National Park Service
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Inventory of Riparian Areas at Pinnacles National Monument

The Question: *What species are supported by the streams and ponds at Pinnacles National Monument?*

Pinnacles National Monument is located within the Salinas River Watershed and is very popular with climbers and hikers. The Monument is an area of steep terrain at the end of the Gabilan Range, and is named for its beautiful rocky peaks, known as pinnacles. Several habitat types are represented at Pinnacles; the dominant vegetation type is chaparral and there are also grasslands, oak woodlands, and some riparian habitat including streams and ponds.



Western toad and Western toad tadpoles documented through inventory of riparian areas at Pinnacles

Although riparian areas do not represent a large proportion of the Monument, they are extremely important to the species that live within and around them. The most developed areas in the park lie within the riparian zones, jeopardizing their health. Also, the headwaters of Pinnacles' streams are outside the monument, and so are subject to contamination before ever reaching the park.

The Project: *Inventory vertebrate and invertebrate species within all riparian areas which are permanent and intermittent.*

An inventory of the species that occur in the riparian areas of Pinnacles National Monument was conducted in 2001- 2004. Surveyors implemented visual counts of all vertebrate species within 1 m of a riparian area. GPS locations were marked for red-legged Frogs and Southern Pacific pond turtles. Aquatic invertebrates were sampled using a variety of methods including dipnets, forceps, aspirators, kicknets, aerial nets, and blacklight traps. These devices captured invertebrates in the water, on the banks, and flying in the air. Eleven different specialists identified collected specimens.



Diablo Range gartersnake, a rare find along Pinnacles streams.

The Results: *A completed inventory showed scientists that the vertebrate species composition has experienced only some change since the last inventory, and included some other points of interest.*

Nearly 250 species of aquatic invertebrates were documented, including 38 dragonflies and damselflies. The inventory for the invertebrates is likely less than 50% complete which is not uncommon for these types of inventories. Such small creatures are hard to find. But, there were suggestions listed by the researches as how to improve the completeness of future inventories and how to amplify awareness of possible future invasive species.

The Results (continued):

Points of Interest:

- Although the vertebrate species composition appeared not to have changed within the last forty years of the Monument's history, some invasives have been eradicated and the federally Threatened red-legged frog has declined. However, the red-legged frog has recently been re- established at the Bear Gulch Reservoir and has begun breeding there.

- Two groups, the *Eremidrilus* worms and *Hydropsyche* caddisflies, showed unusually high diversity. Investigating how these closely related species can coexist in such a small area is an intriguing avenue for further research, the results of which may shed light on the complexities of stream habitats at Pinnacles.

- The Pinnacles riffle beetle, endemic to Pinnacles and surrounding areas, was found to be more widespread within the Monument than was previously thought. But, it may be vulnerable to water pollution and disturbances to natural stream processes emanating from developed areas within and outside the Monument.

- Re-introduction is planned for the foothill yellow-legged frog, which will hopefully help the populations of the Diablo Range garter snake, which feeds on it, and the two-striped garter snake which often co-occurs with the frogs.



The inventory of riparian areas also documented invasive species such as the mosquitofish, a harmful aquatic found within Pinnacles National Monument streams.

Additional Resources

Wildlife of Pinnacles, with links to checklists and information on fish, amphibians, reptiles, dragonflies, and damselflies: http://www.nps.gov/pinn/naturescience/animals.htm

San Francisco Bay Area Inventory and Monitoring Program: www1.nature.nps.gov/im/units/sfan/index.htm

For More Information

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The Pacific Coast Science and Learning Center is one of 15 centers across the country working to increase the effectiveness and communication of research and science results in the national parks by facilitating the use of parks for scientific inquiry, supporting science-informed decision making, communicating relevance and providing access to research knowledge, and promoting resource stewardship through partnerships.