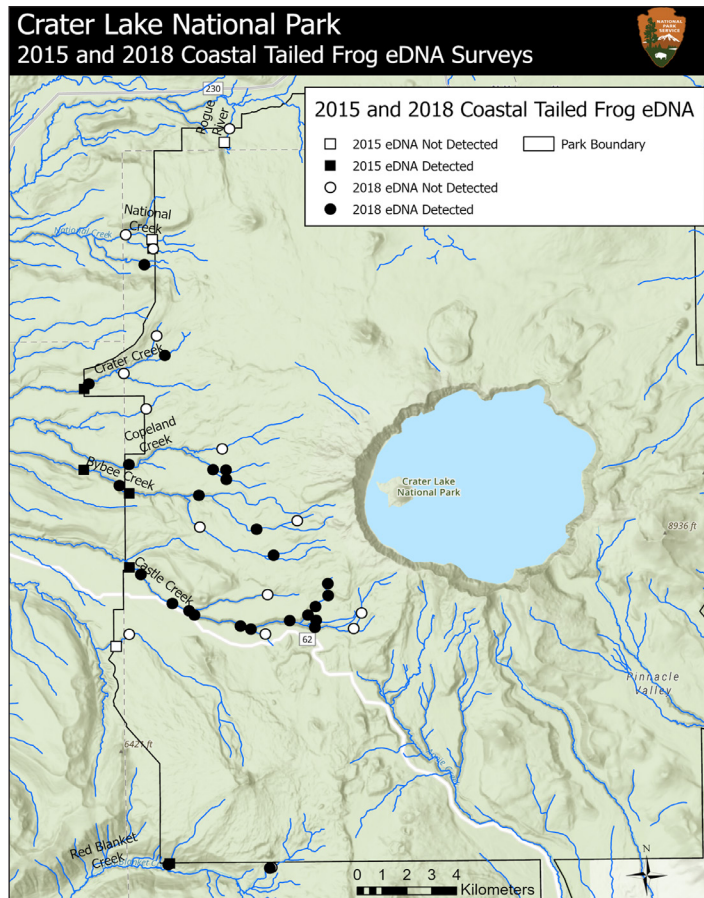


Figure 2. Map of 2015 and 2018 eDNA survey sites in Crater Lake National Park. Squares indicate 2015 sites, and circles indicate 2018 sites. Black squares and circles are where the species' DNA was detected, while white squares and circles are where the species' DNA was not detected. Figure credit: NPS

Researchers detected coastal tailed frogs more broadly through eDNA than through visual observations. Environmental DNA results suggested the species occurred in Red Blanket Creek, Copeland Creek, Crater Creek, and National Creek, in addition to the drainages where frogs were visually observed (Figure 2). Coastal tailed frog DNA was detected at six of nine sites (67%) sampled in 2015 and 28 of 42 sites (67%) sampled in 2018.

Summary and Recommendations

The work described here was the most comprehensive survey to date to specifically target coastal tailed frogs in Crater Lake NP. The results provide a baseline for future monitoring. Researchers made suggestions for additional surveys and monitoring, which include a more thorough evaluation of frog occupancy relative to water temperature and non-native fish density, and consideration of a long-term strategy for monitoring changes in coastal tailed frog abundance and distribution over time.

Literature Cited

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This Brief is Based on:

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