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REPORT AND FINDINGS
1994 AMPHIBIAN SURVEYS
PINNACLES NATIONAL MONUMENT,
CALIFORNIA

Prepared for:
National Park Service
Point Reyes National Seashore
Point Reyes, California

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INTRODUCTION

This survey was conducted at the request of Dr. Gary Fellers, Research Biologist for the National Biological Survey, Point Reyes National Seashore, California. The study is part of ongoing amphibian status surveys currently being conducted at, and in the vicinity of, California National Parks.

The purpose of this survey is:

- 1) to perform repeat field surveys of riparian habitat at Pinnacles National Monument, California, for the California red-legged frog (*Rana aurora draytonii*), foothill yellow-legged frog (*Rana boylei*), and western toad (*Bufo boreas*),
- 2) compare the survey results to data obtained from field surveys of these species in the Monument during the 1992 and 1993 field seasons, and
- 3) to identify any biological threats in the Monument's aquatic ecosystem which could negatively impact the amphibian populations present.

Amphibian field surveys were conducted at Pinnacles National Monument from July 25-27 and August 8-9, 1992 and May 2-3, June 6-7, July 17-18, and August 15-16, 1993. The result of this survey work was submitted to the National Park Service in report from October 1993. Eight days were spent conducting amphibian field surveys in the Monument during the 1994 field season, including five days in June and three days in September. In conjunction with surveys within the Monument, two control sites outside of it were examined for *Rana boylei*. Amphibian survey data sheets and maps with the distributional data obtained on the Monument's amphibian populations during 1994 will accompany this report. Table 1 outlines the riparian locations surveyed and summarizes the amphibian species documented at each.

FIELD METHODS

The survey methods employed in 1994 were essentially the same as those used in 1992 and 1993, however, the 1994 surveys had the knowledge benefit of the Monument's riparian habitat and amphibian distribution provided by the earlier field work. Visual surveying was the method used to document species presence and count larval, juvenile, and adult amphibians. Field data was recorded on Amphibian Survey Data Sheets and maps detailing specific occurrences. Field work was diurnal in nature, partly because past field work at one selected location on Chalone Creek produced more *Rana aurora* during the daytime than at night on the three occasions when daytime versus night survey comparisons were

made there. Diurnal surveys had logistical and safety advantages over nocturnal ones when topography, habitat, and distances were taken into consideration, as surveys were rarely conducted by more than one observer. Field work coincided with seasons when amphibians were active in the Monument's aquatic environments and when amphibian larval and juvenile presence were at or near their peak. Two control sites outside the Monument, one north and one south of it, were examined for *Rana boylei*. Both of the control sites were located on private property.

Dip nets were used to capture and identify amphibian larvae and fish. Field surveys conducted along Chalone Creek involved walking the survey reach in hip boots in mid-stream. Shoreline surveys were conducted at other riparian locations/survey reaches because hip boots were unnecessary or impractical. Binoculars were an important tool at some locations for counting and observing *Rana aurora* and *Clemmys marmorata* (western pond turtle).

A total of 11 sites were surveyed and most were sampled on several occasions. One site was surveyed in sequences and contained numerous reaches (1-5). The length of the sites varied (see data sheets) and, with the exception of Bear Gulch Reservoir, followed streamcourses. From a geographical standpoint, the 1994 field surveys overlapped most of the surveys conducted in 1992 and 1993. The 1994 survey efforts tended to focus on areas that had been productive for *Rana aurora* during the 1992 and 1993 field seasons. Field work was conducted under California Scientific Collecting Permit #2432.

