

Current Status of *Rana aurora*, *Rana boylei*, and *Bufo*
boreas at Pinnacles National Monument, California.

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INTRODUCTION

Field surveys to determine the current status and distribution of *Rana aurora* (red-legged frog), *Rana boylei* (yellow-legged frog), and *Bufo boreas* (western toad) were conducted at Pinnacles National Monument during July and August 1992 (five field days) and the spring and summer of 1993 (eight field days). The Monument is located in the southern portion of the Gabilan Range in west central California. It contains an area of approximately twenty-seven square miles and has an elevational range from 980 feet above sea level at the East Entrance Station to 3304 feet on North Chalone Peak. The majority of the Monument (roughly ninety percent) is in San Benito County. The remainder is in Monterey County, where surveys were not conducted due to an absence of suitable riparian habitat. Chalone Creek is the predominant drainage in the southern Gabilan Range and flows the length of the Monument from its northwest to southeast corners. The majority of the Monument's watershed drains into Chalone Creek. Chaparral is the dominant vegetation present. Riparian vegetation includes willow, cottonwood, sycamore, poison oak, berry, fern, and sedge. Table 1 outlines the riparian locations surveyed and summarizes the amphibian species documented at each.

The strategy of the field surveys was to target *Rana aurora* and *Rana boylei* and locate *Bufo boreas* on an incidental basis. Because of the Monument's small size and limited riparian habitat, this approach worked well. However, because *Bufo boreas* is less habitat specific than *R. aurora* or *R. boylei* and may occur in moist places without significant surface water, this species presence at isolated springs and other moist places where *R. aurora* or *R. boylei* were unlikely to occur was not investigated. The main creeks in Pinnacles draining into Chalone Creek are the West Fork of Chalone Creek, Bear Creek, and Frog Canyon Creek. The West Fork of Chalone Creek and Frog Canyon Creek are intermittent streams where a limited amount of surface water may be found during the dry season in isolated pools. Bear Creek is a perennial stream with beautiful plunge pools, however, some stretches of it lack surface water during the dry season and by late summer its flow is reduced to a trickle. Chalone Creek is both perennial and intermittent, depending on the reach. Deep, perennial pools are present along Chalone Creek and their structure and location may change after heavy winter rains. Bear Gulch Reservoir is located immediately upstream from the Bear Gulch Caves on Bear Creek.

Amphibian survey data sheets, individual maps with daily survey data, and a 7.5 USGS quad of Bickmore Canyon and North Chalone Peak with all of the distributional data gathered on target species during the course of this survey will accompany this report. Photographs documenting the locations surveyed and target species will also be included.

SURVEY METHODS

Riparian habitat with the potential for target species occurrence was identified by past field work, surface maps, an examination of the historical records for target species presence in the Monument (thanks to Mark Jennings), and an extensive knowledge of the Monument's geography and species habitat requirements prior to beginning this survey. Field work coincided with the period when target species were active and larval presence was at its peak.

Visual surveying was the method used to document species presence. This method is effective for the species under study and was successful in most of the riparian habitat surveyed because it was relatively uniform and visibility was generally not obstructed. Some reaches of Chalone Creek in the southern portion of the Monument were impossible to survey due to extremely dense vegetation and thick poison oak presented problems in lower Frog Canyon. The majority of the field work was diurnal, although some nocturnal work was conducted. On three occasions I surveyed a location on Chalone Creek where *R. aurora* is consistently encountered to compare daylight surveying to night spotlighting. On all of the occasions I observed more *R. aurora* during the daytime than at night. As a consequence, night spotlighting was not routinely conducted. Dip nets were used to capture and identify amphibian larvae and fish. Binoculars were of critical aid in locating and observing *R. aurora* in certain riparian situations where observer movement could easily frighten these frogs. Binoculars were also instrumental in making an accurate count of this species at some locations. Photographs were taken to document the riparian habitat surveyed and target species encountered.

A total of eleven sites were surveyed and most were sampled on a number of different occasions. The length of the sites varied considerably and with the exception of Bear Gulch Reservoir followed streamcourses. The shortest site was several hundred yards in length and the longest covered four miles. An amphibian survey data sheet was filled out each time a site was surveyed and distributional data was recorded on individual maps for each field day. Fishes were identified by Frank Glennon, Senior Aquatic Biologist at the Steinhart Aquarium. Field work was conducted under California Scientific Collecting Permit #0963 (1992) and #2432 (1993).

Abundant rains in February and March of 1992 and the December to March 1993 rains made it possible to successfully survey riparian habitat located in an area experiencing severe drought for several years. I have had over thirty years field experience with *Rana aurora*, *Rana boylei*, and *Bufo boreas* in central California and have had a strong interest in the herpetofauna of Pinnacles National Monument since my first visit to it on 18 August 1962.