SITE DESCRIPTION

Pinnacles National Monument is located in the southern portion of the Gabilan Range in west central California. The Monument includes an area of approximately twenty-seven square miles. The elevation ranges from about 800 feet above sea level at Chalone Creek's exit from the Monument at its extreme southeast corner to 3304 feet on North Chalone Peak. About ninety percent of the Monument is located in San Benito County and the remainder is in Monterey County. The largest drainage in the southern Gabilan Range is Chalone Creek, which flows through the Monument from its northwest to southeast corners. Most of the Monument's watershed drains into Chalone Creek, which contains both perennial and intermittent reaches. Within the Monument, the major tributaries of Chalone Creek are the West Fork of Chalone Creek, Bear Creek, and Frog Canyon Creek. The Monument's climate is characterized by hot, dry summers and cool, wet winters. Most of the precipitation occurs between November and April. Chaparral is the dominant type of vegetation present. Riparian vegetation includes willow, cottonwood, sycamore, poison oak, California blackberry, fern, and sedge.

RESULTS

Rana aurora was commonly encountered at Chalone Creek along survey reaches where suitable habitat for this species was present. Occupied reaches were generally characterized by perennial surface water with scattered, deep pools and abundant riparian vegetation. Emergent and/or floating vegetation was sometimes present. This species was documented at all of the locations surveyed along Chalone Creek which supported these conditions. During surveys in June, impressive numbers of adult and sub-adult *R. aurora* were observed in this drainage and the larvae of this species was very abundant. Frequently, adult and larval *R. aurora* were present in the same pools. Chalone Creek was the only location where *R. aurora* reproduction was recorded in the Monument during the course of the 1992, 1993, and 1994 field surveys. The early September surveys produced adult and juvenile *R. aurora* at numerous locations on Chalone Creek and many larvae of this species were nearing metamorphosis at that time. Aside from Chalone Creek, the only riparian location that produced *R. aurora* in 1994 was lower Bear Creek, where an adult was present in a large, deep, distinctive rock pool. During the course of the 1994 field surveys, a total of 70 adult, 14 sub-adult, over 96 juvenile, and over 3355 larval *Rana aurora* were recorded at Pinnacles National Monument. When the 1994 field data on *Rana aurora* is compared to 1992/1993 data, the distinction involves reproduction. Significantly greater numbers of *R. aurora* larvae were present along Chalone Creek in 1994. One might expect the reverse, as the winter of 1992-1993 had above average rainfall, while the winter of 1993-1994 had below normal rainfall. The wet winter of 1992-1993 was, however, preceded by several years of extreme drought in this part of California. Nevertheless, the *Rana aurora* population inhabiting Chalone Creek in the Monument appears to have had good reproductive success in 1992, 1993, and 1994. The number of adult *R. aurora* recorded along Chalone Creek in 1994 is consistent with the number recorded there during the 1992 and 1993 field seasons. Bear Gulch Reservoir and most of Bear Creek did not produce *R. aurora* during any of these years, although there are numerous historical records and voucher specimens from these locations. The habitat at Bear Gulch Reservoir looks unattractive for this species because of its' rocky, relatively steep open shoreline, however, historical records indicate it was at one time plentiful there. The historical records indicate *R. aurora* was present at Bear Gulch Reservoir until at least 1976. Human activities have impacted the riparian habitat at portions of these locations, however, the apparent absence of this species from non-impacted areas along Bear Creek and Bear Gulch Reservoir is puzzling. In 1993, *R. aurora* was confirmed on lower Frog Canyon Creek and the lower reach of the West Fork of Chalone Creek, but only one adult specimen was observed at each location. Chalone Creek probably serves as the population reservoir for the small number of *Rana aurora* present on lower Bear Creek, lower Frog Canyon Creek, and the West Fork of Chalone Creek.