RESULTS

During the course of field surveys *Rana aurora* was by far the most frequently encountered of the target species. In fact, disregarding larvae, *R. aurora* observations outnumbered those of any other amphibian species. *R. aurora* has a history of abundance in the Monument. Chalone Creek is the stronghold for *R. aurora* where the species is relatively abundant. Within the Monument it was observed at locations along the entire length of this drainage where surface water and the proper pool formation was present. In addition, *R. aurora* was documented on the West Fork of Chalone Creek, in Frog Canyon, and on lower Bear Creek. One large, deep pool on Chalone Creek where many *R. aurora* larvae and several adults were present in July and August of 1992 was almost totally silted in when examined on 3 May 1993. No *R. aurora* in any life cycle form was observed at this location during the 3 May field visit. All of the locations where *R. aurora* reproduction was recorded in the Monument were along Chalone Creek.

The presence of *R. aurora* at Chalone Creek is in direct contrast to its current status at Bear Gulch Reservoir and most of Bear Creek. During four field visits to Bear Gulch Reservoir and many field visits to Bear Creek upstream, downstream, and at Monument Headquarters, I saw no *R. aurora* or its larvae at locations where there are numerous historical records and voucher specimens of this species. On all of these field days *R. aurora*, including larvae, were observed at one or more locations along Chalone Creek. The shoreline in the vicinity of the dam at Bear Gulch Reservoir is heavily impacted by visitor presence and the same may be said for Bear Creek around the Bear Gulch Caves and the picnic area upstream from Monument Headquarters. On 15 August 1993 Bear Creek immediately downstream from the reservoir entering Bear Gulch Caves looked and smelled foul. The shoreline of Bear Gulch Reservoir away from the dam and its vicinity is not impacted by visitor presence. Larval and juvenile *Pseudacris* (= *Hyla*) *regilla* was the only amphibian species observed at the reservoir. Bear Creek itself in the vicinity of and downstream from Monument Headquarters is not impacted by human activities, however, its immediate uplands include paved roads, trails, and Monument facilities. *Pseudacris regilla* was the only amphibian species observed from these reaches of Bear Creek. One adult *R. aurora* was observed on lower Bear Creek not far upstream from its confluence with Chalone Creek. The impact of human activities on native Ranids in this portion of the Monument appears to be negative, however, it is difficult to explain the apparent absence of *R. aurora* at non-impacted portions of Bear Gulch Reservoir and the reaches of Bear Creek at and particularly downstream from Monument Headquarters where historical records indicate the species was at one time common.

Unlike *R. aurora*, voucher specimens for *Rana boylei* are few from the Monument. Habitat analysis indicates Bear Creek and possibly Frog Canyon Creek upstream from its confluence with Chalone Creek are the most suitable locations for occupation by

this species. Widespread *R. boylei* habitat is not present. In fact, this species current presence in the Monument is strongly in doubt. One location where historical records indicate both *R. aurora* and *R. boylei* were present, the "Caves of Pinnacles", no longer appears to support either of these species. If, as it is likely, *R. aurora* populations have disappeared from certain localities in the Monument where one or both of these species formerly occurred, the scarcer *R. boylei* has probably followed the same path. I observed no *Rana boylei* or its larvae during my field surveys at Pinnacles. During the 1992 and 1993 field seasons I documented *R. boylei* in most of the larger streams in southeastern San Benito County on herpetological field surveys for the Bureau of Land Management. On 14 and 15 August 1993 I searched for *R. boylei* intensely on Bear Creek from near its confluence with Chalone Creek upstream to Bear Gulch Reservoir. Late on the afternoon of 15 August 1993 I examined a stretch of Coyote Creek east of Gilroy in nearby Santa Clara County. In less than thirty minutes I observed over one hundred *R. boylei* (95 juveniles and 13 adults), so the species was active in the region during this time period.

Bufo boreas larvae were common along the reach of Chalone Creek between the bridge leading to Monument Headquarters downstream to its confluence with Frog Canyon Creek in early May 1993. Chalone Creek had continuous surface water at this time, unlike later visits. *Bufo boreas* is probably present along the length of Chalone Creek, however, certain reaches are more suitable for reproduction than others. A dead sub-adult *B. boreas* was found in a pool in lower Frog Canyon. I suspect *B. boreas* is present in most riparian habitat in the Monument to some extent.

Rana catesbeiana (bullfrog) was not found in Pinnacles National Monument. This is not only positive for the amphibian species present, but for the Monument's aquatic ecosystem as a whole. Feral pigs are present and the damage they do to stream structure is extensive. Shoreline damage was especially prevalent along Chalone Creek and Bear Creek covering large areas. At one location on the West Fork of Chalone Creek I had to throw rocks at a group of pigs drinking from a small pool before I could inspect it. *Rana aurora* was documented at the same pool later in the day. Shoreline disturbance by feral pigs and the destruction and reduction/elimination of shoreline vegetation which is characteristic of it probably increases the predation potential on *R. aurora*, particularly young of the year.