Rana boylei was not recorded from Pinnacles National Monument during field surveys in 1992, 1993, or 1994. Although historically present, the species was apparently uncommon and not widespread. Bear Creek and lower Frog Canyon Creek are the most suitable locations for this species and intensive efforts were made to locate it there. The reach of Bear Creek that was eliminated by Bear Gulch Reservoir may have been occupied by *Rana boylei*. In 1993 and 1994, control sites known to support *R. boylei* were examined outside of the Monument in conjunction with field surveys for this species within its' boundaries. On each of the four occasions when control sites were examined, *Rana boylei* was immediately documented. In 1994 two control sites were utilized, one north of the Monument in southern Santa Clara County and the other south of it in central southeastern Monterey County. At this time, the occurrence of *Rana boylei* in the Monument is doubtful at best. This species was confirmed present and reproducing successfully at most of the larger streams in southeastern San Benito County during Bureau of Land Management field surveys in 1992, 1993, and 1994.

Moderate numbers of recently transformed *Bufo boreas* were recorded along the eastern shoreline of Bear Gulch Reservoir and Bear Creek at and immediately downstream from Bear Gulch Dam on 27 June 1994. When these locations were surveyed on 26 July 1992, 3 May 1993, and 6 June 1993, this species was not encountered there. The reach of Chalone Creek in the vicinity of the East Entrance Station that produced abundant *Bufo boreas* larvae on 2 and 3 May 1993 was void of surface water when examined on 11 June 1994. In 1993 *B. boreas* was confirmed on lower Frog Canyon Creek, but reproduction was not documented there. Because of the range of riparian and upland environments that *B. boreas* can occupy, this species presence in the Monument is not restricted to specific riparian habitat like *Rana aurora* and *Rana boylei*. *Bufo boreas* probably inhabits most of the riparian habitat in the Monument to some degree. This species presence at some locations may go unnoticed from year to year without frequent surveys. Data from the 1993 and 1994 field seasons indicate this species is reproducing in the Monument at a number of locations, including Chalone Creek, Bear Creek, and Bear Gulch Reservoir. *Pseudacris regilla* (Pacific tree frog) is common and widespread throughout riparian habitat in the Monument and was recorded reproducing at the West Fork of Chalone Creek, Bear Creek, Frog Canyon Creek, Chalone Creek, Moses Springs, and Bear Gulch Reservoir.

The 1994 field surveys produced three species of aquatic/riparian oriented reptiles that were not encountered during the 1992 or 1993 seasons. On 26 June 1994 two *Thamnophis atratus* (western aquatic garter snake) were observed, captured, and released at Chalone Creek near the South wilderness Trail's second crossing of this drainage downstream from its' confluence with Frog Canyon. One of these specimens, an adult individual, was observed hunting *Rana aurora* larvae on the bottom of a pool and the other, a sub-adult, had just eaten an adult three-spine

stickleback. On 5 September 1994, an adult *Thamnophis atratus* was observed hunting on the bottom of a pool containing *R. aurora* larvae downstream from the above location. Two *Thamnophis sirtalis fitchi* (valley garter snake) were located at Chalone Creek in the vicinity of the bridge leading to Monument Headquarters. One had been killed by an automobile at this bridge on 12 June 1994 and was preserved. The specimen was deposited in the California Academy of Sciences' Department of Herpetology research collection (catalog # 195939). On 13 June 1994, an adult *Clemmys marmorata* (western pond turtle) was observed in a pool at Chalone Creek about one quarter mile downstream from its' confluence with the West Fork of Chalone Creek. The observations of these species at Chalone Creek in 1994 demonstrates the importance of repeat surveys, as this stream was surveyed extensively in 1992 and 1993, but none of these species were documented. Table 2 provides a checklist of the amphibian and reptile species observed during the 1994 field season.