The threespine stickleback (*Gasterosteus aculeatus*) is abundant in Chalone and Bear Creeks. In addition to this California native, several introduced species of fish were found in the Monument. The Sacramento perch (*Archoplites interruptus*) was observed at several locations covering a considerable distance along Chalone Creek. Although this species is native to the Salinas and Pajaro River systems, its presence in the Monument has undoubtedly been aided by man (Jerry Smith, pers. comm.). The Sacramento perch has been introduced extensively into farm and stock ponds in California. Mosquito fish (*Gambusia*) were found in Chalone Creek downstream from its junction with Grassy Canyon. A specimen of both species was secured for identifica-

tion. On 14 and 15 August 1993 I observed two medium-size predatory fish at close range in a large pool on lower Bear Creek. These fish appeared to be members of the family Centrarchidae, which includes the sunfishes, bluegill, and Sacramento perch. There is potential predation from these non-native Monument fish species on amphibian larvae and their eggs.

Table 2 provides a checklist of the amphibian and reptile species observed in Pinnacles National Monument during the course of this inventory. I did not observe *Clemmys marmorata* (western pond turtle) during my field surveys, nor did I encounter any of the several species of *Thamnophis* (garter snakes) which occur in the Monument.

CONCLUSION

Rana aurora is relatively abundant in suitable habitat along Chalone Creek for its entire length through the Monument. The species is reproducing well in this drainage, as demonstrated by the number of larvae observed at numerous locations in 1992 and 1993. *R. aurora* is present in small numbers on the West Fork of Chalone Creek, lower Bear Creek, and lower Frog Canyon Creek. This species appears to now be very rare or absent in Bear Gulch Reservoir and along reaches of Bear Creek where the historical records indicate it was formerly common. The absence of *Rana catesbeiana* is positive for *R. aurora* and will continue to be unless *R. catesbeiana* gains access to the Monument at some future time. Chalone Creek is a potential introduction route for *R. catesbeiana*.

Rana boylei has historically been of limited occurrence in the Monument and is now either extremely rare or entirely absent from it. Suitable habitat for this species is likely confined to Bear Creek and possibly lower Frog Canyon Creek. It is possible that the creation of Bear Gulch Reservoir eliminated a reach of Bear Creek occupied by *R. boylei*. Field surveys failed to locate *Rana boylei* or its larvae in the Monument. The species is still abundant in streams in southeastern San Benito County. The locations where *R. aurora* and *R. boylei* have declined or may now be absent in the Monument are those most impacted by or within close proximity to human activities.

The distribution of *Bufo boreas* in Pinnacles National Monument is different than that of *R. aurora* or *R. boylei*. Due to the fact that *B. boreas* occurs in a great variety of riparian/wetland habitats, it has the potential to be present practically anywhere there is intermittent or perennial water or springs. *Bufo boreas* is relatively long-lived and during wet years probably accesses areas which would be difficult or impossible to reach otherwise. The species was found in lower Frog Canyon Creek and a careful search for larvae there was unsuccessful.

Pressure on the Monument's amphibian populations and aquatic environments by fish species not native to its waters and habitat disturbances by feral pigs can be reduced or eliminated by aggressive management actions to control and remove these threats. Management activities are currently being pursued to accomplish this goal and will require vigilance.

Table 1. Riparian locations surveyed and the amphibian species documented at each.

<u>Riparian Location</u>	<u>Amphibian Species Observed</u>
Chalone Creek, upstream from confluence with West Fork Chalone Cr.	<i>Rana aurora</i> <i>Pseudacris regilla</i>
Chalone Creek, downstream from confluence with West Fork Chalone Creek	<i>Rana aurora</i> <i>Bufo boreas</i> <i>Pseudacris regilla</i>
West Fork Chalone Creek (from Balconies)	<i>Rana aurora</i> <i>Pseudacris regilla</i>
Bear Creek	<i>Rana aurora</i> <i>Pseudacris regilla</i>
Bear Gulch Reservoir	<i>Pseudacris regilla</i>
Frog Canyon Creek	<i>Rana aurora</i> <i>Bufo boreas</i> <i>Pseudacris regilla</i>

Table 2. Checklist of the amphibian and reptile species observed during the course of this survey.

Amphibians

BUFONIDAE:

Bufo boreas - Western Toad

HYLIDAE:

Pseudacris regilla - Pacific Tree Frog

RANIDAE:

Rana aurora draytonii - Red-legged Frog

Reptiles

IGUANIDAE:

Sceloporus occidentalis - Western Fence Lizard

Uta stansburiana - Side-blotched Lizard

Phrynosoma coronatum - Coast Horned Lizard

TEIIDAE:

Cnemidophorus tigris - Western Whiptail

ANGUIDAE:

Elgaria multicarinata - Southern Alligator Lizard

COLUBRIDAE:

Masticophis lateralis - California Whipsnake

Diadophis punctatus - Ringneck Snake

VIPERIDAE:

Crotalus viridis oreganus - Western Rattlesnake