Several biological threats to amphibian populations were identified in the Monument's aquatic ecosystem. The Sacramento perch (*Archoplites interruptus*), although native to the Salinas and Pajaro River systems, has undoubtedly accessed Monument waters with man's help (Jerry Smith, pers. comm.), as this species has been extensively introduced into stock and farm ponds in California. Stock ponds in the upper reaches of the Chalone Creek drainage outside the Monument are the likely source of this species. It was documented at several reaches along Chalone Creek upstream from Willow Spring (specimen, identified by Frank Glennon, Steinhart Aquarium, San Francisco, Calif.), at Chalone Creek where the North Wilderness Trail crosses it below Willow Spring (specimen), and field observations indicate it is present downstream in this drainage at least to the reach in the vicinity of the bridge leading to Monument Headquarters. One pool approximately 100 yards upstream from this bridge contained about 150 *Rana aurora* larvae when surveyed on 25 July 1992, at which time the threespine stickleback (*Gasterosteus aculeatus*) was the only fish species observed there. When this pool was re-surveyed on 17 July 1993 and 11/12 June 1994, a number of large fish, apparently Sacramento perch, were present in it and no *Rana aurora* larvae were observed. *Rana aurora* larvae were present in pools and channels immediately upstream and downstream from this pool, where the only fish observed were stickleback. On 4 September 1994, Sacramento perch and *Rana aurora* larvae were documented from the same pool at Chalone Creek below Willow Spring. Mosquitofish (*Gambusia affinis*) were recorded from reaches of Chalone Creek downstream from its' confluence with Frog Canyon. *Rana aurora* and mosquitofish were found in association and mosquitofish outnumbered native stickleback at some locations. While larvae-sampling, some *Rana aurora* larvae appeared to have areas of their fins eaten away. Mosquitofish have been documented to feed on and incapacitate *R. aurora* larvae by eating their fins. The establishment of these species in the Monument appears to have had at least some adverse effects on

R. aurora larvae in portions of Chalone Creek. Feral pigs are present in the Monument and negatively impact its' riparian habitat. During the dry season these animals have the potential to concentrate their activities in riparian habitat to areas where surface water is present and do damage to shoreline structure and vegetation. Areas along Chalone Creek where surface water is present in the dry season tend to be occupied by *R. aurora*. These activities by feral pigs can negatively impact stream equilibrium and *Rana aurora* habitat, and probably increase the predation potential on *R. aurora*, especially young of the year. Management is currently conducting a feral pig control campaign in the Monument. Greater feral pig damage to riparian habitat was noted in the Monument in 1993, as opposed to 1994.

SUMMARY FOR MANAGEMENT REVIEW AND ASSESSMENT

Rana aurora draytonii, the California red-legged frog, is relatively abundant at Pinnacles National Monument along Chalone Creek where suitable habitat is present to support it. The species appears to no longer be present at Bear Gulch Reservoir and most of Bear Creek. The U.S. Fish and Wildlife Service has proposed listing *Rana aurora draytonii* as endangered under the Endangered Species Act (Federal Register/Vol.59, No.22/February 2, 1994/Proposed Rules). The predacious Sacramento perch and mosquitofish, species not native to the Monument, inhabit reaches of Chalone Creek and at least one of these species might be found at any given perennial reach of this drainage for its' entire length through the Monument. These species have the potential to negatively impact the *Rana aurora* population at Chalone Creek, the remaining stronghold of it in the Monument. Researchers have noted an inverse correlation between the abundance of introduced fish species and *Rana aurora*.

Rana boylei, the foothill yellow-legged frog, was not documented at Pinnacles National Monument during field surveys in 1992, 1993, or 1994. Historical records indicate the species was uncommon and not widespread in the Monument. This species is still abundant in suitable riparian habitat in the Diablo Range of west central California.

Bufo boreas, the western toad, is probably present in most of the riparian habitat at Pinnacles to some degree. The species is not restricted to specific riparian habitat like *Rana aurora* and *Rana boylei*. Field survey data indicate it is reproducing at a number of locations in the Monument.

Feral pigs cause damage to riparian habitat in the Monument by disturbing stream shorelines and destroying shoreline vegetation. These activities can adversely impact stream equilibrium and aquatic organisms. If water releases from Bear Gulch Dam are necessary for maintenance purposes, the timing should coincide, if possible, with the winter season when eggs, larval, or juvenile amphibians are least likely present downstream in Bear Creek.